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Time Frame and Process of Language Decline in Displaced Tai Yuan: Studies from Ancient Manuscripts

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Abstract: Approximately 5,000 Tai Yuan people live among Central Thai speakers in Don Rae Sub-district, Mueang Ratchaburi District, Ratchaburi Province, Central Thailand. Their ancestors were displaced from Chiang Saen (in present-day northern Thailand), following the Burmese Siamese War in 1804. After more than two centuries living alongside the Central Thai-speaking majority, the Tai Yuan language has inevitably been influenced by the dominant language. This study examines the time frame and process of language decline in the Tai Yuan community of Don Rae Sub-district following migration, using evidence from linguistic changes and cultural changes in traditional scribal conventions. It draws data from colophons of 56 Tai Yuan palm-leaf manuscripts preserved in Don Rae Sub-district. Linguistic and palaeographic approaches are employed to analyze changes in phonology, lexicon, orthography, letterforms, and dating conventions. The results show that, in the first 50 years after migration, no clear evidence of language decline is observed. Around 50-60 years after migration, Central Thai influence emerged through loanwords and a shared month-counting system, followed by gradual changes in orthography, letterforms, and phonology under the influence of Thai and Dhamma Lao scripts. The Lan Na-based month system later faded and was replaced by the official Siamese calendar. By approximately 150 years after migration, the Tai Yuan script had completely disappeared from written evidence, reflecting a gradual, multi-dimensional language decline affecting both linguistic features and the writing system. This study proposes a manuscript-based chronological model for analyzing language decline in displaced communities, offering insights into language maintenance and revitalization.
Keywords: language decline, Tai Yuan language, ancient manuscripts, displaced community

Thailand, located at the center of Mainland Southeast Asia, one of the most linguistically complex regions in the world, has over 70 living languages from five major language families. Despite this diversity, Standard Thai serves as the official national language (Premsrirat, 2011, p. 55). Among these languages, Smalley (1994) classifies the languages of Thailand into four

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hierarchies: the national language, or Standard Thai[2]; regional languages with four varieties: Central Thai, Northern Thai or Kammüang or Tai Yuan, Northeastern Thai or Isan, and Southern Thai or Paktay; marginal regional languages, which are spoken by minority groups residing in border areas while their native speakers also reside in other countries, such as Northern Khmer and Pattani Malay; and other categories of languages with four subcategories: enclave, town and city, marginal, and Displaced Tai (p. 69).

Tai Yuan people residing in Don Rae Sub-district, Mueang Ratchaburi District, Ratchaburi Province, located in the central area of Thailand[3], are a group of displaced Tai, with approximately 5,000 people (Don Rae Subdistrict Administrative Organization, 2025). They are displaced from the majority Tai Yuan group, which constitutes the majority ethnic group in northern Thailand, a region that historically formed the core of the Lan Na Kingdom. In 1804, King Rama I (Phutthayotfa Chulalok) of the Chakri dynasty ordered the forced relocation of Tai Yuan people from the ancient city of Chiang Saen[4] after its recapture from Burmese rule. Many were resettled in central Thailand, and those assigned to the Bangkok royal army were eventually moved to areas along the Mae Klong River in Ratchaburi, where they became the ancestors of today's Tai Yuan communities (Somporn, 1997, p. 8). The Tai Yuan people of Don Rae Sub-district have lived among Central Thai people, particularly the Ratchaburi Thai people, who constitute the majority in the area. Additionally, Lao Wiang people, immigrants from Vientiane, Laos, reside nearby. This group was captured around the same time as the Tai Yuan people, also as a result of warfare (Burusphat et al., 2011, p. 98).

The linguistic identity of the Tai Yuan people in this area is fragile and concerning. The researcher's project, "Conservation of Ancient Manuscripts," was conducted between 2021 and 2025. It was observed that the Tai Yuan language spoken here has diverged from that spoken in northern Thailand. In terms of lexicon, a study by Saraporn (1988) found that speakers across all age groups tend to replace Tai Yuan lexical items with non-Tai Yuan forms, while a portion of the original lexicon has fallen out of use, largely due to the influence of Standard Thai. Somporn (1997, p. 18) also observed that children and teenagers in Don Rae Sub-district no longer speak Tai Yuan in their daily lives and adopt the Ratchaburi variety of Central Thai language as their mother tongue. As for the written language, the community traditionally used Tai Yuan script or Dhamma Lan Na script. Evidence gathered during the author's 2025 fieldwork revealed the preservation of ancient manuscripts in two local temples and identified only one elderly community member who retained full proficiency in reading and writing the script, underscoring the severe erosion of intergenerational transmission of Tai Yuan literacy. The current condition of the Tai Yuan language may therefore be characterized as language decline, which could eventually lead to language shift and language death.

Despite a growing body of research on language decline, previous studies have rarely traced the process over a sufficiently long temporal scale to identify the precise onset of decline or the

[2] In fact, Standard Thai is based on a variety of Central Thai, namely the Bangkok dialect. As the capital of Thailand, Bangkok Central Thai has been designated as the standard and official language for communication and has been adopted as the medium of instruction in the national education system.

[3] The Central Region of Thailand can be divided into three parts: the eastern part, which extends from inland to the east coast; the western part, which connects to the border of Myanmar; and the inner part, which is the river basin and the central plain of the country (Premsrirat, 2004, p. 155). Ratchaburi Province, located in the western part, is classified as part of the Western Region by some government agencies, such as the Royal Institute of Thailand, primarily based on its location. However, in this study, Ratchaburi Province is defined as part of the Central Region because the language and culture of the majority of people in the area do not differ from those of Central Thai people.

[4] The area is in the present-day Chiang Saen District, Chiang Rai Province, the northernmost province of Thailand.

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chronological sequence in which different linguistic subsystems deteriorate. This limitation is largely due to the scarcity of longitudinal empirical data collected consistently from the same speech community over extended periods. Consequently, the internal dynamics and staged development of language decline, particularly at the structural level, remain poorly understood.

To address this gap, this study draws on the researcher's long-term engagement with the displaced Tai Yuan community in Don Rae Sub-district, as well as a substantial corpus of ancient manuscripts preserved within the community. It aims to establish a chronological framework for the onset of language decline following migration and to reconstruct the sequential changes across different linguistic domains. The analysis combines linguistic and palaeographic approaches[5] based on Tai Yuan manuscripts written in the traditional script. Importantly, this study proposes a methodological model for investigating language decline through dated written evidence, rather than treating the case as a purely descriptive account of a single community. This model demonstrates how chronologically anchored manuscript data can be systematically used to trace staged linguistic change over time. The findings are expected to provide a model of language decline among displaced or marginalized ethnic groups in a broader context. In addition, they may offer practical insights for the development of local language revitalization strategies and inform related policy directions.

Origin of Tai Yuan in Don Rae Sub-district

The Tai Yuan, or Yuan, constitutes the majority population in northern Thailand, a region that was formerly part of the Lan Na Kingdom. Today, Tai Yuan people in the north commonly refer to themselves as Khon Müang, while those residing in other regions continue to identify as Tai Yuan or Yuan, with a population of over 7.7 million people (Joshua Project, 2025). Historically, the Tai Yuan people were not confined to northern Thailand. In 1804, King Rama I of the Chakri dynasty ordered the forced relocation of Tai Yuan inhabitants from the ancient city of Chiang Saen, which had been under Burmese control and served as a major stronghold since the early eighteenth century. Following its recapture by five Siamese armies, approximately 23,000 residents were taken captive and distributed among the Bangkok royal army, as well as the Lampang, Chiang Mai, Nan, and Vientiane forces. Those assigned to the Bangkok royal army were initially settled in Sao Hai District, Saraburi Province, while others were brought to Bangkok and later resettled along the right bank of the Mae Klong River in Ratchaburi Province. These resettled populations became the ancestors of present-day Tai Yuan communities in Ratchaburi (Somporn, 1997, p. 8). One such community is located in Don Rae Sub-district, Mueang Ratchaburi District, approximately 12 kilometers southwest of Ratchaburi city, as shown in Figure 1. Established by migrants from Chiang Saen in the early nineteenth century, the community comprises ten villages and two temples: Wat Na Nong and Wat Thung Ya Khom Bang.

[5] A Palaeographic approach is a method of studying ancient scripts through the analysis of their forms, features, and development, in order to read, transcribe, date, and interpret documents or inscriptions.

Figure 1
Map of Don Rae Sub-district, Mueang Ratchaburi District, Ratchaburi Province, Thailand

Linguistic Profile of the Tai Yuan Language

The Tai Yuan language belongs to the Tai subfamily of the Kra-Dai language family and is known by many names, such as Lan Na, Northern Thai, or Kam Müang. It also includes a number of sub-dialects. In terms of dialect, the language can be classified into two main groups: Western Tai Yuan and Eastern Tai Yuan. In terms of lexicon, it can be classified in detail based on provinces; the lexical items used in each area are distinct and unique to speakers' respective areas of residence (Naksuk, 2018; Rungraungsri, 2003). From a study by Naksuk and Suksai (2024, p. 58) on tones and lexicons, it was found that the Tai Yuan language used in Don Rae Sub-district resembles that of Phrae. It can be speculated that Tai Yuan people in this area are more closely related to Tai Yuan speakers in Phrae than those in other areas.

Literature Review

Tai Yuan and Standard Thai Phonology

Previous studies on Tai Yuan phonology, including consonants, vowels, and tones, have examined various dialects across different regions, particularly in northern Thailand. Similar studies have also been conducted in the central region, including the dialects of Nakhon Pathom (Thianthaworn, 1998), Saraburi (Chaokhamin, 1988), Lopburi (Khanittanan, 1973), and Ratchaburi (Saraporn, 1988; Sila, 1975). Saraporn (1988) comprehensively examined the phonology of the Tai Yuan dialect of Don Rae, including single initial consonants, consonant clusters, final consonants, vowels, and tonal system consisting of four tones. However, the researcher's fieldwork identified six tones, corresponding to the findings of Naksuk and Suksai (2024); therefore, the tonal analysis in this study follows the latter. The Tai Yuan dialect of Don Rae consists of 21 single initial consonant phonemes: /p, t, c, k, ʔ, p^h, t^h, c^h, k^h, b, d, f, s, h, m, n, ɲ, ŋ, l, w, j/; two consonant clusters: /kw/ and /k^hw/; nine final consonant phonemes: /p, t, k, ʔ, m, n, ŋ, w, j/; 18 monophthongs: /i, iː, ɨ, ɨː, u, uː, e, eː, ə, əː, o, oː, ɛ, ɛː, ɔ, ɔː, a, aː/; three diphthongs:

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/ia, ɨa, ua/; and six tones: mid-falling [^{331}] (/^{0}/), low-level [^{22}] (/^{1}/), high-rising-falling [^{451}] (/^{2}/), high-falling [^{442}] (/^{3}/), low-rising [^{25}] (/^{4}/), and mid-rising with glottal closure [^{34ʔ}] (/^{5}/).

Standard Thai phonology, based on Naksakul (2013), shares many similarities with the Tai Yuan dialect of Don Rae, including the same nine final consonant phonemes, 18 monophthongs, and three diphthongs. However, the two systems differ in several respects. Standard Thai features /r/ but lacks /ɲ/, whereas the Tai Yuan dialect of Don Rae features /ɲ/ but lacks /r/. The phoneme /c^{h}/ found in the Don Rae dialect does not occur in northern Tai Yuan dialects and may reflect the influence of Central Thai or Standard Thai. In addition, Standard Thai contains 11 consonant clusters: /pr, p^{h}r, pl, p^{h}l, tr, kr, kl, kw, k^{h}r, k^{h}l, k^{h}w/, whereas the Tai Yuan dialect of Don Rae contains only /kw/ and /k^{h}w/. The tonal systems also differ in number, with six tones in the Tai Yuan dialect of Don Rae and five tones in Standard Thai: mid-level tone [^{33}] or /^{0}/, low-falling tone [^{21}] or /^{1}/, high-falling tone [^{51}] or /^{2}/, high-level tone [^{44}] or /^{3}/, and low-rising tone [^{25}] or /^{4}/.

Tai Yuan Lexicon

Tai Yuan and Standard Thai belong to the same language family; however, there are significant differences in many aspects. Smalley (1994) and Wimonkasem (2012) pointed out that Tai Yuan differs from Standard Thai in phonology, grammar, and lexicon. Even though some lexical items are comparable to those in Standard Thai, many others show little similarity or are completely different. For example, the word ‘mosquito net’ is /muŋ^{3}/ in Standard Thai but /sut^{4}/ in Tai Yuan; ‘twenty’ is /ji:^{2}-sip^{1}/ in Standard Thai but /sa:w^{0}/ in Tai Yuan. In some cases, similar words have different meanings or may even be contradictory; for example, /p^{h}ɛ:^{3}/, meaning ‘lose’ in Standard Thai, resemble /pɛ:^{3}/, meaning ‘win’ in Tai Yuan, which may cause semantic confusion.

During the past decades, the Tai Yuan lexicon has been systematically documented in numerous dictionaries. A notable example is the dictionary by Rungruangsri (2004), which contains 26,262 entries. This provides empirical evidence that the Tai Yuan language possesses an extensive lexicon and distinctive linguistic features.

The Writing System of Tai Yuan

Tai Yuan Script

The Tai Yuan script originated in the Lan Na Kingdom and is generally believed to have developed from the ancient Mon script of the Hariphunchai Kingdom between the eleventh and twelfth centuries (Grabowsky, 2022b, p. 146). In Thailand, the script is commonly referred to as the Dhamma Lan Na script because of its close association with Buddhist manuscripts. It is also known by several other names, including Tham Nüa, Tua Müang, and Lan Na Thai script. The script spread beyond the Lan Na Kingdom to Lan Xang and parts of northeastern Thailand, where related forms became known as Dhamma Lao and Dhamma Isan scripts. Other Tai groups influenced by Lan Na also adapted the script, resulting in regional variants such as Dhamma Khün and Dhamma Lü. Because these writing systems share a common origin, they are collectively classified as Dhamma scripts (Wimonkasem, 2009, p. 103).

Manuscripts found in Don Rae Sub-district show that the Tai Yuan script coexisted with Thai, Khom Thai, and Dhamma Lao scripts, reflecting historical interaction among Tai Yuan, Lao, and Central Thai communities (Naksuk & Suksai, 2024, p. 71). Thai and Khom Thai scripts were

primarily associated with Central Thai groups. The Thai script corresponds to the present Standard Thai script, whereas the Khom Thai script resembles the ancient Khom script but was modified to accommodate the Thai phonological system (Wimonkasem, 2009, p. 15). The Dhamma Lao script, used among Lao ethnic groups, developed from the Dhamma Lan Na script and exhibits distinctive letterforms and orthographic conventions. Such contact among different linguistic communities also contributed to occasional borrowing of orthographic features across writing systems. Although the forms of individual letters vary across manuscripts and textbooks due to differences in handwriting styles and scribal conventions, the overall orthographic structure remains relatively consistent. Examples of consonants, vowels, diacritics, and numerals in the Tai Yuan script are provided in Appendix A.

Tai Yuan Orthography

Orthography refers to the set of norms or conventions for writing a language, including correct spelling, punctuation marks, and numerals. The orthographic features of Tai Yuan show both similarities and differences with those of Thai. Regarding the differences, many Tai Yuan letterforms are entirely distinct from those of Thai. Moreover, subjoined consonants were used both as cluster-forming consonants and as final consonants, along with the use of above-base vowels, which are not found in Standard Thai orthography. However, the two systems share some features, for example, a three-class consonant system: high, mid, and low consonants. This feature is also associated with the tonal system. In addition, flexible spelling is identified in ancient manuscripts written in both systems, often reflecting spoken language or the preferences of scribes in that period.

Traditional Tai Yuan Dating Conventions in Tai Yuan Colophons

Hundius (1990) explains that colophons in Tai Yuan or Lan Na manuscripts are notes written by scribes at the end of manuscripts using the Tai Yuan script, often recording the date, place of writing, names of scribes and benefactors, religious expressions, and personal reflections. Although colophon content varies, traditional Tai Yuan dating conventions remained relatively consistent among both Northern Thai and displaced Tai Yuan communities. Payaksri (2025), in a study of manuscripts from Wat Mai Nakhonban in Ratchaburi Province, where the Tai Yuan community also traces its ancestry to Chiang Saen, identified the continued use of traditional systems such as Chula Sakarat (C.S.), Pi Hon Tai, and Lan Na-based months. He argues that these conventions reinforced Tai Yuan identity and reflected resistance to assimilation into the Siamese temporal system, although increasing use of Siamese dating practices suggests their gradual decline.

Chula Sakarat (C.S.), or the Little Era, differs from the Common Era by 639 years and was widely used in Lan Na, Sukhothai, and Myanmar (Eade, 1995, p. 17). It is believed to have been adopted from Myanmar due to long-standing cultural relations and Burmese rule over Lan Na (Pongsripian, 2009, p. 67). In Thailand, it was abolished in 1889 and replaced by the Rattanakosin Era, while the Buddhist Era became the principal chronological system in 1912 (Mernshastara, 1977, pp. 222–223).

Pi Hon Tai is an older Tai dating system based on the sexagenary cycle and predates other eras used among Tai groups (Mernshastara, 1977, p. 47). Each year is identified by combinations of ten Mae Pi and twelve Luk Pi terms, creating a 60-year cycle (Eade, 1995, p. 24).

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Lan Na-based months, often called "Duean Nuea" (northern months), follow a lunar system that is two months ahead of that used in Central Thailand (Eade, 1994, p. 49). For example, the tenth month in the Central Thai system corresponds to the twelfth month in the Lan Na system.

Time Frames and Processes of Language Decline and Attrition[6]

Studies on the time frames and processes of language decline and attrition remain limited. Hulsen (2000) found that L1 lexical knowledge could be retained for more than 40 years, although intergenerational language shift to L2 caused gradual language loss. Schmid (2008, p. 9) noted several unsupported beliefs about attrition, such as the idea that attrition mainly occurs within the first 10 years after migration or is strongest when two languages are either very similar or very different. Schmid (2011, pp. 74–75) argued that attrition is gradual and non-linear, but important changes often occur within the first decade after migration; for example, some migrants used L2 more frequently than L1 within seven years. He (2016, pp. 4–5) also emphasized that attrition may occur across periods ranging from a few months to several decades. A four-year study, for instance, found no attrition in the first year but lexical attrition in the second year.

Regarding the process of language attrition, Dorian (1973, pp. 413–414) found that speakers of Scottish Gaelic were most aware of lexical decline, less aware of morphological change, and least aware of phonological erosion. Benmamoun, Montrul, & Polinsky (2013) showed that phonology is usually the most preserved linguistic component, while verbs are retained better than nouns because they are fewer and easier to recall. Basic syntactic structures and word order are also more resilient than complex structures. Schmid (2011, pp. 22–23) further noted that lexical borrowing and code-switching from L2 into L1 are common among migrants due to more precise meanings, new concepts, or gaps in L1 vocabulary. For example, speakers may use an L2 word when they cannot retrieve its L1 equivalent. However, lexical borrowing alone is not direct evidence of language attrition unless L2 words frequently replace L1 forms. Similarly, Seifart (2019) proposed that some linguistic features are more susceptible to borrowing than others, particularly concrete and lexical words rather than abstract or grammatical elements, while nouns are more easily borrowed than verbs.

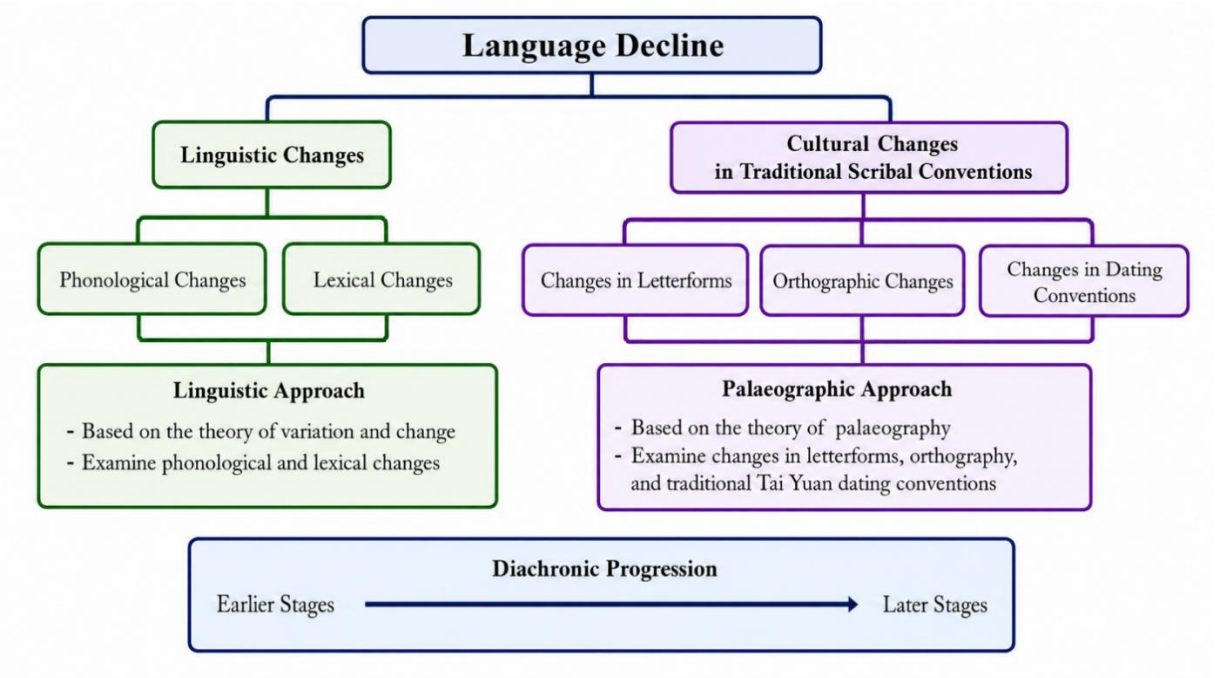
Conceptual Framework

This study defines the term "language decline" as the progressive weakening of a language at the community level, reflected in a reduction in the number of speakers, levels of fluency, functional domains, and sociocultural significance (Fiveable, 2024). From this definition, it can be observed that, in addition to the weakening of language within a community, cultural weakening is also involved. The data for this study are drawn from colophons in palm-leaf manuscripts written in the Tai Yuan script found in Don Rae Sub-district, as discussed in the "Methodology" section. Many well-known linguists argue that written language is not natural but artificial, and merely a representation of spoken language. However, other linguists, particularly those associated with the Prague School, argue that written language constitutes an independent linguistic system with equal

[6] Language attrition can be considered a component or individual-level manifestation of language decline. While language decline refers to the weakening of a language at the community level, language attrition refers to the gradual loss of linguistic competence among individual speakers. Therefore, widespread language attrition within a community may contribute to broader language decline over time.

status and is just as natural as spoken language from a biolinguistic perspective (Aaron & Joshi, 2006, p. 263). Colophons are closely connected to everyday language use and are particularly valuable for examining long-term language change. This view is supported by Hundius's (1990, p. 27) study of Tai Yuan (Lan Na) manuscripts and Grabowsky's (2022a, p. 255) study of Lao manuscripts, both of which found that colophons were commonly recorded in spoken language. Therefore, it is reasonable to use data from colophons to examine the time frame and process of language decline in the displaced Tai Yuan community. The conceptual framework is presented in Figure 2.

Figure 2
Conceptual Framework of the Study



The conceptual framework presented in Figure 2 focuses on the process of language decline through the analysis of both linguistic and cultural dimensions of the writing system. The study is divided into two main dimensions: (1) linguistic changes and (2) cultural changes in traditional scribal conventions, which are analyzed together to understand the long-term process of language change.

The first dimension examines phonological and lexical changes using variation and change theory, which proposes that language variation is the starting point of language change. These changes reflect the development and decline of the language at the structural level, including phonological variation, the emergence or disappearance of lexical items, and influence from other languages.

The second dimension examines cultural changes through the writing system and traditional scribal conventions using a palaeographic approach. The components examined include changes in letterforms, orthography, and dating conventions, particularly the use of Chula Sakarat (C.S.), Pi Hon Tai, and Lan Na-based months. These components reflect changes in writing practices and the continuation or decline of scribal culture.

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The framework also incorporates the time frame and process of change by dividing the data into distinct periods to examine when each change occurs and which components change earlier or later. This approach helps define the trajectory of language and scribal culture decline at both the linguistic and cultural levels.

Methodology

Data Source and Preparation

The data used in this study were obtained from ancient manuscripts written in the Tai Yuan script found in Don Rae Sub-district. A total of 852 manuscripts were collected from two temples: 241 manuscripts from Wat Na Nong and 611 manuscripts from Wat Thung Ya Khom Bang. The manuscripts date from 1793 to 1947, covering a period of 154 years. However, as this study focuses on the time frame and process of language decline, only manuscripts with dated colophons were selected. After categorization, 56 manuscripts were included: 39 from Wat Na Nong and 17 from Wat Thung Ya Khom Bang.

The manuscripts were categorized into four 50-year periods, with 1804 as the base year, marking the migration of the Tai Yuan people from Chiang Saen to Central Thailand. One manuscript, the Vessantara Jātaka: The Royal Children inscribed in 1793, predates the migration and is believed to have been brought from Chiang Saen. It is therefore considered important evidence reflecting Tai Yuan language usage prior to the migration. Details of each period and the number of manuscripts identified are as follows:

The 50 years before the migration	(1754-1803)	1 manuscript
The first 50 years after the migration	(1804–1853)	5 manuscripts
The second 50 years after the migration	(1854-1903)	20 manuscripts
The third 50 years after the migration	(1904-1953)	30 manuscripts

The periods, inscribed years, manuscript names, and manuscript codes of all 56 manuscripts are presented in Appendix B. The abbreviations NN and TB refer to Wat Na Nong and Wat Thung Ya Khom Bang, respectively, while the numbers indicate manuscript codes assigned during the "Conservation of Ancient Manuscripts" project (2022–2025).

The researcher then transliterated the colophons from the Tai Yuan script into Thai script for the purpose of analysis described in the following section.

Data Analysis

After transliterating the colophons from the Tai Yuan script into Thai script, the researcher analyzed language decline based on the conceptual framework. The analysis was divided into two categories: linguistic decline and the decline of traditional scribal conventions. Category 1 consists of two criteria, and Category 2 consists of five criteria. All seven criteria and their details are presented in Table 1.

Table 1

Criteria for Analyzing Language Decline and Their Descriptions

Category and Criteria	Criteria Descriptions
Category 1: Linguistic Decline	
Criteria 1.1: Decline of Original Phonology	Spelling reflects the phonology of Standard Thai, Central Thai, or other languages rather than original Tai Yuan phonology, including changes in consonants and vowels.
Criteria 1.2: Decline of Original Lexicon	Original Tai Yuan lexical items are replaced by items from Standard Thai, Central Thai, or other languages. Original lexical items are verified using Rungruangsri's (2004) Lan Na - Thai dictionary.
Category 2: Decline of Traditional Scribal Conventions	
Criteria 2.1: Decline of Tai Yuan Letterforms	Tai Yuan letterforms change under the influence of other scripts used in the same area.
Criteria 2.2: Decline of Original Tai Yuan Orthography	Original Tai Yuan orthography is replaced by Central Thai or other orthographic systems.
Criteria 2.3: Decline of Traditional Tai Yuan Dating Conventions	
Criteria 2.3.1: Decline in the Use of Chula Sakarat	Chula Sakarat is replaced by other dating systems.
Criteria 2.3.2: Decline in the Use of Pi Hon Tai	Pi Hon Tai is replaced by other dating systems.
Criteria 2.3.3: Decline in the Use of Lan Na–Based Months	Lan Na–based months are replaced by other calendrical systems.

After analysis, the results will be presented in tables. The symbol [+] indicates that a manuscript colophon preserves Tai Yuan linguistic and cultural features, while [−] indicates their decline. The symbol [n/a] indicates that no relevant data were recorded.

Significant linguistic and cultural changes in traditional scribal conventions will then be arranged chronologically to examine the process of language decline over time.

Findings

Tai Yuan language decline was analyzed using 56 colophons from Tai Yuan manuscripts. The manuscripts were divided into four 50-year periods and analyzed according to the criteria presented in Table 1. The complete results are presented in Tables C.1–C.4 in Appendix C. The details under each criterion are as follows.

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Decline of Original Phonology

No phonological changes were observed during the 50 years preceding the migration (1754–1803) or the first 50 years following the migration (1804–1853). Phonological changes first appeared during the second 50-year period after the migration (1854–1903), particularly in the consonant system. One example is the variation between [ɲ] and [j], found in Manuscript NN-0166 (1884), approximately 80 years after the migration. The word meaning 'two,' which is conventionally written as <ယိ> [ɲiː^{2}] in Tai Yuan, appears in this manuscript as <ဧ်ၢ်> [jiː^{2}], reflecting the influence of Central Thai, which lacks the phoneme /ɲ/.

Additional phonological changes are evident during the third 50-year period after the migration (1904–1953). These include the shift from [p] to [p^{h}], found in Manuscript TB-0023 (1912), where the word <ဂိ> [piː^{2}], meaning 'older brother' or 'older sister,' appears as < ဘိ > [p^{h}iː^{2}]. Another change is the shift from [t] to [t^{h}], found in Manuscript TB-0070 (1917), where the word <ဇေ်ၢ်> [teːp^{2}], meaning 'deity,' appears as <ဝေ်ၢ်> [t^{h}eːp^{2}]. A vowel change from [əː] to [ɨ] is also found in Manuscript NN-0055 (1915), where the word <ဆေ်ၢ်> [t^{h}əːŋ^{4}], meaning 'reach,' appears as <ဆိ်ၢ်> [t^{h}ɨŋ^{4}]. The variations from unaspirated to aspirated sounds, such as [p] to [p^{h}] and [t] to [t^{h}], as well as the vowel variation from [əː] to [ɨ], show that speakers are increasingly influenced by the phonology of Central Thai or Standard Thai.

Decline of Original Lexicon

During the 50-year period before the migration (1754–1803) and the first 50 years after the migration (1804–1853), no lexical borrowing from other languages is observed in the Tai Yuan language. In the second 50-year period after the migration (1854–1903), Central Thai loanwords first appear in Manuscript NN-0203 (1862), approximately 58 years after the migration. These include honorific and pronoun forms such as < ၵၢၵ > [k^{h}un^{0}] and < ၼေယ်ၼ်ဇိ်ၢ် ၹ> [ɲoːm^{0} tip^{3}], where the borrowed elements function within personal names.

The word < ၵၢၵ > [k^{h}un^{0}] is an honorific title used before personal names to express respect (The Royal Society of Thailand, 2013, p. 263), whereas Tai Yuan typically uses kinship terms such as <ဂိ်ယ်> [pɔː^{2}] 'father' or < လၢၵ > [luŋ^{0}] 'uncle' to express respect or social closeness. The term <ၼေယ်ၼ်> [ɲoːm^{0}] is used by monks when addressing their parents or persons of similar age (The Royal Society of Thailand, 2013, p. 966), while Tai Yuan uses forms such as <ဂိ်ယ်ဢၵ> [pɔː^{2} ʔɔːk^{1}] (male) and <ဃေၼ်ဢၵ> [mɛː^{2} ʔɔːk^{1}] (female). These borrowed forms also appear in Manuscripts NN-0044 (1898) and NN-0154 (1901). Additional borrowings include <ဃေလ်ၼ်ၼ်> [lɛːm^{4}] 'sharp' (Tai Yuan < ဃ်လ်ၼ်ၼ် > [liam^{5}]) in Manuscript NN-0166 (1884), and < ဇေ်ကဲ > [dek^{4}] 'child' (Tai Yuan <လဢ်ၼ်ၵ > [la^{1}-ʔɔn^{1}]) in Manuscript NN-0232 (1895).

In the third 50-year period after the migration (1904–1953), Central Thai loanwords become more frequent and are particularly common in Buddhist contexts, suggesting that many scribes were monks or religious disciples. An example is the use of the Central Thai pronoun

< ᨽᩬᩴ > [p^{h}om^{4}] in Manuscript NN-0178 (1914), replacing the original Tai Yuan pronouns < ᩉᩣᩅ > [kha:^{5}] and < ᩁᩮᩬᩤ > [k^{h}ɔ:j^{5}]. The earlier loanwords, such as < ᨣᩮᩬᩴ > [ɲo:m^{0}] and < ᩃᩢᩃᩣᩁᩢᩈ > [la^{1}-ʔɔn^{1}], continue to appear in multiple manuscripts from this period.

Overall, the evidence shows a clear increase in lexical borrowing over time, from no borrowing in the early periods to a growing presence of Central Thai or Standard Thai loanwords in later periods. This development reflects increasing language contact in social, religious, and educational domains, leading to stronger influence of Central Thai on the Tai Yuan lexicon.

Decline of Tai Yuan Letterforms

During the 50-year period before the migration (1754–1803) and the first 50 years after the migration (1804–1853), no changes in Tai Yuan letterforms were identified. The first change appeared in the second 50-year period after the migration (1854–1903), in Manuscript TB-0763 (1875), approximately 71 years after the migration. In this manuscript, the letter <ᨠ> /k/, which originally consisted of three equal vertical strokes, was reduced to two vertical strokes, a form like that of the Dhamma Lao script. This may indicate close contact between the Tai Yuan and Lao Wiang communities in Ratchaburi.

In the third 50-year period after the migration (1904–1953), a further change is observed in the letter <ᨠ> /p/ in Manuscript TB-0980 (1925), where the original top notch disappears, resulting in a form identical to <ᨠ> /k/. This requires contextual interpretation to distinguish the two letters and suggests possible influence from the Dhamma Lao script. However, since these changes are not consistently found in later manuscripts, they may reflect individual scribal handwriting rather than systematic orthographic change.

Overall, the evidence suggests that Tai Yuan letterform changes were limited and sporadic, and that significant orthographic change generally requires a long period to become established.

Decline of Original Tai Yuan Orthography

During the 50-year period before the migration (1754–1803) and the first 50 years after the migration (1804–1853), no changes in Tai Yuan orthography were identified. The first signs of change appear in the second 50-year period after the migration (1854–1903), when Thai orthographic features begin to appear in Tai Yuan manuscripts. For example, in Manuscript NN-0110 (1861), approximately 57 years after the migration, the term “Chula Sakarat” <ᩈᩪᩋᩁᩈᨠᩁᩣᨩ> is written with Thai influence instead of the Tai Yuan form < จุลศักราช >. Later manuscripts (NN-0223, 1881; TB-0432, 1890; TB-0982, 1894; NN-0107, 1896) also show mixed use of Thai script and numerals, and Manuscript NN-0044 (1898) shows a mixture of Khom Thai and Dhamma Lan Na scripts.

In the same period, orthographic confusion also emerges in the use of high- and low-class consonants, likely due to influence from Central Thai tonal orthography. This is first observed in Manuscript NN-0135 (1877), where the word < ᩉᩬᩢᩴ > [liam^{5}] appears without the leading <ᩉ> as < ᩃᩬᩢᩴ > [liam^{2}], resulting in a change in tone and meaning. Similar variation is also found in

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Manuscripts NN-0166 (1884) and TB-0982 (1894), where differences in spelling affect both tone and lexical meaning.

In the third 50-year period after the migration (1904–1953), three main orthographic changes are observed. First, vowel spelling variation appears in Manuscripts NN-0104 (1908) and TB-0495 (1911), where a traditional vowel form is replaced by an alternative spelling in words such as <ᨽᩮᩬᩁᩮᩣ᩠ᩉᩣ᩶> [pʰɔʔ³] ‘because.’ Second, in Manuscripts TB-0023 (1912) and NN-0111 (1920), words with final consonant /-k/ were written using a Dhamma Lao orthographic convention, represented as <◌᩠◌>, e.g., <ᩈᩩᩬ᩠ᨠ> [sak¹] meaning ‘once,’ reflecting close contact with the Lao Wiang community. Third, in Manuscript NN-0065 (1931), Thai diacritic marks were incorporated into the Tai Yuan writing system, including Mai Tho <᩵>, Mai Han Akat <᩶>, and Mai Tai Khu <᩷>. For example, ‘success’ changed from <ᩈᩬᩴᩈᩮᩢ᩵> [som⁴-let³] to <ᩈᩬᩴᩈᩮᩢ᩵> [som⁴-let³], and ‘person’ from <ᨽᩪ᩵> [pʰu:²] to <ᨽᩪ᩵> [pʰu:²], reflecting increasing Central Thai influence.

Overall, Tai Yuan orthography remained stable in the early period after migration but began to show increasing influence from Central Thai and Dhamma Lao scripts approximately 57–73 years later. These changes include script mixing, adoption of Thai orthographic markers, and variation in consonant selection related to tonal representation, reflecting long-term language contact and orthographic adaptation.

Decline of Traditional Tai Yuan Dating Conventions

Manuscript TB-0434 (1793), the oldest manuscript from Don Rae Sub-district, was written shortly before the migration and preserves traditional Tai Yuan dating conventions in full, including Chula Sakarat, Pi Hon Tai, and the Lan Na-based month system. During the first 50 years after the migration (1804–1853), these traditional systems were still consistently used without the presence of alternative dating systems.

In the second 50-year period after the migration (1854–1903), Chula Sakarat began to decline. Among 20 manuscripts from this period, only six still used Chula Sakarat, four used the Buddhist Era (e.g. TB-0763, 1875; TB-0982, 1894; NN-0107, 1896; TB-0097, 1899), and ten had no recorded year. In the third period (1904–1953), Chula Sakarat is no longer observed, and Manuscript NN-0136 (1906) is the first to adopt the Rattanakosin Era. Most manuscripts from this period use the Buddhist Era or omit dating entirely, with all recorded years following Central Thai zodiac conventions.

The Pi Hon Tai system shows a similar pattern. It is consistently used alongside Chula Sakarat during the 50-year period before migration (1754–1803) and the first 50 years after migration (1804–1853), but disappears completely after 1853.

The Lan Na-based month system also shows gradual decline. While it remains stable in early manuscripts, Manuscript TB-0726 (1853) already shows mixing with the Central Thai month system, reflecting local geographical perceptions of the central region as “Duean Tai” (southern months). Later, Manuscript TB-0242 (1900) records both systems but with errors in month alignment, indicating reduced knowledge of the Lan Na calendar. By the third period (1904–1953), the Lan Na-based month system is no longer used and is fully replaced by the Central Thai system.

Overall, the evidence shows a stepwise decline in traditional Tai Yuan dating conventions after the migration: Chula Sakarat and Pi Hon Tai disappear within approximately 100 years, while the Lan Na-based month system undergoes gradual mixing before being completely replaced. This pattern reflects a broader loss of knowledge and weakening transmission of traditional temporal systems among Tai Yuan communities in Don Rae Sub-district.

Significant Events, Time Frame, and the Process of Language Decline

The study of Tai Yuan manuscript colophons shows that, following the migration of the Tai Yuan ancestors of Don Rae Sub-district to central Thailand in 1804, several significant events marked the language decline of the displaced Tai Yuan community. The earliest and latest events are summarized in Table 2.

Table 2
Significant Events in the Language Decline of the Displaced Tai Yuan Community

Year (A.D.)	Post-migration Duration (Year)	Significant Events
1804-1853	0-50	No evidence of language decline was identified, and the use of the Central Thai month system alongside the Lan Na-based month system was first observed in 1853, 49 years after the migration.
1861	57	The use of Central Thai orthographic conventions in the Tai Yuan script was first observed.
1862	58	The earliest Central Thai loanwords identified were [$k^{h}un^{0}$], an honorific title, and [ɲoːm^{0}], a pronoun used by monks to address their parents or individuals of a similar age.
1875	71	1. The use of the Buddhist Era as a traditional Buddhist dating system, rather than under the 1912 Thai government decree, was first observed. 2. A change in Tai Yuan letterforms was first observed in the letter <ᨠ> /k/, which appeared in the form <ᨠ> under the influence of the Dhamma Lao script.
1877	73	Confusion in the use of high-class and low-class consonants (specifically between <ᨡ> and <ᨡ>) was first observed.
1881	77	The use of Thai numerals alongside Tai Yuan numerals was first observed.
1884	80	A change in a consonant sound was first observed, with [ɲ] changing to [j].
1900	96	The use of the Lan Na-based month system was last observed.
1906	102	The Rattanakosin Era was first observed following the 1889 government decree, seven years after its implementation.
1908	104	A change in the representation of the vowel /ɔ/ in Tai Yuan orthography was observed, with <ᨣᨶ᩠ᨶ> changing to <ᨣᨶ᩠ᨶ>.

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Table 2
Continued

1912	108	Words with the final consonant /-k/ were observed to be spelled using a special orthographic form based on the Dhamma Lao script, represented as < ◌̸ >.
1913	109	The use of the Thai script diacritics Mai Tho (falling tone mark) < ◌้ >, Mai Han Akat (vowel mark) < ◌ั >, and Mai Tai Khu (short vowel mark) < ◌็ > was first observed in Tai Yuan orthography.
1925	121	A change in the Tai Yuan letterform <ᨣ> /p/ was observed, with the form changing to <ᨤ> under the influence of the Dhamma Lao script.
1947	143	No evidence of palm-leaf manuscripts written in the Tai Yuan script was found after this year.

The data in Table 2 show that language decline occurs gradually through the accumulation of significant events. Based on these data, the time frame and overall process of Tai Yuan language decline are summarized in Table 3.

Table 3
Time Frame and Process of Tai Yuan Language Decline

Approximate Duration After Migration (Year)	Process of Language Decline
50 years prior	The displaced Tai Yuan community maintained its language and cultural practices.
50	No clear evidence of language decline was observed. The Central Thai month system appeared alongside the Lan Na–based month system.
60	Central Thai loanwords and orthographic conventions were identified in the Tai Yuan script.
70	Changes in Tai Yuan letterforms and dating systems were identified. Confusion in the use of certain consonant groups was observed.
80	Thai numerals were used alongside Tai Yuan numerals. Changes in the phonological system were observed.
90	Linguistic changes continued to be observed, while the Lan Na–based month system remained in use.
100	The Lan Na–based month system disappeared, and the official Siamese calendar system was adopted.
110	Additional orthographic changes were identified, including influence from the Dhamma Lao script and Thai script diacritics.
120	Changes in Tai Yuan letterforms continued under the influence of the Dhamma Lao script.
130	Influence from other scripts continued to appear in the Tai Yuan writing system.
140	Evidence of palm-leaf manuscripts written in the Tai Yuan script disappeared.
150	The displaced Tai Yuan community ceased using its traditional script in written records.

From Table 3, it can be concluded that about 50 years after the migration, signs of language decline in the displaced Tai Yuan community began to appear at both linguistic and orthographic

levels. At the linguistic level, Tai Yuan phonology and lexicon were increasingly influenced by Central Thai, leading to reduced language proficiency. At the orthographic level, about 70 years after the migration, the Tai Yuan script was still in use, but its orthography showed influence from Central Thai script and the Dhamma Lao script used by Lao Wiang speakers. This change occurred gradually over time. After 150 years, in the absence of effective preservation measures, the Tai Yuan script ceased to be used, and the language became increasingly assimilated under state centralization, particularly through the education system. These findings may be useful for developing preventive measures in other ethnic communities before language decline becomes severe.

Conclusion and Discussion

The findings of this study both support and extend previous research on language decline and language attrition by providing a long-term historical perspective based on dated Tai Yuan manuscripts. Rather than viewing language decline solely as an individual psycholinguistic phenomenon, this study shows that it can also be understood as a community-level historical process, in which different linguistic components change at different rates under the influence of language contact, writing traditions, and sociopolitical change. The discussion focuses on four principal dimensions: the diachronic development of language decline, the sequence of linguistic change, the role of orthography, and the implications for language revitalization.

Consistency with Previous Studies

The findings support Hulsen's (2000) and Schmid's (2011) argument that language decline is neither abrupt nor linear, but develops gradually through continuous interaction between language use and changing social environments. The stability of Tai Yuan language during the early post-migration period suggests that continuous language use in the community can preserve a minority language for several decades despite prolonged contact with a dominant language. This observation reinforces Hulsen's (2000) proposal that first-language competence may remain stable over extended periods even when speakers increasingly contact with a second-language environment.

The findings also support previous studies arguing that lexical borrowing alone should not be regarded as evidence of language attrition (Seifart, 2019; Benmamoun et al., 2013; Schmid, 2011). This study demonstrates that borrowing initially functioned as an adaptation process in a multilingual society rather than a sign of language loss. However, the subsequent replacement of the original lexical items by those of Central Thai shows that prolonged borrowing may gradually develop into lexical replacement. This finding suggests that lexical borrowing and language decline should not be treated separately but as successive processes of a continuous development of language change.

Similarly, the stability of the phonological system and basic grammatical structures during the early periods supports Benmamoun et al.'s (2013) proposal that basis linguistic structures are generally more resistant to language decline than lexical elements. Therefore, the evidence suggests that language decline occurs unevenly across linguistic domains rather than affecting all components simultaneously.

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Divergence and Extension of Previous Studies

Although the findings support several theories of language attrition, they also extend previous research in important ways.

First, previous studies have predominantly investigated language attrition through experiments involving contemporary bilingual speakers, consequently examining change at the individual level (He, 2016; Schmid, 2011). By contrast, this study investigated language decline from 56 dated palm-leaf manuscripts covering more than 150 years. This approach demonstrates that historical manuscripts possess a long-term linguistic archive that reveals not only whether language decline occurred, but also when it began and how it progressed across generations. Consequently, language decline can be examined as a community-level historical process rather than as an individual psycholinguistic phenomenon.

Second, the study extends previous research by demonstrating the importance of orthography as an independent dimension of language decline. Earlier studies have largely emphasized phonology, morphology, and the mental lexicon (Benmamoun et al., 2013), whereas the evidence from this study indicates that orthographic change followed a different development. Rather than changing rapidly, the writing system remained relatively conservative while gradually incorporating features from neighboring writing traditions. This orthographic conservation suggests that scribal traditions and manuscript preservation delayed structural change even after lexical borrowing had become widespread. Orthographic change therefore appears to represent an intermediate process between lexical replacement and the eventual abandonment of the original writing system.

Third, the study shows that multilingual script environments involve more complexity than that found in previous studies of bilingualism. The coexistence of Tai Yuan, Thai, Khom Thai, and Dhamma Lao writing systems indicates that script contact cannot be explained as the replacement of one writing system by another. Instead, different writing systems coexisted and interacted over extended periods before they become standardization. This finding introduces the concept of script layering, whereby multiple writing systems function simultaneously within a single writing tradition, representing a dimension of language decline that has received little attention in previous scholarship.

Methodological and Theoretical Contributions

Apart from its empirical findings, this study provides a methodological framework for investigating historical language decline. Unlike previous studies that rely primarily on interviews, experiments, or observations of living speakers, this study shows that dated manuscripts provide reliable chronological evidence for establishing both the timing and process of linguistic change over long periods. This approach enables researchers to distinguish gradual structural change from temporary language contact and offers an alternative methodology for communities whose written records have survived but whose spoken language has undergone substantial transformation.

The findings also extend existing theories of language decline by showing that different linguistic components do not deteriorate simultaneously. Instead, language decline follows a sequential process, beginning with lexical borrowing, followed by phonological and orthographic adaptation, and eventually resulting in the disappearance of the original writing tradition. This

development supports existing theories of language attrition by incorporating orthographic development and historical chronology into the analysis.

Notable Findings and Broader Implications

Perhaps the most significant finding is that the displaced Tai Yuan community did not experience an immediate language shift despite prolonged contact with Central Thai. Instead, the language remained in use for decades while gradually showing signs of structural weakening. This finding suggests that language decline should be understood as an extended process of change rather than a single occurrence, thereby distinguishing it from complete language shift.

An equally important finding involves the influence of state policy and formal education during the later stages of decline. The gradual disappearance of the original writing system coincided with increasing institutional dominance of Central Thai, supporting Fishman's (1991) argument that language maintenance depends not only on community transmission but also on institutional support. This study of the Tai Yuan language further suggests that writing systems may disappear earlier than spoken language when education and government administration become centralized.

Overall, the study explores the research questions by identifying the approximate time frame in which language decline began after migration and demonstrating that different linguistic components changed at different rates. More importantly, it expands current approaches to language decline by integrating orthography, historical chronology, and community-level documentary evidence into a single analytical framework.

From Language Decline Process to a Model for Language Revitalization

The historical development of language decline presented in this study has important implications for language revitalization. Rather than viewing language decline solely as language loss, the findings show that it follows observable progression representing different levels of structural vulnerability. This historical perspective provides a practical framework for revitalization strategies.

The early post-migration period represents a crucial stage for language maintenance because the linguistic system remained largely intact despite increasing contact with Central Thai. Later stages show greater vulnerability, particularly in orthography and language use. Accordingly, revitalization strategies should be adapted to different stages of decline, from lexical preservation and orthographic standardization to community-based language transmission and the reconstruction of domains of language use.

Although this framework developed from the historical evidence of the displaced Tai Yuan community, it may also be applied to other minority and displaced language communities with historical written records. Moreover, the study shows that dated manuscripts serve not only as historical documents but also as valuable long-term linguistic archives that contribute to theories of language decline and strategies for language revitalization.

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Institutional Review Board Statement

This study is document-based and was reviewed by the Mahidol University Central Institutional Review Board (MU-CIRB) using the institutional assessment form. It was determined not to involve human subjects research; therefore, no ethics approval certificate was issued.

Informed Consent Form

As this was a document-based study, informed consent was not required.

Data Availability Statement

For further information, please contact the corresponding author at the email address provided.

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The author reports no potential conflicts of interest related to this work.

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Appendix A

Comparison of Tai Yuan Script, Thai Script Equivalents, and IPA Transcriptions

Table A.1
Full Consonant Forms in the Tai Yuan Script

ᨠ	ᨡ	ᨣ	ᨤ	ᨥ	ᨦ	ᨧ	ᨨ	ᨩ	ᨪ	ᨫ
ก	ข	ฃ	ค	ฅ	ฆ	ง	จ	ฉ	ช	ซ
k	k^h	k^h	k	k^h	k^h	ŋ	c	s	c	s
ᨬ	ᨭ	ᨮ	ᨯ	ᨰ	ᨱ	ᨲ	ᨳ	ᨴ	ᨵ	ᨶ
ฌ	ญ	ฎ	ฐ	ด/ฑ	ฒ	ณ	ต	ถ	ท	ธ
s	ɲ	t	t^h	d	t^h	n	t	t^h	t	t^h
ᨷ	ᨸ	ᨹ	ᨺ	ᨻ	ᨼ	ᨽ	ᨾ	ᨿ	ᩀ	ᩁ
น	บ	ป	ผ	ฝ	พ	ฟ	ภ	ม	ย	ร
n	b	p	p^h	f	p	f	p^h	m	ɲ	h/ l
ᩃ	ᩅ	ᩈ	ᩉ	ᩋ	ᩍ	ᩎ	ᩏ	ᩐ	ᩑ	
ล	ว	ศ	ษ	ส	ห	ฬ	อ	อย	ฮ	
l	w	s	s	s	h	l	ʔ	j	h	

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Table A.2
Subscript Consonant Forms in the Tai Yuan Script

ᨠ	ᨡ	ᨢ	ᨣ	ᨤ	ᨥ	ᨦ	ᨧ	ᨨ	ᨩ	ᨪ
ก	ข	ค	ฆ	ง	จ	ฉ	ช	ฌ	ญ	ฏ
k	k^h	k	k^h	ŋ	c	s	c	s	ɲ	t
ᨫ	ᨬ	ᨭ	ᨮ	ᨯ	ᨰ	ᨱ	ᨲ	ᨳ	ᨴ	ᨵ
ฐ	ด/ฑ	ฒ	ณ	ต	ถ	ท	ธ	น	บ	ป
t^h	d	t^h	n	t	t^h	t	t^h	n	b	p
ᨶ	ᨷ	ᨸ	ᨹ	ᨺ	ᨻ	ᨼ	ᨽ	ᨾ	ᨿ	ᩀ
ผ	ฟ	ภ	ม	ย	ร	ล	ว	ศ	ษ	ส
p^h	f	p^h	m	ɲ	h/ l	l	w	s	s	s
ᩁ	ᩂ	ᩃ								
ห	ฬ	อ								
h	l	ʔ								

Table A.3
Independent Vowel Forms in the Tai Yuan Script

ᨠ	ᨠᩣ	ᨠᩤ	ᨠᩥ	ᨠᩦ	ᨠᩧ	ᨠᩨ
อ	อา	อิ	อี	อุ	อู	เอ
a	aː	i	iː	u	uː	eː
ᨠᩮ	ᨠᩯ	ᨠᩰ	ᨠᩱ			
โอ	เอา	ฤ	ฤๅ			
oː	aw (au)	lɨʔ	lɨː			

Table A.4

Dependent Vowel Forms in the Tai Yuan Script

-ะ	-า	-ิ	-ี	-ึ	-ื	-ุ
a	aː	i	iː	ɨ	ɨː	u
-ู	เ-ะ	เ-	แ-ะ	แ-	โ-ะ	โ-
uː	e	eː	ɛ	ɛː	o	oː
เ-าะ	-อ	เ-อะ	เ-อ	เ-ียะ	เ-ีย	เ-ือะ
ɔ	ɔː	ə	əː	iaʔ	ia	ɨaʔ
เ-ือ	-ัวะ	-ัว	-ำ	ไ-	ใ-	เ-า
ɨa	uaʔ	ua	am	ai (aj)	ai (aj)	au (aw)

Table A.5

Diacritic Forms in the Tai Yuan Script

Mai Yo (Low tone mark)	Mai Kho Chang (Falling tone mark)	Mai Sat (/a/)	Mai Kak (/-k/)	Mai Kong (/o/ + ŋ)
Ra Ham (Cancellation mark)	Mai Kang Lai (Nasalization mark)	Mai Kang Mon (Nasalization mark)	Mai Sam (Repetition mark)	

Table A.6

Two Sets of Numeral Forms in the Tai Yuan Script: Dhamma Numerals (top row) and Hora Numerals (middle row)

๐	๑	๒	๓	๔	๕	๖	๗	๘	๙
0	1	2	3	4	5	6	7	8	9

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Appendix B

Details of the Ancient Manuscripts Used in the Study

Table B

Periods, Inscribed Years, Manuscript Names, and Manuscript Codes in This Study

Period	No.	Code	Year	Name of manuscript
The 50 years before the migration (1754–1803)	1.	TB-0434	1793	Vessantara Jātaka: The Royal Children
The first 50 years after the migration (1804–1853)	2.	NN-0031	1815	Vinaya Piṭaka
	3.	NN-0047	1819	Abhidhamma vol. 2
	4.	TB–0113	1821	Sutasoma Jātaka
	5.	TB–0943	1825	Vessantara Jātaka: Māharāja
	6.	TB-0726	1853	Ratana Sutta
The second 50 years after the migration (1854–1903)	7.	NN-0110	1861	Janasandha Jātaka vol. 2
	8.	NN-0203	1862	Vessantara Jātaka: Māharāja
	9.	NN-0202	1871	Sarakarivicha Sutta
	10.	NN-0156	1872	Ānisaṃsa Sabbadāna
	11.	TB-0763	1875	Vessantara Jātaka: The Return to the Capital
	12.	NN-0135	1877	Hong Hin Jātaka (Dukkhakhattiya Jātaka)
	13.	NN-0223	1881	Hong Hin Jātaka (Dukkhakhattiya Jātaka) vol.2
	14.	NN-0166	1884	Vessantara Jātaka: Maddi
	15.	TB-0432	1890	Vessantara Jātaka: Maddi
	16.	NN-0982	1894	Milinda Pañha
	17.	NN-0232	1895	Vidhura Jātaka vol. 2
	18.	NN-0107	1896	Cakkana Vutti Pāpasutta
	19.	NN-0052	1898	Pāramī Phan Chan [pa:^{4}.la^{1}.mi:^{0} pan^{0} can^{3}]
	20.	NN-0044	1898	Vessantara Jātaka: Himavanta Forest
	21.	TB-0097	1899	Vessantara Jātaka: The Light Forest
	22.	NN-0002	1900	Candaghāta Jātaka vol. 3
	23.	TB-0761	1900	Dutiya Māleyya
	24.	TB-0242	1900	Vessantara Jātaka: Indra's Realm
	25.	NN-0005	1901	Dutiya Māleyya
	26.	NN-0154	1901	Ānisaṃsa Mahā Vessantara Jātaka
The third 50 years after the migration (1904–1953)	27.	NN-0136	1906	Dhammadā Son Lok [t^{h}am^{0}.ma^{1}.da:^{0} sɔ̆:n^{4} lô:k^{2}]
	28.	NN-0004	1906	Suttanta Piṭaka - first volume (vol. 1)
	29.	NN-0018	1906	Surinda Jātaka vol. 4
	30.	NN-0113	1908	Dakkhiṇāvibhaṅga Sutta
	31.	NN-0104	1908	Phañā Khankhāk vol. 4
	32.	NN-0143	1909	Janasandha Jātaka - first volume

Table B
Continued

33.	TB-0435	1909	Vessantara Jātaka: Maddi
34.	NN-0061	1910	Kammavācā
35.	TB-0495	1911	Chagati Dīpanī
36.	TB-0023	1912	Kāyanagara
37.	NN-0191	1912	Ānisaṃsa Kadook (Ānisaṃsa of Bones) [ʔa:^{0}.ni^{3}.soŋ^{4} ka^{1}.du:k^{1}]
38.	NN-0178	1914	Paṭhamasaṃbōdhigathā
39.	NN-0124	1914	Paṭhamasaṃbōdhigathā vol. 4
40.	NN-0241	1914	Sirimulkittiraja Jātaka
41.	NN-0055	1915	Mahasamaya Sutta
42.	TB-0070	1917	Sudhana Jātaka
43.	TB-0401	1917	Hen Kham Jātaka (Golden Palm Civet Jātaka)
44.	TB-0138	1918	Tamnan Phra Ariya Metteyya [tam^{4}.na:n^{0} pʰaʔ^{3} ʔa^{0}.li1. ɲaʔ^{3}.met^{3} taj^{4}]
45.	NN-0111	1920	The Tale of the Little Chicken
46.	NN-0142	1920	Suttanta Piṭaka - first volume (vol. 1)
47.	NN-0056	1921	Nibbāna Sutta
48.	NN-0088	1921	Vessantara Jātaka: Himavanta Forest
49.	NN-0158	1921	Sujavanna Jātaka vol. 7
50.	TB-0980	1925	Nibbāna Sutta
51.	NN-0098	1929	Paṭhamasaṃbōdhigathā vol. 6
52.	NN-0087	1931	Pabbajjā Khandha vol. 2
53.	NN-0065	1931	Dutiya Māleyya (last volume)
54.	NN-0130	1931	Vessantara Jātaka: The Forest Edge
55.	NN-0057	1940	Mahā Paṭṭhāna-Pakarana
56.	TB-1213	1947	Ānisaṃsa Mahā Vessantara Jātaka

Appendix C

Analytical Data on Tai Yuan Language Decline

Table C.1
Analytical Data on Tai Yuan Language Decline from the 50 Years Before the Migration (1754-1803)

No.	Code	Year (A.D.)	Category 1		Category 2				
			1.1	1.2	2.1	2.2	2.3		
							2.3.1	2.3.2	2.3.3
1	TB-0434	1793	+	+	+	+	+	+	+

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Table C.2

Analytical Data on Tai Yuan Language Decline from the First 50 Years After the Migration (1804–1853)

No.	Code	Year (A.D.)	Category 1		Category 2				
			1.1	1.2	2.1	2.2	2.3		
							2.3.1	2.3.2	2.3.3
1	NN-0031	1815	+	+	+	+	+	+	+
2	NN-0047	1819	+	+	+	+	+	+	+
3	TB–0113	1821	+	+	+	+	+	+	+
4	TB–0943	1825	+	+	+	+	+	+	+
5	TB-0726	1853	+	+	+	+	+	+	+

Table C.3

Analytical Data on Tai Yuan Language Decline from the Second 50 Years After the Migration (1854–1903)

No.	Code	Year (A.D.)	Category 1		Category 2				
			1.1	1.2	2.1	2.2	2.3		
							2.3.1	2.3.2	2.3.3
1	NN-0110	1861	+	+	+	-	+	-	-
2	NN-0203	1862	+	-	+	+	n/a	-	-
3	NN-0202	1871	+	+	+	+	+	-	-
4	NN-0156	1872	+	+	+	+	+	-	-
5	TB-0763	1875	+	+	-	+	-	-	-
6	NN-0135	1877	+	+	+	-	n/a	-	-
7	NN-0223	1881	+	+	+	-	n/a	-	-
8	NN-0166	1884	-	-	+	-	n/a	-	-
9	TB-0432	1890	+	+	+	-	+	-	-
10	TB-0982	1894	+	+	+	-	-	-	-
11	NN-0232	1895	+	-	+	+	n/a	-	-
12	NN-0107	1896	+	+	+	-	-	-	-
13	NN-0052	1898	+	+	+	+	n/a	-	+
14	NN-0044	1898	+	-	+	-	n/a	-	-
15	TB-0097	1899	+	+	+	+	-	-	-
16	NN-0002	1900	+	+	+	+	n/a	-	-
17	TB-0761	1900	+	+	+	+	+	-	-
18	TB-0242	1900	+	+	+	+	+	+	-
19	NN-0005	1901	+	+	+	+	n/a	-	-
20	NN-0154	1901	+	+	+	+	n/a	-	-

Table C.4
Analytical Data on Tai Yuan Language Decline from the Third 50 Years After the Migration (1904–1953)

No.	Code	Year (A.D.)	Category 1		Category 2				
			1.1	1.2	2.1	2.2	2.3		
							2.3.1	2.3.2	2.3.3
1	NN-0136	1906	+	-	+	+	-	-	-
2	NN-0004	1906	+	-	+	+	n/a	-	-
3	NN-0018	1906	+	-	+	+	n/a	-	-
4	NN-0113	1908	+	+	+	+	n/a	-	-
5	NN-0104	1908	+	+	+	-	n/a	-	-
6	NN-0143	1909	+	+	+	+	n/a	-	-
7	TB-0435	1909	+	+	+	+	-	-	-
8	NN-0061	1910	+	+	+	+	n/a	-	-
9	TB-0495	1911	+	+	+	-	-	-	-
10	TB-0023	1912	-	-	+	-	n/a	-	-
11	NN-0191	1912	+	-	+	+	n/a	-	-
12	NN-0178	1914	+	-	+	+	n/a	-	-
13	NN-0124	1914	+	+	+	+	n/a	-	-
14	NN-0241	1914	+	+	+	+	n/a	-	-
15	NN-0055	1915	-	+	+	+	n/a	-	-
16	TB-0070	1917	-	+	+	+	-	-	-
17	TB-0401	1917	+	+	+	+	-	-	-
18	TB-0138	1918	+	+	+	+	-	-	-
19	NN-0111	1920	+	+	+	-	n/a	-	-
20	NN-0142	1920	+	+	+	+	n/a	-	-
21	NN-0056	1921	+	+	+	+	-	-	-
22	NN-0088	1921	+	+	+	+	n/a	-	-
23	NN-0158	1921	+	-	+	+	n/a	-	-
24	TB-0980	1925	+	+	-	+	-	-	-
25	NN-0098	1929	+	+	+	+	n/a	-	-
26	NN-0087	1931	+	+	+	+	n/a	-	-
27	NN-0065	1931	+	+	+	-	n/a	-	-
28	NN-0130	1931	+	+	+	+	n/a	-	-
29	NN-0057	1940	+	-	+	+	n/a	-	-
30	TB-1213	1947	+	+	+	+	-	-	-