

A Gradient Typology of Contractions in Chinese Languages

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The study examines the diverse patterns of contraction in Chinese languages. We propose a gradient account to elaborate on the typology of Chinese contractions regarding the variations of the syllable structures. It is assumed that contraction is a three-level sound change, from two syllables to one. Complete contraction is monosyllabic, while incomplete contraction should be analyzed as disyllabic, with different degrees of intervocalic reduction. Min and Rugao contractions are basically complete, while Cantonese and Taiwan Mandarin contractions are still developing at the transitional stage. They have the tendency towards complete contraction, especially in fast speech. In the gradient account, Chinese contractions can get better predicted and interpreted under broader phonological frameworks.

Keywords: contraction, Chinese languages, syllable structure

1 Introduction

Contraction is particularly prevalent in Chinese languages. Many Chinese languages have been documented to undergo contraction, particularly in spontaneous speech, including Taiwan Mandarin (Cheng & Xu, 2015; Cheng, Xu, & Gubian, 2010; Tseng, 2005a, 2005b, 2005c; Chuang, 2022), Southern Min (Chung, 1996; Hsu, 2003; Li & Myers, 2005), Hakka (Chung, 1997), Cantonese (Bauer & Benedict, 2011; Luke & Nancarrow, 1999), Tianjin (Wee, 2005, 2014), Rugao (Xu, 2020), etc. Although many studies have attempted to document the pattern of Chinese contraction, most of them failed to interpret the variations of contraction across dialects (e.g., the coexistence of full and partial contraction within/across dialects) but only focused on a specific dialect. Predictions on the grounding of evidence from a single dialect are unavailable for all the contractions in Chinese dialects. Syllable patterns may even vary within a dialect. Such diversity in a particular dialect has been widely discussed but has not been cross-dialectally compared. As a lack of adequate consideration may lead to biased predictions of contracted patterns, an exhaustive examination of Chinese contraction is necessary to help elucidate the puzzles in order to capture a more universal picture and subtle differences in dialectal variations. The present study aims to compare and discuss variations of contractions in Chinese languages, both intralingually and cross-dialectally.

2 Chinese Syllable Structure

The standard syllable in Chinese generally complies with the CGVX sequence (C= onset consonant; G= prenuclear glide; V= nucleus vowel; X= coda glide, nasal, or stop) (Duanmu, 2007); syllables of most Chinese dialects are bimoraic (e.g., Mandarin, Min, Cantonese), which are considered to be heavy syllables

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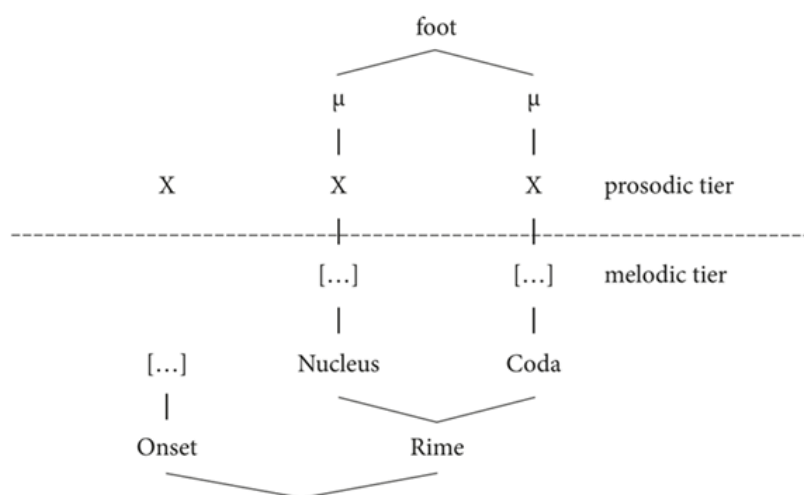
(Duanmu, 1999, 2000).

As CGVX is the general template for Chinese syllables, different points of view have been held for the basic syllable structures in Chinese. The major concern that gave rise to the debate is the affiliation of the prenuclear glide. We conclude the to-date classifications into two groups of models: One is the traditional OR and IF models, which attempt to divide a syllable into two constituents; the other is the μ -model, which assigns syllable weight to the weighted segments. It is convinced that the latter has better interpretability for Chinese languages.

Under the μ -model, the segment-melodic complex, proposed by Srinivas (2016), can explain cases of Chinese contraction well. As previous discussions adopted the idea of the skeleton for analysis, the complex can also associate it with the μ -model. As shown in Figure 1, the prosodic tiers include the skeletal tier as well as the phonological hierarchy (e.g., counting of syllable weight, moraic foot, syllable foot, etc.); the melodic tiers consist of segments within the OR model.

Figure 1

Projection of the Segment-melody Complex (Liang & Wee, 2022; Srinivas, 2016)



Two tiers are linked with the segments as the connecting points. The projection, with the mora-based model and the OR model, has good suitability in Chinese syllable structures (Liang & Wee, 2022). We then work on Chinese contractions under the complex.

3 Interaction between Syllable Weight and Contraction

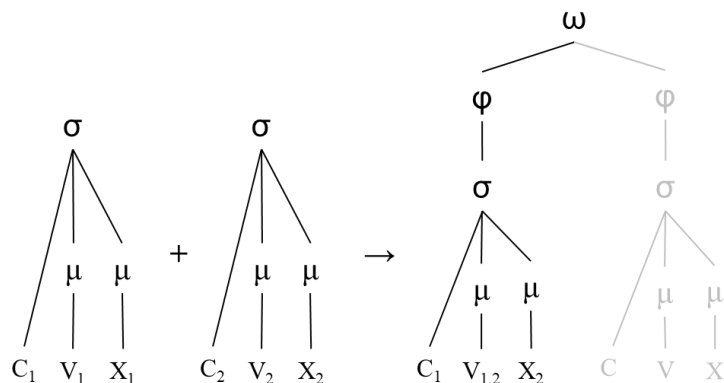
Identifying different degrees of contraction, the correspondence between syllable weight and the output segments should be treated differently. At least, full (complete) and partial (incomplete) contractions may have their own structure. To avoid the ambivalent status of the medial glide, we temporally adopt the case of CVX sequence for a standard syllable.

3.1 Complete Contraction First, complete contraction refers to the total integration of two syllables into one. Chung's (1996) skeletal account used the concept of the skeletal tier for syllable-timing, under *Autosegmental Phonology*. Adopting the μ -model, we alter Chung's (1996) skeletal account into the mora-based structure with phonological hierarchy. As in Figure 2, two bimoraic syllables can be converted into a bimoraic syllable. Note that the output C and X would come from the first and the final source syllable, thus being C₁ and X₂, which is constrained by Edge-in Association (Yip, 1988). The output nucleus may be co-decided by the V₁ and V₂ and the more sonorous source vowel would be selected as the output nucleus. A complete contraction case will find another applicable neighbor syllable, if any, to form a new syllabic

trochee and a phonological word², which can be as productive as a new foot and can be viewed as a type of word formation accordingly (as shown in gray color).

Figure 2

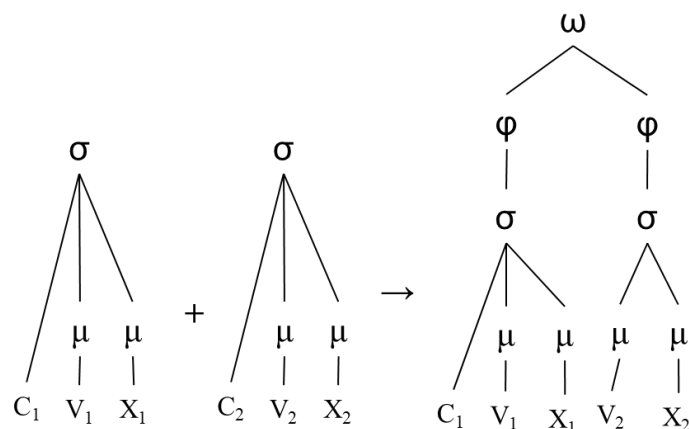
Complete Contraction in CVX (Chung, 1996; Hsu, 2003)



3.2 Incomplete Contraction Second, incomplete contraction addresses the partial deletion of the intervocalic segments (X_1+C_2), which is much more complicated than the complete one. In incomplete contractions, the possible structures can be $C_1V_1X_1+V_2X_2$ and $C_1V_1+V_2X_2$. For $C_1V_1X_1+V_2X_2$, it is doubtless that V_1X_1 and V_2X_2 belong to different syllables, σ_1 and σ_2 , as illustrated in Figure 3. CVX.VX also complies with the general possible syllable sets, where the onset consonant C in a heavy CVX syllable is optional; thus, the deletion or reduction of C is fairly sensible for the universal analysis.

Figure 3

Incomplete Contraction in CVX+VX



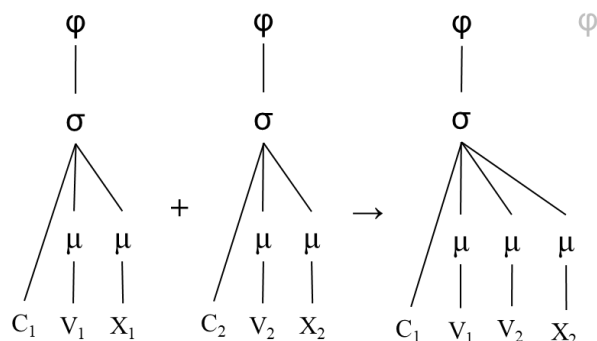
As for $C_1V_1+V_2X_2$, the resyllabification can be questionable. There are two possible considerations for the output syllabification. One is that C_1V_1 and V_2X_2 are belonging to one syllable, which can be superheavy with 3μ . The other possibility we argue is that C_1V_1 and V_2X_2 belong to two different syllables.

Chen (2020) measured the duration of $C_1V_1+V_2X_2$ and found the rime duration is about 1.5 times longer than a standard CVX syllable, thus suggesting the moraic structure of the $C_1V_1V_2X_2$ set should be CV.VX, as shown in Figure 4.

² According to Duanmu (1999), two mora forms a foot (M-foot), and two syllables form a syllabic foot (S-Foot). As the minimal word should contain a disyllabic trochee, a S-foot equals to a phonological word.

Figure 4

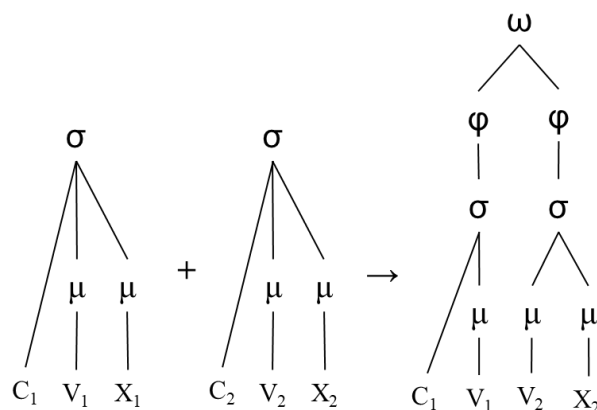
Trimoraic Analysis of Incomplete Contraction in CVVX (Chen, 2020)



However, we cast a doubt on the possibility of the overloaded syllable weight, for the following reasons: First, the violability of the well-formedness of a syllable, where the maximal size of syllable weight for a syllable should be bimoraic, may grant the costly permission for many other cases. In the trimoraic analysis, $^*\sigma_{\mu\mu}$ is violated, while it is not preferred under the universal grammar. It will contribute to the loss of a syllable and a corresponding foot, in which Max- σ -SO and MAX- ϕ -SO are violated meanwhile. As we allow CVVX to appear, many constraints (e.g., $^*\sigma_{\mu\mu}$, Max- σ -SO, and MAX- ϕ -SO) are violated accordingly. This makes the rankings even more byzantine. Therefore, to solve the challenges mentioned above, we propose an alternative analysis for the resyllabification. It is argued that C_1V_1 and V_2X_2 are affiliated with two syllables, as shown in Figure 5. The analysis prevents MAX- ϕ -SO and Max- σ -SO from getting violated.

Figure 5

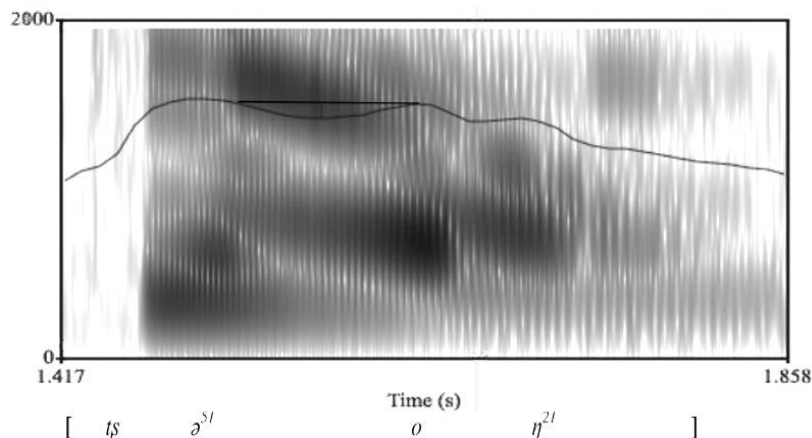
Disyllabic Analysis of Incomplete Contraction in CVVX



Evidence for the present analysis can also be solicited from acoustic measurement. As observed by Kuo (2010), an amplitude drop is sometimes possible between V_1 and V_2 . This explains that though two sets are connected closely, there remains to be a distance of intimacy in between. Take $[t\text{ɕ}\text{ə} + t\text{ɕ}\text{on}]$ ‘this kind’ for example. As in Figure 6, $[t\text{ɕ}\text{ə} + t\text{ɕ}\text{on}]$ will become $[t\text{ɕ}\text{ə}.\text{on}]$, where the lengthened $[\text{ə}]$ is canceled and the onset $[t\text{ɕ}]$ is deleted. An intensity fall can be found between $[\text{ə}]$ and $[\text{o}]$. This can be strong support for the syllabification, as they are belonging to two syllables.

Figure 6

Intensity Contour in CVVX (Kuo, 2010)

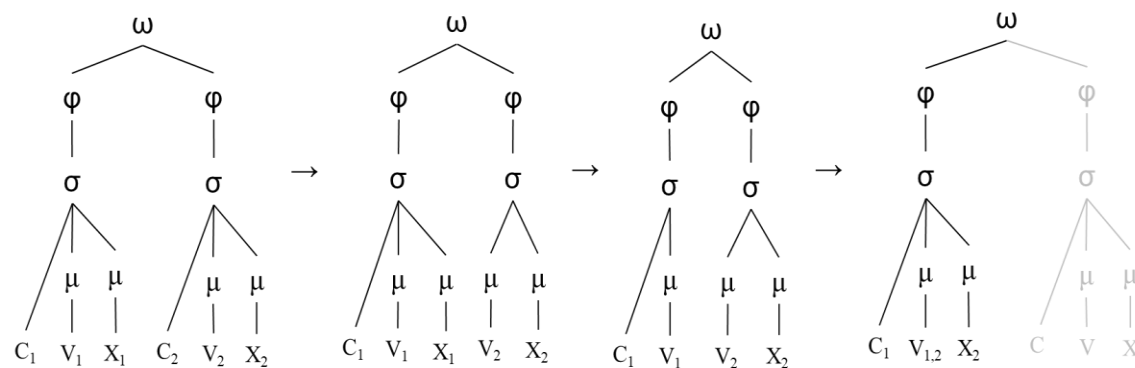


4 A Gradient Account

4.1 Modeling Phonological Structures of Chinese Contractions Intricate as syllable structures are in Chinese contractions, we summarize the discussions above, proposing a gradient account for these variations. The gist of the gradient account is that contraction is a gradual sound change. We consider contraction to be two syllables gradually merging into one, along with a decrease in prosodic counts like the skeleton and the more number. There can be three levels of contractions. The gradient change generally follows the paradigm as in Figure 7.

Figure 7

The Gradual Change of Chinese Contraction



4.2 Intralingual and Cross-dialectal Variations As contractions are various in Chinese languages, we select a few notable cases from certain Chinese dialects to demonstrate the variations with the gradient account. First, in Table 1, Taiwan Mandarin contractions are mainly CVX.VX or CV.VX, such as [tʰɔŋ.(h)əŋ] or [tʰɔŋ] for [tʰɔŋ + tʂʰəŋ] ‘usually.’ As CVX.VX is the initial stage of contraction, CV.VX is also the common contraction form in Taiwan Mandarin. In contrast, complete contractions within the CVX sequence are infrequent. Only for some lexicalized items like [njan] ‘that way’ and [tɛjen] ‘today,’ complete contraction is possible.

Table 1*Taiwan Mandarin Contraction*

Uncontracted	Incomplete contraction		Complete contraction	Gloss
CVX+CVX	CVX.VX	CV.VX	CVX	
t ^h ɔŋ + t ^h ɔŋ	t ^h ɔŋ.(h)ɔŋ	t ^h ʃ.ɔŋ	—	‘usually’
k ^h ə: + ʃi:	k ^h ə:.(h)i:	k ^h ə.i:	—	‘but’
tan + ʃi:	tan.(h)i:	tã.i:	—	‘but’
t ^h jɛn + t ^h jɛn	t ^h jɛn.jɛn	t ^h jɛ̃.jɛn	—	‘every day’
na: + jaŋ	na:.jaŋ	na.jaŋ	njaŋ	‘that way’
tɛin + t ^h jɛn	tɛin.jɛn	tɛĩ.jɛn	tɛjɛn	‘today’

In Taiwan Southern Min Contraction, complete contraction CVX is the majority, as in Table 2. Some of them are even highly lexicalized, such as [sjaŋ] for [sjo: + kaŋ] ‘the same.’ For non-violability of phonotactics, there may be some cases that are in an atypically disyllabic template. For example, [ki.ai] for [ke: + lai] is one of the cases.

Table 2*Taiwan Southern Min Contraction*

Uncontracted	Incomplete contraction		Complete contraction	Gloss
CVX+CVX	CVX.VX	CV.VX	CVX	
ke: + lai	—	ki.ai	kai	‘come over’
sjo: + kaŋ	—	—	sjaŋ	‘the same’
bo: + e:	—	—	bwe:	‘unable’
tsai + k ^h i:	—	—	tsai	‘morning’
bo: + ai	—	—	bwai	‘not want’

In Rugao contraction, most of the cases we solicit are complete contractions in the CVX template, as in Table 3. For example, [ɛjæn + ɛjən] is completely merged as [ɛjæn] ‘believed,’ in which two C(G)VX syllables are completely fused into one.

Table 3*Rugao Contraction*

Uncontracted	Incomplete contraction		Complete contraction	Gloss
CVX+CVX	CVX.VX	CV.VX	CVX	
ɛjæn + ɛjən	—	—	ɛjæn	‘believe’
tʂa + kow	—	—	tsaw	‘this’
si + xej	—	—	sej	‘time’
jin+ xej	—	—	ɹej	‘then’
ɛjən + jən	—	—	ɛjən	‘credit’

In Cantonese contraction, CV.VX is the most common template. [dzi: + gej] ‘know’ is partially merged as [dzi.ɛj], as in Table 4. In fast speech, CVX is applicable (Hsu, 2005). [ji: + ga:] ‘oneself’ is accordingly entirely fused as [ja:]. CV.VX and CVX are common in Cantonese.

Table 4*Cantonese Contraction*

Uncontracted	Incomplete contraction		Complete contraction	Gloss
CVX+CVX	CVX.VX	CV.VX	CVX	
dzi: + geɟ	—	dzi.eɟ	dzeɟ	‘know’
ji: + ga:	—	ji:.a:	ja:	‘oneself’
bət + ɔ:	—	bɐ.ɔ:	bɔ:	‘however’
ji: + geɟ	—	ji.eɟ	jeɟ	‘already’

In the gradient model, we consider the intralingual and cross-dialectal variations to be a gradual process of sound change. It is syllable timing that leads to the change, from the dissyllabic syllables to the monosyllabic ones. As the standard syllables in three languages are bi-moraic, the uncontracted forms are CVX.CVX (4 μ ; 3X+3X). In TM, contractions present a gradient change, in which intervocalic segments may not be totally reduced. In the semi-contracted stage, the unweighted onset of the 2nd source syllable is possibly contracted or deleted first. This contraction does not involve the change of the moraic structure but the duration of the dissyllabic word (4 μ ; 3X+2X). In the extreme reduction, the weighted coda glide/nasal of the 1st source syllable is then removed. As for Min and Cantonese contractions, two syllables can only be, to the fullest, contracted into one CVX syllable (2 μ ; 3X), with X₁ and C₂ deleted. It should be noted that the output nucleus in Min contractions is merged from two source syllables, thus co-decided by V₁ and V₂, which may reflect the sonority preference (Hsu, 2003).

6 Conclusion

The study examines the diverse patterns of contraction in Chinese languages. We propose a gradient account to elaborate on the typology of Chinese contractions regarding the variations of their syllable structures. We assume contraction is a gradual sound change, from two bimoraic syllables to one bimoraic syllable. Min and Rugao contractions are mostly in a clear dichotomized distribution, with uncontracted CVX+CVX or contracted CVX available. Their contracted forms comply with the syllable structures and phonotactic constraints, better viewed as syllable contraction. Taiwan Mandarin and Cantonese contractions are developing at the transitional stage, where intervocalic segments may not be totally reduced and two syllables haven’t been fully contracted into one sometimes. Cantonese contraction has a strong tendency to complete contraction, for several cases supporting the idea. Taiwan Mandarin contractions are mostly incomplete contractions, except for some lexicalized examples.

In the gradient account, Chinese contractions can get better predicted and interpreted under broader phonological frameworks. Future studies are suggested to examine more data from other dialects and conduct an empirical study for our assumption of contraction caused by the sharp prosodic drop.

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