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**VIETNAMESE LINGUISTICS:
STATE OF THE FIELD**

Edited by
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INTRODUCTION FROM THE VOLUME EDITORS

The current issue is the result of a workshop held at the Harvard Yenching Institute in April of 2021, entitled *Vietnamese Linguistics, Typology and Language Universals*, and which featured nineteen linguists working on diverse aspects of the Vietnamese language, ranging from semantics to historical phonology. Our purpose in gathering was to take stock of the great leaps in Vietnamese linguistic research that have occurred over the past few decades, to bring together cutting-edge research from each subdiscipline, and to begin a new collaborative dialogue on Vietnamese linguistics, typology, and language universals. Most of all, it was our belief that the time had come to reconsider Vietnamese linguistics as a unified field of inquiry. As a result, a new academic organization was founded: the *International Society of Vietnamese Linguistics*.

In the past twenty years, research into the Vietnamese language has advanced exponentially, in tandem with developments in our understanding of syntax, semantics, phonetics, and phonology—both on the synchronic and diachronic levels. Specific work on the Vietnamese language now informs and even leads broader linguistic inquiry in a number of unprecedented ways. These new developments invite a concentration of state-the-field research into a single volume, one that will serve not only to summarize current issues in each subdiscipline of Vietnamese linguistics, but also to initiate a longer, more collaborative conversation about the Vietnamese language.

Our goals in this special issue are thus twofold: first, we seek to provide a snapshot of current research into Vietnamese syntax, semantics, phonology, and phonetics, from both the historical and synchronic points of view, that may serve as a resource for linguists interested in exploring our current understanding of the Vietnamese language. Second, we hope that this issue will also serve as an invitation to all linguists working on the Vietnamese language or related languages to contribute to a broader, more cosmopolitan discussion—one in which discoveries of one subdiscipline may serve to inform or enlighten another.

The overarching theme of the research contained within this special volume was to apply a comparative approach to the study of Vietnamese. In each of the subdisciplinary investigations here, the Vietnamese language was compared with other languages around the world, falling into three major categories: 1) languages to which it is genealogically related (i.e. Vietic, Viet-Muong, Austroasiatic, etc.); 2) languages that are genealogically unrelated but areally and/or typologically related (i.e. those languages spoken in the sprachbund linguistic region of East/Southeast Asia); and 3) languages that are neither genealogically nor areally and/or typologically related (i.e. Indo-European languages). This comparative approach highlights not only what is particular about the Vietnamese language, but also how universal principles are specifically instantiated in the Vietnamese language, as well as its direct and non-analogous relationships with other languages with which it is in contact.

The ten articles in this volume may be divided up into the following subdisciplines: Historical Linguistics, Phonetics & Phonology, Morphology & Syntax, and Semantics & Pragmatics. Shimizu Masaaki's work focuses on the intersection of philology and historical linguistics and focuses on the use of Chữ Nôm materials from the early modern and modern period to reconstruct phonological changes in the southern dialects of Vietnamese. Mark Alves presents a study of basic household Vietnamese etyma, informed by archaeohistorical data, in order to reconstruct details of prehistoric and quasi-historic Red River Vietic life on the eve of full Sinitic colonization. John Phan and Hilario de Sousa compare phonological characteristics of Sino-Vietnamese vocabulary with other contemporary southwestern Chinese languages to uncover new evidence suggesting the existence of a Southwestern Middle Chinese Dialect that was once native to the region of the Red River Plain, and spoken there up until the first few centuries of the second millennium. James Kirby and Mark Alves present a study on the statistical regularities and recognizability of Sino-Vietnamese loanword phonology in modern Vietnamese, and they have made their research data and tools available to researchers for future queries. Phạm Thị Thu Hà and Marc Brunelle examine two corpora of Southern Vietnamese to demonstrate that Vietnamese indeed demonstrates intonation, but that it is variable and does not seem grammaticalized (in contrast with the intonation systems of Western European language). Nigel Duffield uses data from a wide variety of languages, including Vata, Irish and Vietnamese, to shed light on universal aspects of

the underlying position of arguments and of the “functional sequence” in the pre-verbal domain, properties which are typically obscured in English. Trần Phan and Wei-Tien Dylan Tsai investigate a particular type of non-canonical *what*-questions in Vietnamese (often dubbed surprise-denial/disapproval questions) that displays properties not attested in languages with apparent similar construals—in particular, Mandarin and Taiwan Southern Min. Trang Phan and Michal Starke provide a comprehensive and systematic view of Vietnamese yes-no question particles and show how this description leads us to a deeper understanding of Vietnamese clause structure in general. Y.-L. Irene Liao, Trần Phan, and T.-H. Jonah Lin analyze the syntactic structure of post-nominal modifiers in Vietnamese, based on the antisymmetry approach (Kayne 1994) to phrase structure. Finally, Tue Trinh discusses the fact that in Vietnamese, speakers and hearers can refer to themselves by pronouns, proper names, or relational nouns, which differentiates Vietnamese from English and many other languages.

Though from diverse subdisciplines of linguistic inquiry, our contributors from North America, Europe and Asia all represent the cutting-edge of linguistic research on Vietnamese. By bringing their work together, we hope to invite truly thought-provoking discussion of what the study of Vietnamese can reveal about language universals and linguistic variations from both diachronic and synchronic perspectives. Finally, we hope that the body of linguistic research represented here will serve as an invitation to all scholars working on Vietnam, to learn about the Vietnamese language, its structure and its history, and to collaborate with linguists on larger questions that will deepen our understanding of Vietnamese history, culture, and society.

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Trang Phan is currently a lecturer of Vietnamese language and linguistics at Vietnamese National University Hanoi. Phan obtained her Ph.D. from University of Sheffield in 2013 on the structure and acquisition of Vietnamese verbal aspect. From 2014 to 2016, she was a postdoc researcher of the Cartographic Syntax project at Ghent University, working on various aspects of Vietnamese clausal structure in a cross-linguistic perspective, including the position of Vietnamese with respect to the NP/DP parameter, the prodrop parameter, and the topic-prominent/subject-prominent parameter. From 2019 to 2021, she was the principal investigator of the project on the nanosyntax of Vietnamese tense and aspect funded by Vietnam National Foundation for Science & Technology Development (NAFOSTED) which has finished successfully. From 2020 to 2021, Phan was a visiting scholar at Harvard Yenching Institute, working on how Vietnamese nominals update our current understanding of classifier languages.

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John Phan is currently an Assistant Professor of Vietnamese Humanities in the Department of East Asian Languages & Cultures at Columbia University, as well as faculty member of the Columbia Linguistics Program. Phan obtained his Ph.D. from Cornell University in 2013, focusing on the phonological history of Vietnamese under Sinitic influence. From 2013-2014, he was a post-doctoral fellow of the Japan Society for the Promotion of Science (JSPS), based at the National Institute for Japanese Language & Linguistics (NINJAL), in Tokyo. From 2014-2017, he taught in the Department of Asian Languages & Cultures at Rutgers University, before joining the faculty at Columbia. Phan's research focuses both on the historical phonology of the Sinitic and Vietic languages, as well as on the literary and intellectual history of premodern Vietnam. His forthcoming book, to be published by Harvard Asia Center, is tentatively titled *Lost Tongues of the Red River: Annamese Middle Chinese and the Origins of the Vietnamese Language*.

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Mark Alves has been a professor at Montgomery College in the Department of ELAP, Linguistics, and Communication Studies since 2004. He received his Ph.D. at the University of Hawaii in 2000 in linguistics (Southeast Asian linguistics, Chinese linguistics, and Language Acquisition), with a dissertation of a description of the Pacoh language of central Vietnam, later published as a book in 2006. He has been the Editor-in-Chief of JSEALS since 2015, and he has periodically served as editor of SEALS conferences proceedings. He has published widely on historical and comparative linguistics of Southeast Asia with a focus on Vietnamese and the Austroasiatic language family. His dozens of publications have explored regional language contact in greater Southeast Asia; typological linguistics, especially morphology in Austroasiatic; loanwords, especially Sino-Vietnamese and regional Chinese loanwords; ethnohistorical linguistics, including matters of metallurgy and metal implements, household objects and activities, domesticated birds, color terms, kinship terms, grammatical words, among other categories. His research agenda has increasingly incorporated an interdisciplinary approach involving linguistic, historical/textual, archaeological, and ethnographic data.

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FROM THE JSEALS EDITOR-IN-CHIEF

This is the ninth JSEALS Special Publication. The goal of JSEALS Special Publications is to share collections of linguistics articles, such as select papers from conferences or other special academic events, such as this workshop, as well as to offer a way for linguistic researchers in the greater Southeast Asian region to publish monograph-length works.

This volume contains ten articles resulting from a special workshop on Vietnamese linguistics in March of 2021, hosted by the Harvard Yenching Institute: three papers focused on historical linguistics, five papers on syntax, and two papers on phonological issues. The international group of contributors are all linguists with strong backgrounds in Vietnamese linguistics (as well as related issues of Chinese for papers addressing such topics), making this a significant contribution to Vietnamese linguistic research, but also with clear contributions to the broader field of linguistics within their linguistic subfields. As the work is published in English, it makes aspects of Vietnamese linguistics available to the international community, and it is an Open Access publication available to scholars in Vietnam.

Since 2009, JSEALS has published many articles on a variety of topics in Vietnamese linguistics, as well as languages in Vietnam. We are thus very pleased that JSEALS is able to contribute this quality linguistic research and look forward to more such publications in the future.

Mark J. Alves

April 25th, 2022

Montgomery College

Rockville, Maryland

PHILOLOGICAL STUDY OF VIETNAMESE HISTORICAL PHONOLOGY—NÔM MATERIALS FOR 19TH-CENTURY SOUTHERN DIALECT¹

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Abstract

This study analyzes Nôm materials compiled from the 19th century to see how grammatical consideration of Nôm materials can contribute to the historical study of Vietnamese dialects, especially Southern Vietnamese. The materials used here are the manuscript of the Sino-Vietnamese version of *Phật Thuyết Thiên Địa Bát Dương Kinh*, and the woodprint version of *Lục Vân Tiên Truyện*. We trace back the process of the merger between coronal and velar syllable-codas reflected in the Nôm materials to point out that the time range of the merger is around one century, from the 19th century to the 20th century.

Keywords: historical phonology, grammar, Vietnamese Southern dialect, Nôm characters, Sino-Vietnamese readings

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1 Introduction

From the time Henri Maspero published a monumental work on Vietnamese historical phonology in 1912 until now, Nôm characters have played an important role in the historical study of Vietnamese. Concerning the nature of Nôm characters, Maspero (1912: 7) claimed, “It is enough to compare the characters of the inscription of Ninh-bình [14th century] with those of inscriptions and books printed in the 17-18th centuries and with the present characters to recognize that they are not different and they are much more fixed than imagined”. To support this opinion, he used Nôm materials as those reflecting the phonological features of 13th-century Vietnamese. The main concern was the characters indicating consonant clusters that existed at the time of their creation.

In the 1980s, Nguyễn Tài Cẩn published a series of articles concerning the origin, structure, and changes of Nôm characters from a linguistic perspective (Nguyễn 1985). In 1995, he also used Nôm evidence to reconstruct ancient Vietnamese, but only as secondary evidence. These two authors are different in the way they used Nôm materials for historical phonology. The former regarded the phonological features extracted from the phonetic components of Nôm as fixed enough to view them as representing 13th-century Vietnamese phonology. In contrast, because the latter recognized the various Nôm forms for the identical morpheme in a single text, he did not dare mention the period of each Nôm character, but only used them as supportive evidence for the reconstructed forms. We respect the careful attitude of the latter, but we should also find some way to use the characters more effectively.

An important work that has overcome this limitation of Nôm in terms of applicability in research was published by Nguyễn Tuấn Cường in 2012. That author analyzed the structure of Nôm characters in different versions of *Thi Kinh Giải Âm* 詩經解音 to see the actual evolutionary process of Nôm characters within a single title. Another outstanding contribution of this work to Nôm studies is that it

¹ I would like to express my gratitude to Professor Mark Alves, who kindly commented on earlier versions of this paper. I am also grateful to the participants in A state-of-the-fields workshop on Vietnamese Linguistics, Typology and Language Universals, held by Harvard Yenching Institute, April 16-17, 2021. I alone am responsible for any remaining errors.

clarified the uneven distribution of Nôm types: *giả tá*² and *hình thanh* are much more numerous than *hội ý* and *hội âm*. At around the same time, a Nôm dictionary with source notations for each character was published by Nguyễn Quang Hồng in 2014. Thanks to this, reading and researching Nôm materials have become much easier than before. These achievements have enabled us to grasp the general trend of Nôm evolution and essential features of Nôm characters, among which the most important is the phonetic-prominent nature. Given these conditions, I have reconstructed the Sino-Vietnamese (SV) initial system in a certain period by analyzing the phonetic components (Shimizu 2020).

Using basically the same methods, this study is intended to make clear the development of the Southern dialect of Vietnamese in detail through the analysis of two Nôm materials that reflect the Southern phonological features in the 19th century. It also tries to make clear which features of Nôm characters are the most linguistically significant and can make the most significant contribution to the linguistic study of Vietnamese.

2 Methodology

To investigate the diachronic process of Southern dialect formation, this study will apply the following procedures:

- Because our purpose is to use Nôm materials for the phonological study, it is worth describing the phonetic-prominent nature of Nôm characters.
- The target of this study is Southern Vietnamese and the Nôm materials transcribing the 19th-century Southern dialect. The outstanding feature of the present materials is the irregular choice of phonetic components compared with the standard Nôm. To make this claim, first, we need to prove that the readings of phonetic components of Nôm based on SV readings of Chinese characters were standardized with the help of the rhyming dictionary prevailing in Vietnam at that time.
- To shed light on the target of this study, it is essential to review the synchronic and diachronic nature of Southern Vietnamese, especially the phonological features. Thereby, we can claim what contribution Nôm materials can make for the present purpose.
- Under the conditions described above, the first thing to do is to transcribe each Nôm characters into Quốc Ngữ scripts in a traditional way. Second, we compare the Nôm readings and the SV readings of their phonetic components. When differences are found between them, we assume two possibilities for the reasons: One is the reflection of the phonological changes taking place in one or both of them from their creation period until the present, and the other is because of the absence of appropriate SV candidates that suit the target native syllables. Of course, our concern is the former cases that give evidence for phonological changes, whereas the latter are quite easy to sort out because the existing SV syllables are limited in number and easily located in the SV syllable database. Among the former cases, our chief concern here is the case in which the Nôm syllable coda has a coronal nasal/stop and that of their phonetic components has a velar nasal/stop, and vice versa, a correspondence that reflects the Southern dialect during the Nôm creation period.
- The final step is to contextualize the Nôm-SV correspondence in the rhyme development process of Southern Vietnamese from its formation to the 20th century. The expected contribution of Nôm materials is understanding about the gradual merger of coronal and velar codas depending on the preceding vowel classes (i.e., first central or diphthongs, and then back and front vowels).

² Most of the Nôm characters are classified into 4 types: *giả tá* 假借 that uses the original form and the Sino-Vietnamese reading of the Chinese character to express the native Vietnamese vocabulary, such as 哈 *hai* meaning ‘two;’ *hình thanh* 形聲 that combines the phonetic component based on the Sino-Vietnamese reading and the semantic component, such as 辭 *năm* meaning ‘year’ consisting of 南 *nam* as the phonetic component and 年 ‘year’ as the semantic component; *hội ý* 會意 that consists of two semantic components, such as 仝 *trùm* meaning ‘magnate’ (人 ‘person’ and 上 ‘upper’); and *hội âm* 會音 that consists of two phonetic components, such as 羸 *trái* ‘fruit’ that consists of 巴 *ba* and 賴 *lại* that represents *blái* (> *trái*).

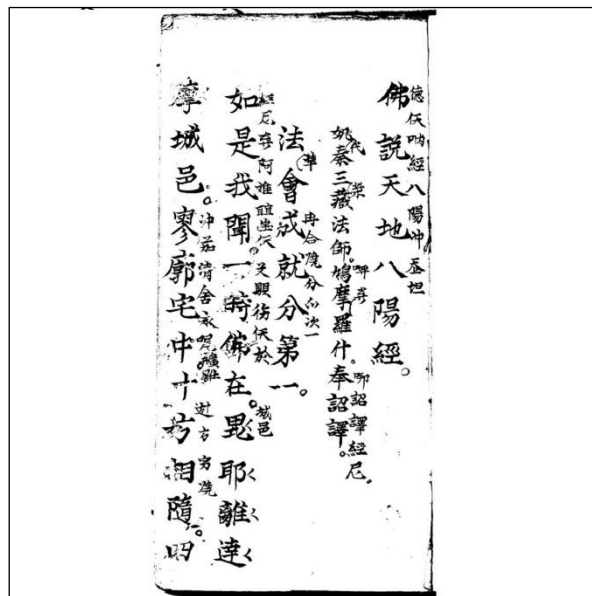
3 Materials

Two Nôm materials are used in this study: One is the handwritten text of the Sino-Vietnamese version of *Phật Thuyết Thiên Địa Bát Dương Kinh* 佛說天地八陽經 (*BDK*), and the other is the woodprint text of *Lục Vân Tiên Truyện* 蓼雲仙傳 (*LVT*).

The text of *BDK* used in this study was originally stored at Cảnh Phước 景福 Temple in Bangkok, Thailand. It was brought to Japan and introduced by Sakurai Yumio (1945-2012) in 1979. Now, it is preserved at the library of Kyoto University Center for Southeast Asian Studies. According to our philological analysis, it was handwritten in the 19th century, quite possibly in 1885. Because there is no available Quốc Ngữ-transcribed version, all the Nôm characters were transcribed by the author.

The copy of the woodprint version of *LVT* used in this study was provided from the private library of Nguyễn Quảng Tuân (1925-2019). Its content is a well-known literary work from Southern Vietnam written by Nguyễn Đình Chiểu (1822-1888). The text was originally compiled in Guangdong Province, China, and the fifth printed version in hand was printed in 1901. There is a Quốc Ngữ version transcribed by Nguyễn Quảng Tuân himself.

Figure 1: The first page of the handwritten text of *Phật Thuyết Thiên Địa Bát Dương Kinh*.



3 The Nature of Southern Vietnamese

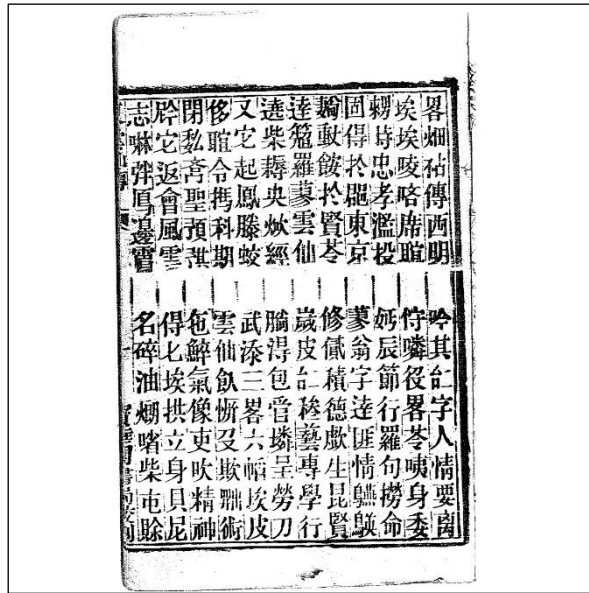
Past studies on Southern dialects have mainly targeted the Saigon dialect³. Most of them provide synchronic considerations (Thompson 1959, Nguyễn 1971, Thompson 1984-85, Cao 1988), and a few discuss diachronic aspects (Hoàng 2004, Kondo 2016). The main findings of the synchronic studies have so far revealed the following:

1. Initial consonants in Southern Vietnamese are more conservative than in Northern Vietnamese.
2. The tonal system lacks a distinction between two tonemes called *hỏi* and *ngã*.
3. One of the most distinctive features of Southern Vietnamese rhymes is “the lack of contrast between coronal and velar codas”. (Cao 1988)

The main concern of this study is closely related to (iii). More precisely, the phenomenon can be explained as the different distribution of coronal and velar codas in Northern and Southern Vietnamese. Some examples are shown in (1) (Pham 2006).

³ Hoàng Thị Châu (2004) pointed out that the Southern dialect region, spreading from Đà Nẵng to Cà Mau, is highly unified in phonological features, except for Quảng Nam and Quảng Ngãi, where /a:/ and /a/ behave differently than they do in other regions when succeeded by final consonants.

Figure 2: The first page of the Woodprint version of *Lục Vân Tiên Truyện*



(1) Distribution of coronal and velar codas in two major dialects

Orthography	Hanoi	Saigon	Gloss
a. <i>đứt</i>	[dít]	[dík]	‘be broken’
b. <i>ớt</i>	[ʔə:t]	[ʔə:k]	‘pepper’
c. <i>khát</i>	[xa:t]	[xa:k]	‘thirsty’
d. <i>mắt</i>	[mat]	[mak]	‘eyes’
e. <i>hét</i>	[he:t]	[he:k]	‘to scream’
f. <i>chuột</i>	[cuət]	[cu:k]	‘mouse’
g. <i>đích</i>	[dic]	[dít]	‘target’
h. <i>lệnh</i>	[lep]	[lə:n]	‘order’
i. <i>khách</i>	[xac]	[xat]	‘guest’
j. <i>khác</i>	[xa:k]	[xa:k]	‘different’
k. <i>khắc</i>	[xak]	[xak]	‘to engrave’

It is because of the existence of a.~f. and j.~k. that the descriptions of Southern Vietnamese often point out the phenomena as (iii). These examples show that Hanoi speakers pronounce them distinctively as [t] and [k], whereas Saigon speakers pronounce both as [k].

Past diachronic studies also mention (iii). Among others, the most noteworthy is the claim of external influence on the evolution of Southern dialects, especially that of the Chaozhou dialect of Chinese. The claim is that the phenomenon of losing the final pair [-n -t] in a certain part of Southern rhymes allows us to think of the influence of Chaozhou dialect, because Chaozhou people occupy a high ratio of the Chinese immigrants to the Southern Vietnam (Hoàng 2004: 228). The evidence is the rhyme system of the Chaozhou dialect, which lacks the finals /-n, -t/. Verifying the appropriateness of this claim requires more authentic data and historical documents. Furthermore, there are actually several Chinese dialects in southern Vietnam, and the Chaozhou dialect has never been the dominant one in Southern Vietnam.

An attempt to account for the rhyme systems of two major dialects of Vietnamese—Hanoi and Saigon—on the same phonological grounds was made by Pham (2006). Unlike the past diachronic works, she assumed two different phonological mechanisms for Hanoi and Saigon dialects; however, these two mechanisms are processed under the same conditions. The theoretical assumptions are the default variability hypothesis, which allows for the same underlying representation shared by both coronal and velar consonants (Rice 1996), and the syllable weight constraint, which allows feature

sharing by both vowels and consonants in light syllables (Clements 1991). The conclusions are summarized in (2).

(2) a. Phonetic distribution of final consonants in the Hanoi rhyme

		VC		V:C		
	i	ɨ	u			
	e	ə	o		ə:	
	ɛ	a	ɔ	ɛ:	a:	
				iə	iə	uə
underlying final	C/k	C/k	C/k	C/k	C/k	C/k
feature sharing	[cor]		[lab]			
surface consonants	t/c	t/k	t/kp	t/k	t/k	t/k

b. Phonetic realization of final consonants in the Saigon dialect

		VC		V:C		
	i	ɨ	u	i:	ɨ:	u:
	e	ə	o			
	ɛ	a	ɔ	ɛ:	a:	ɔ:
underlying final	C	C	C	C	C	C
feature sharing	[cor]		[lab]			
surface consonants	[t]	[k]	[kp]	[k]	[k]	[k]

In (2), C stands for an unspecified place. In (2a), C surfaces as a coronal after all vowels according to the default variability hypothesis, whereas in (2b), C surfaces as a coronal after short front vowels and a velar elsewhere. Therefore, according to this analysis, the Hanoi dialect has three underlying places of articulation (labial, unspecified, dorsal), whereas the Saigon dialect has only two (labial, unspecified). In addition, the Hanoi dialect presents complementary distribution in final /k/ (c~k~k^p), while the Saigon dialect does in /C/ (t~k~k^p).

Pham’s analysis is theoretically well supported and succeeded in accounting for all the aspects of both dialects’ rhyme systems. We would like to point out that, while Pham’s analysis is synchronic in nature, the relatively short history of Southern Vietnam allows us to think about diachronic aspects of the dialect. Immigrants to the Southern region are generally from Northern or Central Vietnam. It was not until the end of the 17th century that they reached the region of modern Saigon (Gia Định, at that time). Fortunately, some Romanized Catholic documents dating from the 17th century are available. One of the most famous ones is Alexandre de Rhodes’ *Dictionarium Annamiticum Lusitanum, et Latinum*, which has a hybrid nature. The rhyme system with nasal and stop codas in *Dictionarium* is similar to that of the present Northern system (Gergerson 1969, Nguyễn 2010). Therefore, the present Northern system can be regarded as the origin of the present Saigon system.

Following are the Northern⁴ and Southern⁵ phonemes extracted from our field data.

(3) a. Northern phonemes:

Onsets	/t tʃ c k ʔ t ^h b d f v s z ʒ x ɣ h m n ɲ r l/
Medial	/w/
Vowels	/a: a ə: ə i: ɛ: e: i: ɔ: o: u: iə uə uə/
Codas	/p t k(k~c~k ^p) m n ɲ(ɲ~ɲ~ɲ ^m) w j/
Tones	1. level, 2. mid falling, 3. low falling, 4. broken, 5. rising, 6. low glottalized, 7. rising checked, 8. low checked

⁴ Based on the data given by the consultant (female, 21 yrs) from Nam Định province.

⁵ Based on the data given by the consultant (female, 22 yrs) from Tiền Giang province.

b. Southern phonemes:

Onsets	/t t̚ c k g(̃y) ʔ tʰ b d f s z ʂ kʰ(̃x) h m n ɲ r l j/
Medial	/w/
Vowels	/a: a ə: ə i: ĩ ε: e: i: o: u: iə uə iə/
Finals	/p t k k ^p m n ŋ ŋ ^m w j/
Tones	1. level, 2. mid falling, 3-4. broken, 5. rising, 6. low glottalized, 7. rising checked, 8. low checked

IPA notation in (3) is modified, so it is easy to compare with Pham’s work. A significant difference between Pham’s interpretation of Saigon phonemes and ours is the presence or absence of long/short contrasts in the orthographic monophthongs and diphthongs, which are exemplified in (4).

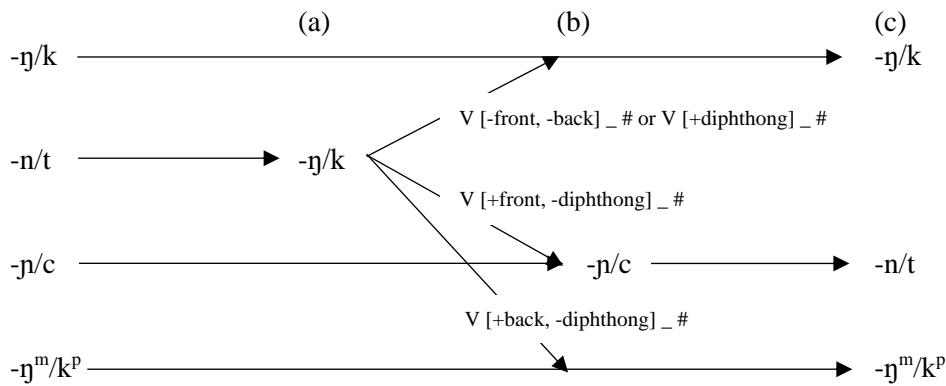
(4) Interpretation of orthographic diphthongs

Orthography	Pham		This study	
	North	South	North	South
<i>tim</i>	/tim/	/tim/	/ti:m/	/ti:m/
<i>kiém</i>	/kiəm/	/ki:m/	/kiəm/	/ki:m/
<i>cúm</i>	/ku:m/	/kum/	/ku:m/	/kim/
<i>buòm</i>	/buəm/	/bu:m/	/buəm/	/bu:m/

The interpretation presented in (4) shows that this study does not suppose the contrasts between /i/ and /i:/, and /u/ and /u:/. The same interpretation is given in most of the past studies.

Given the phonemes in (3) and their distribution exemplified in (1), our hypothesis about the Southern rhyme development is summarized in (5). As mentioned above, the Nam Đĩnh system, which is the most similar to *Dictionarium*, is placed on the left as the origin of the development, and the present Southern system is presented on the right as the result of the development.

(5) Southern rhyme development (coronal & velar codas)



The process begins with (a), in which $-n, t$ merged into $-\eta, k$. This process can be regarded as the trigger of all the following processes. Process (b) is the same as “feature sharing” with short vowels in (2a). The following process is (c), in which $-\eta, c$ changed into $-n, t$. This process might be explained in terms of the coronal default model, in which coronal is the unmarked place with no dependent (Avery and Rice 1988).

Supposing (5a) is the trigger of all the following processes in either a synchronic or diachronic sense, it is worthwhile to analyze Nôm characters, which can potentially distinguish coronal and velar codas by the phonetic components.

(6) SV-Nôm correspondence of syllable codas in standard Nôm

SV / Nôm	-p	-m	-t	-n	-k	-ŋ	-j	-w
-p	21							
-m		54						
-t			81		1***			
-n		2*		123				
-k			1**		76			
-ŋ						152		
-j/front V							192	
-w/back V								78

mim*: 閔, 閔; *duot*: 欲; ****liéc*: 列

Looking at Nôm data in two documents *BDK* and *LVT* from Southern Vietnam, many cases violating the nearly one-to-one correspondence can be found. The nature of these cases is a mismatch between coronal and velar codas. Typical cases are shown in (7), and all the other examples in the two materials are given in the Appendix.

(7) Irregular correspondences between SV and Nôm codas

a. 徽 <i>chân</i>	(徽 SV: <i>trung</i>)	‘foot’	(<i>LVT</i>)
b. 啖 <i>han</i>	(香 SV: <i>huong</i>)	‘to ask’	(<i>LVT</i>)
c. 晚 <i>miệng</i>	(免 SV: <i>miễn</i>)	‘mouth’	(<i>BDK</i>)
d. 啞 <i>lặng</i>	(吝 SV: <i>lận</i>)	‘to be quiet’	(<i>LVT</i>)
e. 找 <i>dứt</i>	(弋 SV: <i>dặc</i>)	‘to be cut’	(<i>BDK</i>)
f. 北 <i>bắt</i>	(北 SV: <i>bắc</i>)	‘to arrest, catch’	(<i>LVT</i>)
g. 捌 <i>bác</i>	(捌 SV: <i>bát</i>)	‘uncle’	(<i>LVT</i>)
h. 戛 <i>nhác</i>	(戛 SV: <i>dát</i>)	‘to be lazy’	(<i>BDK</i>)

These are the cases in which Nôm coronal codas were transcribed with SV velars, and vice versa. Considering the dialectal difference, the present situation can be generalized as (8).

(8) Relationship of phonemes and orthography in Southern Nôm compared with standard Nôm

	Orthography	SV	Nôm	Orthography
Standard (Northern)	<i>n, t</i>	/-n/, /-t/	/-n/, /-t/	<i>n, t</i>
	<i>ng, c</i>	/-ŋ/, /-k/	/-ŋ/, /-k/	<i>ng, k</i>
Southern	<i>n, t</i>	/-ŋ/, /-k/	/-ŋ/, /-k/	<i>n, t</i>
	<i>ng, c</i>			<i>ng, c</i>

In (8), the relationship between phonemes and orthography reflected in Southern Nôm materials is shown, compared with that in standard Nôm. In fact, the principle of one-to-one correspondence is observed at the phonological level even in Southern Nôm. However, in a comparison with the orthographic system, many cases of mismatch can be found in both materials. Considering the development process of the Southern dialect given in (5), the cases in (8) can be regarded as having undergone the (5a) process, that is, -n > -ŋ and -t > -k. When we investigate all the cases in the Appendix, we can observe a deviation of the distribution among the preceding vowels. The table in (9) shows the distribution of all the cases sorted by the types of preceding vowels.

study analyzed a textbook of Swatow grammar published in 1884 and concluded that the rhyme system at that time possessed a full set of codas containing -n, t succeeding all kinds of vowels, which indicates that the -n/-t > -ŋ/-k change occurred within around one century (Lin 2005). The latter work analyzed the field data of Chao'an 潮安 collected by the late Y. R. Chao in 1928-29. Observing the rhyme types that preserve the syllable-coda -n/-t, the only syllable pattern that was preserved at that time is -in, while other patterns were already lost (Yue 2001). This indicates that among all the syllable patterns containing -n/-t the one containing the front high vowel survived the longest. The similar situation in Chaozhao-hua could be supportive for our hypothesis about the process of -n/-t > -ŋ/-k change in Southern Vietnamese.

7 Conclusions

One of the most characteristic features of Southern Vietnamese is its distribution of coronal and velar codas in syllables. The distribution is different systematically from that of Northern Vietnamese. Because the distinction between coronal and velar codas is reflected precisely in Nôm-SV correspondence, it is worthwhile to look at the actual Nôm-SV correspondence in Southern Nôm materials to investigate the rhyme development of Southern Vietnamese. Based on the previous works and our own field data, it can be pointed out that the development process of rhymes containing coronals, palatals, and velars was initially triggered by the single rule -n/-t > -ŋ/-k. At the same time, the typical feature of Southern Nôm is the mismatch of Nôm-SV correspondence between coronal and velar codas. Therefore, two Southern Nôm materials compiled in the 19th century were analyzed to determine that the syllable types indicating the completion of the -n/-t > -ŋ/-k process are those containing central vowels and diphthongs with a small number of back monophthongs. This implies that not all the syllables ending with -n, t changed into -ŋ, k at the same time, but the process took about 100 years, from the 19th to 20th centuries.

Further investigation is required to clarify the historical development of coronal and velar codas after back and front vowels in Southern Nôm materials. In addition, the same research procedure must be undertaken for the earlier texts to clarify the precise time at which the change started.

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Appendix: Nôm examples from BDK and LVT

BDK

Nôm	Readings	Phonetic Components	SV	Standard Forms	SV	Pages	Chinese Meaning
𠵼	<i>biêng</i>	𠵼	<i>biên</i>	丙	<i>bính</i>	2a4	懈怠
𠵼	<i>nhác</i>	𠵼	<i>dát</i>	落	<i>lạc</i>	2a4	懈怠
𠵼	<i>dít</i>	𠵼	<i>dặc</i>	悉	<i>tát</i>	5b5 6a1, 6b1, 7b1	休 減
攢	<i>chác</i>	質	<i>chát</i>	職	<i>chức</i>	7b4	固
𠵼	<i>miêng</i>	免	<i>miễn</i>	𠵼	<i>mãnh</i>	12b3	口

Nôm	Readings	Phonetic Components	SV	Standard Forms	SV	Pages	Chinese Meaning
𠵼	<i>dứt</i>	弋	<i>dặc</i>	悉	<i>tất</i>	24a3	断
𠵼工卩	<i>đặn</i>	鄧	<i>đặng</i>	憚	<i>đạn</i>	27a2	皆
𠵼犬言王	<i>cuốn</i>	狂	<i>cuông</i>	卷	<i>quyển</i>	28b2	卷
洛	<i>lặng</i>	吝	<i>lận</i>	朗	<i>lãng</i>	31a1	静
終	<i>trọn</i>	終	<i>chung</i>	論	<i>luận</i>	32a5	共

LVT

Nôm	Readings	Phonetic Components	SV	Standard Forms	SV	Pages	Meaning
咯	<i>lặng</i>	吝	<i>lận</i>	浪	<i>lãng</i>	1a2	to be quiet (唵咯 lẳng lẳng)
邦	<i>ban</i>	邦	<i>bang</i>	班	<i>ban</i>	1b12, 9a9	day-time (邦埋 ban mai)
助	<i>gấn</i>	亘	<i>cảng</i>	良	<i>cán</i>	2b3	to stick
徵	<i>chân</i>	徵	<i>trung</i>	蹟	眞 <i>chân</i>	2b4, 2b10, 9a9	foot (徵{𠵼上天} chân trời)
嗜	<i>han</i>	香	<i>huong</i>	罕	<i>han</i>	2b10	to ask
𠵼彡烈	<i>liết</i>	烈	<i>liệt</i>	列	<i>liệt</i>	5a2	to glance
盘	<i>bàng</i>	盤	<i>ban</i>	傍	<i>bàng</i>	11a3	to be enough (彼盘 bĩ bàng)
咽	<i>nhãng</i>	因	<i>nhân</i>	𠵼	仍 <i>nhung</i>	12a11	to talk nonsense (𠵼咽 nói nhãng)
嚙	<i>màng</i>	曼	<i>mạn</i>	忙	<i>màng</i>	12b6	to desire
𠵼口方	<i>phản</i>	方	<i>phương</i>			15a4	to grope (𠵼{𠵼口方} hoi phản)
干	<i>cang</i>	干	<i>can</i>	綱	<i>cang</i>	15a12	substitute for 綱
難	<i>nang</i>	難	<i>nan</i>	能	<i>năng</i>	15b2	carefully ({𠵼火弩} 難 nô nang)
光	<i>quan</i>	光	<i>quang</i>	官	<i>quan</i>	15b7 16b12	mandarin (部光 bộ quan)
唐	<i>đàn</i>	唐	<i>đàng</i>	彈	<i>đàn</i>	16a1	musical instrument
千	<i>thiêng</i>	千	<i>thiên</i>	声	<i>thanh</i>	17a2	to be sacred
冤	<i>hoang</i>	冤	<i>oan</i>	荒	<i>hoang</i>	17b1	substitute for 荒 (天荒 thiên hoang)
彦	<i>ngàng</i>	彦	<i>ngạn</i>	昂	<i>ngang</i>	18b11	to be puzzled (語彦 ngữ ngàng)
閑	<i>nhàng</i>	閑	<i>nhàn</i>	讓	<i>nhượng</i>	20a7	to be lively (閑閑 nhộn nhàng)
洛	<i>lặng</i>	吝	<i>lận</i>	浪	<i>lãng</i>	20b12	to be quiet (洛{𠵼彡裡 lẳng lẽ)
乾	<i>càng</i>	乾	<i>càn</i>	強	<i>cường</i>	22a9, 26a2, 26a9, 39b9	the more ... (乾添 càng thêm)

Nôm	Readings	Phonetic Components	SV	Standard Forms	SV	Pages	Meaning
悶	<i>muông</i>	悶	<i>muôn</i>	夢	<i>mông</i>	22b9	water morning glory
忙	<i>man</i>	芒	<i>mang</i>	曼	<i>man</i>	23b12	to be unconscious (({[𠃉]迷})忙 mê man)
𠃉徵足	<i>chung</i>	𠃉徵足	<i>chân</i>	徵	<i>trung</i>	24a8, 34b8	because (爲({[𠃉]徵足}) vì chung)
空	<i>khôn</i>	空	<i>không</i>	坤	<i>khôn</i>	24b1	to be difficult
蔘	<i>chôn</i>	終	<i>chung</i>			26a6	to be restless (蔘蔘 bôn chôn)
論	<i>lương</i>	論	<i>luận</i>	量	<i>lương</i>	33a3, 42a8	to think (持論 nghĩ lương)
北	<i>bắt</i>	北	<i>bắc</i>	扒	八 <i>bát</i>	33a4, 44b1, 44b5	to arrest, catch
天	<i>thiên</i>	天	<i>thiên</i>	声	<i>thanh</i>	33a9	to be sacred (灵天 linh thiên)
得	<i>đắt</i>	得	<i>đắc</i>	怛	<i>đát</i>	33a12	to sell well (半得 bán đắt)
唵	<i>mượn</i>	命	<i>mạng</i>	嘜	曼 <i>mạn</i>	34b8	to borrow (唵衛 mượn về)
降	<i>dán</i>	降	<i>giáng</i>	旦	<i>dán</i>	34b10	to stick (降連 dán lên)
引	<i>dắng</i>	引	<i>dẫn</i>	啣	孕 <i>dụng</i>	35a1	to be aloud (引 ({[𠃉]崔 dắng dôi})
捌	<i>bác</i>	捌	<i>bát</i>	博	<i>bác</i>	35b12	uncle
版	<i>bàng</i>	版	<i>bản</i>	榜	<i>bàng</i>	39b5	to be surprised (版潮 bàng lãng)
別	<i>biéc</i>	別	<i>biết</i>	碧	<i>bích</i>	42b11	bluish green

LEXICAL EVIDENCE OF THE VIETIC HOUSEHOLD BEFORE AND AFTER LANGUAGE CONTACT WITH SINITIC

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Abstract

This study presents Vietnamese words which are Vietic etyma or early Chinese loanwords in the domain of the household (e.g., structures, implements, clothing, decorations, cuisine). The Vietic etyma correspond to the Neolithic lifestyle of Austroasiatic agriculturalists, but some words may stem to the Metal Age. The early Chinese loanwords correspond to Chinese-style households of the Han Dynasty and some centuries after. Few early Chinese loanwords are found in Vietic languages outside of Viet-Muong, which highlights sociolinguistic circumstances making Viet-Muong distinct. Combined with ethnohistorical and archaeological data, this lexical data leads to hypotheses about changes in this semantic domain and lifestyles in northern Vietnam in the early 1st millennium CE.

Keywords: Vietic, Sinitic, loanwords, ethnohistory, inter-disciplinary

ISO 639-3 codes: Vietnamese, Muong, Chinese

1 Introduction

The purpose of this paper is to explore the ethnohistoric history of the speakers of Vietic, that is, the ancestral language group of modern-day Vietnamese (cf. § 1.3.1 on the term “Vietic”). The topic of focus is the semantic domain of the household, primarily nouns of material culture but also relevant verbs. The subdomains considered in this study include those in Table 1.

Table 1: Subdomains of the household considered in lexical data of Vietic and Early Chinese loanwords in Vietnamese

Subdomains	Types of Lexical Data
Household structures and components	Housing, architectural elements, household decorations
Household items and implements	Bedroom items, personal objects, musical instruments, various implements, related actions
Clothing and decorations	Garments, jewelry, grooming, colors, related actions
Food and cuisine	Prepared foods, ingredients, produce, implements, related actions

The period in consideration is from the stage of Proto-Vietic to the early period of language contact between Vietic and Sinitic (i.e., Old Chinese and before branching into varieties of Chinese; cf. § 1.3.2 on the term “Sinitic”) from the Han Dynasty (c. 200 BCE to 200 CE) to some centuries into the first millennium CE. Accomplishing this requires lexical data that is selected through regularly occurring phonological patterns and identification of lexical retentions, innovations, and borrowings (primarily from Chinese, but also Tai) and then grouped by semantic/cultural domains. While this study is firstly a historical linguistic one, its scope provides data to answer questions that might be asked by historians and archaeologists. The two key questions considered in this paper are the following.

1. What impact did lexical borrowing from Sinitic have on Vietic in the semantic domain and subdomains of the household?
2. What does lexical data in Vietic and Vietnamese in the cultural domain of the household suggest about the daily lifestyle of Vietic peoples in the household prior to and following contact with Chinese culture and the Sinitic speech community?

In Section 1, I provide general information about historical linguistic issues as they relate to history and archaeology, the historical time frame considered, and the data sources (i.e., Vietic reconstructions and loanwords from Sinitic) and methods of historical linguistic analysis. Sections 2 and 3 present and discuss the lexical data—first Vietic and then early Chinese loanwords (ECLs hereafter)¹—grouped by subdomains of the household, including household structures, household implements, clothing, foods, among others related to these subdomains. Section 4 summarizes key findings, notes remaining questions, and requests further and hopefully collaborative research, in which historical linguistic data can be utilized. The Appendix provides a list of words excluded from the key observations due to factors that reduce certainty of their status as ECLs, but which should be considered in the future if/when new data becomes available.

1.1 Historical linguistics, history, and archaeology

Historical linguistics is a field naturally associated with the study of diachronic changes of the systems of phonology, morphology, syntax, and lexical semantics of a language. To researchers outside of linguistics, these issues may not seem immediately applicable to their research agendas. Knowing that, for example, the historical development of tone systems of Chinese, Vietnamese, or Thai relates to types of consonants at the ends of syllables, of which some no longer exist, may be only vaguely interesting to some non-linguists. The question should be how it might lead actionable knowledge outside of historical linguistic inquiry.

Historical linguistics has offered practical information to academics interested in historical and sociocultural research. In recent decades, archaeologists have increasingly employed—indeed, relied upon—historical linguistic understanding of language families to make progress in the understanding of the origins and spread of people and the associated language families such as Indo-European (e.g., Renfrew 1988, Mallory 1989, Anthony and Ringe 2015, etc.), Austronesian (e.g., Bellwood 2005: 111-145, Simanjuntak 2017, etc.), among others. Historians sometimes use toponyms to seek information about prerecorded history in areas (e.g., Lê 2006 on toponyms in Vietnam), which is effectively a subtype of etymology, but with a focus on place names. Occasionally, ethnohistorians make reference to specific words for objects with broad implications of the interactions of peoples in the past.

This is far from the limits of what historical linguistic data has to offer to historians and archaeologists. One major development in the first decade of the current millennium was the explosion of widely available linguistic data, databases, and reconstructions of lexicons of early stages of language groups. As a result of such data, some researchers taking an interdisciplinary approach (Blench 2014 and 2017, Blust 2019, Sagart 2022, etc.) have provided ethnohistorical and archaeological insights with far more lexical data than the generality of language families or a few place names and words, however useful those have proven to be. The massive five-volume *Lexicon of Proto-Oceanic* series (ed. by Ross et al. (1998-2016)) models the way that lexical reconstructions in semantic/cultural domains can be effectively combined with ethnographic and archaeological data. The wealth of such lexical data can and should be utilized outside of historical linguistics.

Beyond just toponyms, **etymological investigation** looks at all domains with the goal of identification of native etyma (e.g., Proto-Austroasiatic or Proto-Vietic), lexical innovations (e.g., Viet-Muong or Vietnamese), and loanwords (e.g., ECLs, later Sino-Vietnamese vocabulary, Tai loanwords, etc.). Combined with the aforementioned massive collections of lexical data, researchers can now do more effective cross-linguistic comparative studies of both modern languages and historical linguistic reconstructions that permit identification of possible origins and historical paths of words among

¹ Abbreviations used in this paper: AA = Austroasiatic; CH = Chinese; ECL = early Chinese loanword; MC = Middle Chinese; OC = Old Chinese; PV = Proto-Vietic; SV = Sino-Vietnamese;

languages. Mainland Southeast Asia presents a particularly complex history of contact among several language groups over a few thousand years (i.e., Austroasiatic, Sino-Tibetan/Trans-Himalayan, Tai-Kadai/Kradai, Austronesian, and Hmong-Mien), resulting in considerable confusion by researchers about word origins. While unable to clarify all issues, the new resources and tools have obvious potential to more reliably help sort out historical linguistic and cross-cultural interactions.

Moreover, **phonological features** connected to a historical context—such as the example above of the historical development of tone systems—can at least reveal relative chronologies of native etyma or loanwords. Such is the case for ECLs, with phonological features that mark them as predating the borrowing of Sino-Vietnamese vocabulary (cf. § 1.3.1). In ideal cases, in combination with historical information, historical phonological details can indicate approximate periods of etymological origins of words. Such data also provides sufficient chronological information to generate working hypotheses about relevant historical sociocultural interactions in certain periods. For instance, based on linguistic and archaeological data, we must assume that the Vietnamese word *đan* ‘to weave’ has more than a 4,000-year history as a widely attested Proto-Austroasiatic etymon (§ 2.1). In contrast, Vietnamese *ngói* ‘roof tile’ is likely a late-period Old Chinese loanword (§ 3.1). Archaeological excavations of thousands of Chinese-style roof tiles at the proto-urban Cỏ Loa archaeological site from about 200 BCE (cf. Kim et al. 2010) provide a possible early date of cultural transmission, though it is also possible the word itself could have been borrowed in subsequent centuries.

In addition, rather than the uncertainty of single words, considering **large quantities of lexical data** leads to identifiable phonological patterns. Such recurring patterns are crucial in identifying which words are highly likely to be native etyma or loanwords as well as which are to be excluded as chance similarity. A related issue is that the prevalence of “look-alike” words is much higher than many realize, sometimes leading to false or misleading perceptions of relationships between languages. For example, Vietnamese and Samoan share the form *ai* meaning ‘who’, but the Samoan form comes from Proto-Malayo-Polynesian **sai* (Blust and Trussel 2010), while the Vietnamese form has an uncertain origin (possibly Austroasiatic **ʔa:j* ‘(1st person dual)’). Consider also Vietnamese *mày* ‘you (intimate)’ from Proto-Austroasiatic **mi:ʔ* ‘(2nd person singular)’ and the similar-looking English pronoun *my* (1st person possessive) from Proto-Indo-European, which are certainly unrelated. The likelihood of chance similarity is further increased in languages with simple syllable structures (e.g., consonant-vowel-consonant, as in Vietnamese, varieties of Chinese, and Tai languages) as the number of possible combinations is restricted.

Thus, focusing on single words or small datasets to make ethnohistorical claims is fraught with such risks. Conversely, large quantities of lexical data in which robust phonological patterns can be identified to certify or exclude possibilities are necessary to researchers of ethnohistorical topics. Combining such data with clear historical evidence of sociocultural contact and shared origins further strengthens such claims, while the lack thereof necessarily weakens them, as in the instances of Vietnamese and Samoan or of Austroasiatic and Indo-European.

Another useful method is related to the study of **semantic domains**. With the availability of large quantities of lexical data, it is possible to apply a kind of historical semantic/cultural domain analysis. That is normally an approach applicable to ethnographic or cognitive linguistic studies based on modern languages. The quantity of reconstructed vocabulary can never reach the extent of any modern language. Only several hundred strong Vietic reconstructions and probable early Chinese words are available, versus many thousands of modern Vietnamese words. But with some twelve hundred plus words, what can be done to study cultural domains of early Vietic culture is substantive, and such a quantity is obviously vastly more reliable than relying on a single word, which does not provide testable phonological patterns. The identification of reconstructed words in the cultural domain of the home can thus serve as historical linguistic study, but also as a resource to ethnohistorical and ethnoarchaeological queries.

It is challenging to balance the presentation of archaeohistorical information with comparative historical linguistic data. In this article, I have attempted to provide brief yet central ethnohistorical and archaeological information that match the lexical data. In many cases, details have undoubtedly been missed, and factual details will need to be amended in the future. Rather than a perfectly detailed picture of linguistic and sociocultural changes two millennia ago, which is ultimately impossible, the data

herein presents a broad, preliminary picture and starting points for future queries with the available data.

1.2 The historical period in consideration and key questions

The time frame for this study begins with the dispersal of the Austroasiatic language family, continues to the emergence of Vietic as a distinct branch of Austroasiatic, and lastly extends through the Han dynasty and a few centuries after. The latter period marked the arrival of significant Sinitic-speaking communities which, over a period of some several centuries, led to the development of a hypothesized local variety of Chinese, Annamese Chinese as per Phan (2013). These periods are listed in Table 2, which contains contemporaneous archaeological and historical events.

Table 2: *Periods in Vietnamese language history*

Linguistic Stages	Possible Related Archeological / Historical Events	Approximate Times
<i>Austroasiatic dispersal</i>	Neolithic agriculturalist expansion; Beginning of the Phùng Nguyên culture in the Red River Delta	c. 2000 BCE
<i>Vietic developing as distinct branch of Austroasiatic</i>	Bronze Age in the Red River Delta; End of the Đông Đậu culture period	c. 1000 BCE
<i>Likely language contact with Tai; uncertain early contact with Sinitic</i>	Iron Age in the Red River Delta; Beginning of the Đông Sơn culture	c. 500 BCE
<i>Early substantial Sinitic-Vietic language contact Development of Annamese Chinese</i>	Early large Chinese population settlements in northern Vietnam	1 st millennium CE
<i>Viet-Muong developing as a distinct Vietic sub-branch Hypothesized Annamese Chinese language shift to Viet-Muong</i>	End of Chinese administration in northern Vietnam	c. 1000 CE
<i>Further linguistic developments of Vietnamese (archaic to modern)</i>	Several Vietnamese dynasties with eventual southward spread	c. early 1 st mill. to the present

Based on growing linguistic and archaeological studies, the Austroasiatic dispersal appears to have occurred in about 2000 BCE (e.g., Sidwell and Blench 2011, Simanjuntak 2017, etc.). The Mản Bạc site of the Phùng Nguyên culture (2000-1500 BCE) is an apparent locus of contact between previously settled hunter-gatherers and incoming agriculturalists from the north (Matsumura et al. 2008), and archaeogenetic studies of remains at this site are associated with Austroasiatic groups (Lipson et al. 2018). Various archaeologists have posited that the Phùng Nguyên culture marks a starting point for a continuous sequence of cultures in the Bắc Bộ region, around the Red River Delta, leading to the Đông Sơn period (c. 600 BCE to 200 CE) (cf. Kim 2015:105-106). Considering that archaeogenetic data puts Austroasiatic in this region and there is a continuity to the Đông Sơn period, we can conclude that pre-Proto-Vietic and later Vietic have been spoken in this region since the Austroasiatic dispersal. Precisely when Vietic became distinct from other Austroasiatic branches is unanswerable. However, the Bronze Age around 1000 BCE near the end of the Đông Đậu culture is enough time after the Austroasiatic dispersal and a time of sociocultural development to consider at least as a point of reference.

The Iron Age in this part of Southeast Asia is generally considered to start around 500 BCE (Higham 2014:197), somewhat after the beginning of the Đông Sơn period, and coinciding with sociocultural developments leading up to the building of the Cổ Loa site in northern Vietnam. While pre-Qin presence of Sinitic groups in northern Vietnam is only hinted at in archaeological evidence (e.g., a Đông-Son era burial with Chinese coins and lacquer bowls (Cameron 2014:410)), the Eastern

Han Dynasty is the likely first era of significant Sinitic-Vietic language contact, with records of Chinese settlers (e.g., Taylor 1983). This latter matter is well supported in the lexical data presented in Section 3 on ECLs. The archaeological record is vague about the means of the spread of the Iron Age in the region, and the language contact situation of that period is similarly uncertain. But we can speculate, or indeed assume, that the cultural change happened through sociocultural contact—and thus also language contact—between groups from the north and south, among which must have included speakers of Sinitic, Kra-dai (and the Tai branch), and Austroasiatic (and the Vietic branch).² How much direct or indirect language contact there was with Indian and/or Malayo-Chamic culture in this early period is an open question.³

Considering the archaeological evidence, by the time of the documented arrival of significant numbers of Sinitic-speaking peoples, the Vietic-speaking communities had already evolved a range of lifestyles. Some lived in rural areas with associated Neolithic sociocultural practices. Other Vietic groups, such as those at Cồ Loa, lived in a proto-urban dwelling in the early Iron Age stage (cf. O’Harrow 1978, Kim 2015), presumably with a higher degree social stratification, artisanal specialists, some possible degree of inter-regional contact, and sociopolitical structures to manage large-scale constructions.

Crucially, this study does not cover the Vietnamese language or lexicon after the formation of the Viet-Muong sub-branch of Vietic or of Sino-Vietnamese (SV hereafter when referring to vocabulary) Chinese character readings stemming to Late Middle Chinese, at approximately the beginning of the second millennium CE. This study is concerned only with the pre-proto-Viet-Muong stage. The later period saw much more lexical borrowing which has different phonological properties, and that lexical layer represents a very different sociocultural circumstance after a millennium of Sinitic-Vietic language contact.

1.3 Data and Methods

I have sorted into semantic/culture domains several hundred Vietic lexical reconstructions, including a variety of proto-language and later innovations and loanwords, and several hundred ECLs in Vietnamese, with some seen in other Vietic languages. The lexical data for this study includes Vietnamese words which are Vietic etyma (and sometimes also Austroasiatic etyma) and ECLs. This section considers the methods of evaluation of these datasets—selection and exclusion via phonological and semantic features—and how the selected words are considered for ethnohistorical linguistic implications.

1.3.1 Vietic reconstructions and Early Chinese loanwords

The lexical data for this study consists of almost exclusively (with a handful of exceptions) Vietnamese words for which there are available Vietic reconstructions and/or ECLs. These two language sources are briefly described below.

Vietic

Vietnamese language history involves Vietnamese and the dozen or so related languages with additional dialectal variety, including many varieties of Mường and the language groups of Cuối/Thỏ, Pong, Chút (Rục, Mày, Sách, Arem), Thàvụng, Kri, and the Măliêng group (cf. Sidwell 2009 and 2015 for a historical overview). These languages constitute the Vietic branch of the Austroasiatic language family.

² The Malayo-Chamic sub-branch of Austronesian had a presence in central and southern Vietnam, but there is no substantial evidence of language contact between Malayo-Chamic and either Kra-dai or Vietic. There is, however, ample evidence of Chamic contact with Bahnaric and Katuic languages in that region (Thurgood 1999), effectively contained largely to the south.

³ As noted in Section 2.3, the word *vải* ‘cotton’, and seen throughout Austroasiatic, is likely from Sanskrit or Pali. Similarly, the word *cày* ‘plough’, Vietic *gal, Austroasiatic *Ingal/*ŋgal, is likely from Sanskrit लङ्गलम् *laṅgalam* ‘a plough’ (Apte 1957-1959: 1356). How and when these words were transmitted is unknown, but worth noting.

While the term *Viet-Muong* (and less often *Vietnamuong*) has been in use since the 1960s, the term *Vietic* dates from the 1980s (first mentioned by Hayes (1982b:82 and 1982a:101)). While Viet-Muong has been used to refer to the entire group, it is currently widely agreed that Viet-Muong is a sub-branch of Vietic, with the other Vietic languages in various other sub-branches. While Vietnamese, varieties of Mường, Pong and Cuối have monosyllabic morphemes and fully developed tonal systems (generally five or six lexical tones), the conservative Vietic languages have presyllables and, at most, partially developed tone systems (e.g., four-tone systems or no tones but phonation-based systems) (cf. Alves 2021).

The Vietic reconstructions were culled from the tentative reconstructions of Ferlus 2007, found in the online Mon-Khmer Etymological Database (<http://www.sealang.net/monkhmer/dictionary/>). His over 1,000 reconstructions were based on a dozen Vietic languages and dialects. I have assembled that lexical and added data from over a dozen more Vietic languages from published and unpublished sources for a total of nearly 30 Vietic lects. Based on this increased quantity of comparative data, I have selected several hundred of Ferlus's reconstructions and have added over 150 more reconstructions.

All the select Vietic reconstructions are based on (a) sufficient representation among the Vietic language groups (Viet-Muong, Pong-Cuoi, and the archaic languages, such as Chứt, Mảliêng, and Thàvụng) to indicate substantial time-depth or possibly proto-language level and (b) recurring phonological patterns that identify words as etymologically related. As much as possible, they have been checked for status as simultaneous Austroasiatic etyma and for possible borrowing from Sinitic, and occasionally Tai. Reconstructions from Ferlus's list lacking sufficient representation among the various sub-branches in Vietic have been excluded, with the assumption that there is reduced certainty as to whether they stem to the proto-language period: it is possible that they are later lexical innovations. Those which are likely loanwords have been noted as such and included, when relevant, in the discussion of ECLs, with occasional mention of possible Tai loanword status.

When possible, decisions are informed by ethnohistorical and archaeological data. For example, Ferlus reconstructed Vietic words for 'guava' and 'pineapple,' both of which are fruits that are indigenous to Central and South America. Therefore, they could only have been brought to Southeast Asia in the colonial era, and there can be no Proto-Vietic words for pineapples or guava. In general, the expectation is that there is at least some archaeological and/or historical textual evidence to support a sociocultural circumstance for reconstructed words within the proposed timeframe.

Finally, in the database, the Vietic etyma are marked for (a) part of speech, (b) major semantic domains, and (c) secondary semantic domains. It is this last aspect that has been crucial in identifying words that are related to the household and the subdomains listed in Table 1.

Early Chinese Loanwords

Chinese loanwords in Vietnamese have been borrowed in multiple periods for at least two thousand years.⁴ SV words proper (i.e., *từ Hán-Việt*) are listed in SV dictionaries as Chinese character readings and stem to the Late Middle Chinese period after Vietnam's administrative independence and around the assumed time of the speciation of Viet-Muong. In tables with comparative lexical data throughout this study, standardized SV readings are listed as a point of reference with respect to the ECLs, thereby highlighting the many loanword doublets. In contrast, ECLs are fully nativized in terms of phonology (e.g., having the onsets 'r' and 'g/gh' which never occur in the later SV layer, etc.), orthography (i.e., mostly written with Nôm characters, which are used to represent native Vietnamese speech rather than

⁴ Tai languages also have many ECLs and borrowings from Chinese in recent periods (cf. Alves 2017a). The shared ECLs of Vietnamese and Tai languages have previously created confusion about the direction of borrowing. While there is the possibility of sharing ECLs between the Tai and Vietnamese, a large majority of the several hundred ECLs in Vietnamese that I have assembled are not in Proto-Tai or readily found in varieties of Tai, and there is no phonological evidence suggesting Tai-Vietic exchange of ECLs. Consequently, there are many reasons to assume that ECLs were borrowed directly from Sinitic separately in both Vietic and Tai. In contrast, ECLs in modern Vietnamese have likely been borrowed into minority Tai languages inside Vietnam, and Lao or Thai could similarly be donor languages of ECLs to minority Vietic languages in those areas, but not in ancient eras.

Classical Chinese), and perception (i.e., being seen by native speakers as native Vietnamese words). Crucially, ECLs were borrowed in a period of Vietic history prior to the full development of Viet-Muong as a distinct variety of Vietic with significant typological convergence with Annamese Chinese. Thus, in the early Sinitic-Vietic contact period, this northern variety of Vietic of the region stretching from the Red River Delta to Thanh Hoa had most likely retained many archaic linguistic features: words with presyllables and a lack of a fully developed tone system.

I speculate a scenario of the borrowing of ECL household words following the historian Keith Taylor's proposed Han-Viet families in this early period (e.g., Taylor 1983:48-47). For the linguistic parallel, I recommend thinking in terms of *Sinitic-Vietic* contact since this sociolinguistic contact occurred relatively early in the dispersal of Sinitic and before Vietnamese or even Viet-Muong were fully distinct. Presumably, Sinitic in the Han Dynasty had less linguistic diversity in the smaller northern region than after the Sinitic dispersal into and settlements in what became southern China, with resulting branches.

The lexical data includes at least several hundred items ranked from medium to high certainty. I have gathered these from many different publications (e.g., Wang Li 1948, Haudricourt 1954a, Schneider 1992,⁵ Chiang 2011, Alves 2016 and 2018a, etc.). These words have been assessed for phonological patterns and semantic properties, within reasonable possibility of semantic change and extension, and then checked for occurrence in Ancient Chinese texts and ethnohistorical descriptions. Such ECLs should be available in Chinese texts dating to the period in question, and there should be historical information that suggests certain practices or objects are from this early historical period. This data is still being sifted and evaluated, and additional words will likely be found over time. For this study, about one hundred items have been selected, with another fifteen or so other words moved to the Appendix due to the lack of solid supporting data.

1.3.2 Historical Linguistic Issues and Ethnohistorical Questions

For this study, I have (a) assembled a large quantity and variety of lexical data, as discussed, (b) noted re-occurring phonological patterns among the lexical data, and (c) related the lexical data (including semantic and phonological details where relevant) to historical-archaeological information. While Vietnamese words are a key point of reference, the use of proto-language reconstructions and focus on early loanwords deepens the time depth of the linguistic data. The comparative data presented in the tables throughout this study include (a) Ferlus's 2007 Vietic reconstructions with additions based on updated lexical dataset; (b) Old and Middle Chinese reconstructions (primarily Baxter and Sagart 2014a and 2014b, but occasionally Schuessler 2007 and 2010 and Chinese dialect data from the Xiaoxuetang database); (c) Proto-Austroasiatic (primarily Shorto 2006) and Austroasiatic languages in the Mon-Khmer Etymological Dictionary; and (d) Proto-Tai of Li (1977) and Pittayaporn (2009). As for Vietic historical phonology, I have relied on Ferlus's articles (1982, 1992, 1997, and 2014) and Nguyễn Tài Căn's 1995 book, and for Proto-Viet-Muong, Nguyễn Văn Tài's 2005 book. This focus on early-era words (i.e., the first millennium CE and before) is important as many later-era Chinese loanwords also entered the semantic domain in this study, but they represent a very different sociolinguistic contact situation and different historical period. Altogether, sufficient linguistic data, historical phonological patterns, and corroborating extralinguistic data are crucial to raising the certainty of ethnohistorical linguistic portrait.

⁵ Schneider's 900-plus-page dictionary of Hán-Nôm characters has a category *Nôm apparenté au chinois*, suggesting Nôm words of proposed Chinese origin. He noted perhaps a couple thousand of these in his dictionary. After counting 80 of them in the first 40 pages of his book, I stopped as at least 70 were obviously not Chinese loanwords. Schneider's knowledge of Hán-Nôm is vast, but his expertise is not in linguistics. After reviewing the entire book, I found the vast majority to be false cognates for numerous reasons (e.g., other known etymologies, phonological mismatches, semantic mismatches, a combination of problems, etc.). Of the remainder, over a hundred can be found in previous publications by linguists and were already in my database. Finally, from Schneider's work, I was able to add some several dozen promising new items to my database and incorporate some into this study.

As mentioned, for Vietic reconstructions, only those attested in both Vietnamese and multiple Vietic sub-branches are included (those with likely recent Vietnamese loanwords are not included), thereby increasing the certainty of the early status of the reconstructions. While the details of the phylogenetic tree of Vietic are not yet agreed upon, it is generally observed that (a) Viet-Muong constitute one sub-branch, (b) Pọng and Cuối are closer to Viet-Muong than are the archaic lects, and (c) the archaic lects likely belong to multiple sub-branches. While it is theoretically possible to reconstruct words that are in only one sub-branch of Vietnamese, that is a weaker method when trying to make claims about the ethnohistory of a group.⁶ For the most part, the Vietic reconstructions herein include lexical attestations from all three of these groups, thereby increasing the likelihood that such words could date back to the Đông Sơn period or earlier.

As for ECLs, many occur only in Vietnamese, while a smaller number can be found in Mường data listed in tables of comparative data in various parts this article, and fewer still are in other Vietic languages, typically, those ECLs corresponding to Vietic reconstructions. This is to be expected: the linguistic ancestors of Vietnamese and varieties of Mường were precisely in the region with the largest language contact with Sinitic and Annamese Chinese.

Vietic etyma and ECLs share phonological developments (e.g., retention of the /r/ and /ɣ/ onsets and the development of the diphthong /uə/ from *ɔ, etc.), in contrast with the later layer of SV vocabulary, which more closely patterns with Late Middle Chinese (e.g., retroflex onsets). As noted above, the works of Ferlus, Nguyễn Tài Căn, and Nguyễn Văn Tài are key references. The entire history of Vietnamese phonology cannot be presented here, but some of the recurring patterns that can be readily seen in the data presented throughout this paper are in Table 3. Comparative data shows various patterns of retentions and changes of onsets, vowels, codas, and tone categories. There are admittedly instances of changes that cannot be explained, but for now, these patterns are what I have in mind as I evaluate the lexical data to include or exclude.

The phonological patterns serve not only to identify possible native or borrowed words. They can also help indicate how ancient words are, as I alluded to near the beginning of this paper. More complex phonological material, especially presyllabic material, tends to be an indication of earlier forms. While the exact timing of the collapse of clusters and presyllabic material in Old Chinese into single consonants cannot be stated, it must have occurred before the stage of Middle Chinese (which has been reconstructed as monosyllabic and with only possible medial glides) by the mid-first millennium CE. In contrast, Vietnamese likely retained at least some presyllabic material into the early 2nd millennium (Shimizu 2015 and Gong 2019) and clusters into the 19th century (e.g., Vu 2019). One indication of ECLs with presyllabic material is affricate onsets in Vietnamese: /v/ ‘v’, /ɣ/ ‘g/gh’, and /z/ ‘d’ (cf. Ferlus 1982 for Vietic and Baxter and Sagart 2014b of Old Chinese loanwords), leading to the probability that these could have been borrowed as early as the Han Dynasty. Another factor in determining chronology is tones. The earliest Chinese texts explicitly noting tone categories date to the 6th century, even before the Qieyun 切韻 rime dictionary of 601 CE. Decades of studies following the Haudricourt (1953 and 1954b) hypothesis of tonogenesis in Vietnamese support the notion that tone categories B and C had final segments (*-ʔ and *-s/-h respectively), or comparable phonation features (i.e., creakiness or breathiness). The consequence is that ECLs with those tone categories could date to the first half of the first millennium.

⁶ It is possible to reconstruct a Proto-Vietic etymon when a word is only in Vietnamese but also in Proto-Austroasiatic as this indicates a lexical retention from an earlier stage. There are only a few instances of these, but not in this study.

Table 3: Retentions and changes leading to modern Vietnamese phonemes (not exhaustive)⁷

Onsets	
1.	Retentions: nasals (*m, *n, *ɲ, *ŋ); stops (*b, *t, *d, *k, *d, *c, etc.); etc.
2.	Changes: *s > /t/; implosives to nasals *b > /m/; *d' > /n/; voicing alternations (*t > /d/; *g > /k/); etc.
3.	Collapsing of clusters and presyllables to single affricates or retroflex onsets: *CV.C > /v, ʎ, z/; *CC > /t̚, ʂ, z/
Vowels	
4.	Retentions: *i > /i/; *o > /o/; *u > /u/; *ə > /ə/; etc.
5.	Changes: *ə > /i/; diphthongization (*ɔ > /uə/; *ɛ > /iə/; *a > /iə/); etc.
Codas	
6.	Retentions: *p, *t, *k > /p, t, k/
7.	Changes: *c > /k/; *ɲ > /n/
8.	Rephonologization: *-l > /-j/ or /-Ø/; *-ʔ > Tone B; *-s and *-h > Tone C
Tones	
9.	<i>Ngang</i> and <i>huyền</i> tones (related to Chinese Tone A) <ol style="list-style-type: none"> 1. OC open syllables or MC <i>pingsheng</i> tones 2. Early MC <i>qusheng</i> tones (after loss of OC *-h) (Alves 2018a) 3. Pre-Late Middle Chinese retention of lower-register <i>huyền</i> tones instead of SV upper-register <i>ngang</i> tones in syllables with sonorant onsets (e.g., *m, *n, *l, etc.)
10.	<i>Sắc</i> and <i>nhặng</i> tones (related to Chinese Tone B and Tone D) <ol style="list-style-type: none"> 1. OC syllables with final *-ʔ or early MC <i>shangsheng</i> tones with glottalization 2. OC closed syllables and MC <i>rusheng</i> tones
11.	<i>Hỏi</i> and <i>ngã</i> tones (related to Chinese Tone C) <ol style="list-style-type: none"> 1. OC syllables with final *-s/-h

These are, of course, only broad strokes, and no strong claims of certainty of precise timing can be made, but such phonological data supports claims of early borrowing of the words, with consequences on ethnohistorical queries. And the more items that match the phonological patterns, the stronger the case. Nevertheless, many caveats must be considered in determining word origins and time depth.

1. Chance similarity of phonological and semantic features of words can never be ruled out completely, but phonological patterns and historical evidence can mitigate this.
2. Reconstructable words are not necessarily connected to the proto-language period. Some words have spread in the region in later periods. Again, phonological and historical evidence can mitigate this.
3. Linguistic data cannot always be combined with historical or archaeological data in an effective way, and there are data gaps in most sections.
4. While a tremendous amount of data has already been processed, additional data has yet to be incorporated and processed: more insights will come, and hopefully, items shown to be problematic will eventually be excluded.
5. The words considered in this study include primarily only those for which Vietnamese (including regional dialects) has attested words. This means there are more possible Vietic etyma from the early period, but the focus on Vietnamese is necessary to provide more reliably evaluated data.
6. Ideally, all objects, concepts, and actions are weighed against extralinguistic data, such as historical textual, archaeological, and ethnographic data to test the validity of historical linguistic claims. However, the depth of exploration and available information varies, and not every single detail can be covered for this study.

⁷ There is widespread, but not complete, agreement that Old Chinese words had presyllabic material and was nontonal. Some reconstructions of Old Chinese do not have presyllables (e.g., Schuessler), and there is a school of thought among some Chinese linguists that the precursor to modern Chinese had tones. I take the position that, while details must still be continuously tested with new ideas and data, Proto-Sinitic must have shared some features with other Sino-Tibetan languages, which are mostly polysyllabic and nontonal.

As a result, not all the Vietic reconstructions or posited ECLs can be claimed valid with absolute certainty. Nevertheless, there is strength in numbers: not all claims of etymological origin and early loanword status must be valid to make general assertions about the past ethnolinguistic situation.

1.3.3 Continuity of ancient practices and associating modern words with the distant past

Words can be innovated at any point in a language's history, and words can be shared among languages. Keeping this in mind, I propose that the data in this study are by and large associated with the period from about 1,500 to 4,000 or more years ago. Archaeological evidence suggests that a number of practices related to household structures and objects in the region have been maintained for thousands of years (cf. § 2.1). This ethnohistorical continuity supports the possibility that Vietic lexical reconstructions and ECLs have substantial time-depth back to these archaeologically attested periods. Similarly connecting words to the distant past requires multiple points of data: (a) Words in numerous related languages in a wide geographic area (i.e., multiple sub-branches, not just Viet-Muong); (b) phonological forms that indicate time depth (e.g., B and C tone categories in syllables with previous final consonants, certain patterns of changes of consonants or vowels, complex onsets in archaic Vietic languages, etc.); (c) supporting ethnohistorical and archaeological data.

Before Sections 2 and 3, two examples of lexical influence in sociocultural domains are presented: one of kinship terms and burials and the other of domesticated animals, both of which are somewhat peripheral but still relevant to the household. These exemplify the historical sociocultural context for Vietic before and after language contact with Sinitic. They also model the approach of combining ethnohistorical/archaeological data with the linguistic data, primarily lexical data but also considerations of semantic domains and historical phonology. Both of these cultural domains have supporting historical and/or archaeological evidence to provide chronological points of reference for probable lexical retentions from a pre-Qin period or early periods in which lexical borrowing may have occurred. These also show ways in which phonological features can be employed as support for etymological claims.

The example of kinship terms and burials

The 5th century *History of the Later Han* (後漢書 Hou Han Shu) reports a 1st century Han Dynasty mandate of Chinese-style marriages in the Jiaozhou region, as well the adoption of Chinese-style clothing and other household accoutrements. Also, Taylor's (1983) posited Han-Viet families further indicate intermarriage. This evidence of sociocultural contact corresponds to ECLs in the Vietnamese system of kinship terms. Benedict (1947) described this lexical impact on the Vietnamese kinship system several decades ago. More recently, Alves (2017b) has summarized the impact of Chinese on the broader Vietnamese system of referential terms, including pronouns, kinship terms, and other terms of address. The lexical data reveals a combination of native vocabulary (i.e., Vietic *em* 'younger sibling', Austroasiatic *con* 'child', and Vietnamese *anh* 'elder brother' with no known external source) and both ECLs and later SV vocabulary. ECLs in this category which have Vietic reconstructions include *mợ* 'wife of mother's brother' (SV *mở*, 姆 *mữ*, OC **məʔ*, MC *muwX*, Vietic *mi:ʔ*), *cậu* 'mother's brother' (SV *cũu*, 舅 *jiù*, OC *[*g*](*r*)*uʔ*, MC *gjuwX*, Vietic **gu:ʔ*), *chị* 'elder sister' (SV *tí*, 姊 *zǐ*, OC *[*ts*][*i*]*ʔ*, MC *tsijX*, Vietic **ʃi:ʔ*), all of which have tone categories that attest to their early borrowing, namely, the *nặng* tone corresponding with OC -ʔ and the MC tone B versus the SV layer *hỏi/ngã* tones. These ECLs in the domain of kinship—combined with ethnohistorical information about intermarriage—clearly show an early impact on the Vietic kinship system and thus the pre-Viet-Muong household in the first several centuries.

However, while early kinship loanwords can be considered as possible early evidence of sociocultural contact, and therefore potentially useful to those exploring the ethnohistorical past of Sinitic-Vietic contact, such words cannot be attested by archaeological data. In contrast, Han dynasty brick tombs in northern Vietnam are well documented. In relation to this archaeological data, as Phan (2013:171) notes, Vietnamese has borrowed the same Chinese word for 'tomb' in multiple periods, as in Table 4, with the earliest borrowing *mả* potentially in the Han Dynasty, as indicated by the tone

category and vowel (cf. SV *mộ*). The form *mộ* was likely borrowed some centuries later, but before tonogenesis in Vietic (Alves 2018a). Indeed, while an ECL form *-mah has been reconstructed in Vietic and is attested in various sub-branches of Vietic, there is no widespread native term for ‘grave/tomb’ in Vietic, despite tremendous amounts of archaeological evidence of burials in the region. Further support for the early borrowing of this word is the Vietic language Arem’s form [lamãh] with a presyllable, which supports Baxter and Sagart’s (2014a) Old Chinese reconstruction *C.mʰak-s with presyllabic material.⁸

Another related practice from the period under consideration was the posting of stelae in front of tombs. Vietnamese *bia* ‘stele’ is another ECL (cf. SV *bi*, 碑 *bēi*, OC *pre, MC *pje*). The Vietnamese diphthong ‘ia/iê’ frequently derives from Early Middle Chinese *je (e.g., *đĩa* ‘pond’, SV *trì*, 池 *chí*, MC *drje*; *lìa* ‘to leave’, SV *lì*, 離 *lí*, MC *lje*). While dating the borrowing of *bia* in the context of burials does require additional archaeological data (i.e., Han Dynasty tombs in northern Vietnam with stelae), that *bia* is an ECL seems quite likely.

Table 4 also contains data from the Mường Bi variety of Mường, of which there are some 30 lects described in Nguyễn Văn Tài’s (2005) book. Mường Bi data (from Nguyễn Văn Khang et al. 2002) is provided in tables of data in this study when possible, and in many cases, as in Table 4, there are comparable ECLs in Mường. In Table 4, both the tone for the word meaning ‘grave/tomb’ and the voiceless /p/ onset for ‘stele’ implies that at the very least, these at least date to the Proto-Viet-Muong stage, so these are probably genuine ECL retentions.⁹ The comparative data is provided to expand the view beyond Vietnamese, as well as to demonstrate the general proportion of ECLs in Vietnamese in contrast with Mường Bi, which does have a smaller number of ECLs. And yet, Mường has more ECLs than do other Vietic languages, as will be noted in subsequent sections.

Table 4: Graves and stelae

Gloss	ECL	SV	Muong	Chinese	OC	MC
grave/tomb	mả	mộ	má	墓 mù	*C.mʰak-s	muH
grave/tomb	mộ	mộ	(má)	墓 mù	*C.mʰak-s	muH
stele	bia	bi	pia	碑 bēi	*pre	pje

The example of domestic animal terms

Words for domestic animals similarly provide an example of exploring a cultural domain—one related to a settled lifestyle—through ethnohistorical data together with linguistic evidence for native and borrowed words. Reconstructed Vietic terms for domesticated animals include precisely those recurring in archaeological literature for Austroasiatic groups, including ‘dog,’ ‘pig,’ and ‘chicken’ (e.g., Higham 2017a). Đông Sơn bronze bells with elephant figurines (Nguyễn Văn Cường 2014:156-157) are suggestive but not absolute evidence of elephant husbandry in the pre-Qin period, increasing the possibility that the Vietic reconstruction *-vɔːj ‘elephant’ could date to that period. Overall, we see words for expected domesticated animals based on archaeologically attested evidence. This supports the idea that the Vietic reconstructions are indeed connected with domesticated animals a few thousand years ago.

⁸ One problem with this reasoning is that Baxter and Sagart sometimes used Vietic data and Chinese loanwords to reconstruct presyllables in Old Chinese. However, they did use additional data sources for presyllabic material in Old Chinese, such as Proto-Min and Chinese loanwords in Proto-Hmong-Mien (Baxter and Sagart 2014:8).

⁹ It is not always possible to determine whether all of the ECLs in Mường are from the original first millennium borrowing, or whether these are later borrowings from Vietnamese.

Table 5: Vietic Terms for Domestic Animals

English	PV	AA	Viet	Muong
<i>dog</i>	*ʔa-co:ʔ	*coʔ	chó	chỏ
<i>pig</i> ¹⁰	*gu:rʔ ku:rʔ	NR	cúi (heo cúi)	cùi
<i>chicken</i>	*r-ka:	NR	gà	ca
<i>duck</i> ¹¹	*vi:t	NR (cf. Tai *pet ^D)	vịt	wit
<i>goat</i>	*-te:	NR	dê	tê
<i>elephant</i>	*-vo:j	NR	voi	way

ECLs of domesticated animals, a few of which are widespread enough to be reconstructed in Vietic (i.e., ‘horse’, ‘cat’, ‘swallow’), are clearly reflective of early sociocultural Sinitic-Vietic contact. The twelve possible ECLs for domesticated animals include mammals, birds, and even insects. Words such as ‘horse,’ ‘donkey,’ ‘silkworm’, and ‘cat’ are all tied to probable instances of cultural imports from the north. While I have been unable to locate ethnohistorical information detailing the sharing of domestic animals from China to northern Vietnam, most of the proposed ECLs in Table 6 can be found in historical Chinese texts in the Han period or earlier. As for linguistic methodology, the words in this table all show strong semantic and phonological (i.e., consonants, vowels, and tone categories) correspondences with their late Old Chinese or early Middle Chinese counterparts. Unless/until substantial counterevidence and/or counterarguments can be provided, these items must be considered strong candidates as ECLs in the early first millennium, especially those with *sắc/nặng* or *hỏi/ngã* tones (see § 1.3.2), such as ‘horse’, ‘rabbit’, and ‘cocoon’. Thus, it appears that the number of words for domesticated animals rose considerably within the first centuries of Sinitic-Vietic contact in the region of northern Vietnam.¹²

An important observation can be made based on the data in Table 6. The number of ECLs in Mường is significantly higher than the number of reconstructable ECLs in Vietic, eight versus three words respectively. This highlights the lexical closeness of Vietnamese with Mường and its lexical distance from other Vietic languages.¹³ This is a recurring pattern seen throughout the data presented in this paper.

¹⁰ The Vietnamese word *cúi* ‘pig’ in Table 5 is a rarely used word in Vietnamese, though it is the primary word in 25 of 30 varieties of Mường in Nguyễn Văn Tài (2005:236). Generally, *heo* ‘pig’ is used in southern Vietnamese, while *lợn* ‘pig’ is used in northern Vietnamese (and five varieties of Mường). See the Appendix for comments on *lợn*’s etymological origin.

¹¹ Alves (2015a) has posited that ‘duck’ is a Tai loanword in Vietic, though linguistic and archaeological justification for this claim is admittedly limited, making the direction of borrowing of this word less certain.

¹² Without archaeological evidence to suggest otherwise, we must assume that these words are introduced terms specifically for domesticated animals. Animal husbandry is a commonly shared cultural practice, and so loanwords in this domain would naturally refer to the domesticated ones. However, original terms for the related undomesticated species may also have been available. That would require a new line of inquiry.

¹³ I fully expect further data sifting will reveal additional ECLs in Vietic languages outside the Viet-Muong sub-branch, but at this point, it seems likely that the increase will not substantially change the overall scenario of more intense language contact between Viet-Muong with Sinitic than applies to other Vietic sub-branches.

Table 6: Early Chinese Loanwords for Domesticated Animals

Category	Gloss	ECL	SV	PV	Muong	CH	OC	MC
Mammals	<i>horse</i>	ngựa	ngô ¹⁴	*m-ŋə:ʔ	ngữa	午 wǔ	*[m].q ^h aʔ	nguX
	<i>donkey</i>	lừa	lư	NA	lừa	驢 lú	NONE	NONE
	<i>cat</i>	mèo ¹⁵	miêu	*mɛ:w	mèo	貓 māo	*C.m ^h raw	maew
	<i>rabbit</i>	thỏ	thố	NA	thỏ	兔 tù	*[ʔ]a-s	thuH
Birds	<i>pigeon</i>	câu	cuu	NA	cù nhà	鳩 jiū	*[k](r)u	kjuw
	<i>swallow</i>	én	yén	*ʔɛ:nʔ	yén	燕 yàn	*ʔe[n]-s	*enH
	<i>goose</i>	ngan	nhạn	NA	ngan	雁 yàn	*C.[ŋ]ʔrar-s	ngaenH
	<i>spur (of rooster)</i>	cựa	cự	NA	(kiéch)	距 jù	NONE	NONE
Insects	<i>silkworm</i>	tằm	tằm	NA	(đôi dòng)	蠶 cán	*C.[dz]ʔ[ə]m	dzom
	<i>cocoon</i>	kén	kiến	NA	kén	繭 jiǎn	*k ^h enʔ	kenX
	<i>moth</i>	ngài	nga	NA	(pơ pơ)	蛾 é	*ŋ ^h aj	nga

Next, sections 2 and 3 explore core aspects of the household, first focusing on Vietic reconstructions in multiple subsections and then on ECLs in comparable semantic domains. The sequence follows the list of subtopics in Table 1.

2 Vietic

The Vietic lexical data related to household structures and objects largely portrays a Neolithic lifestyle. This is to be expected as (a) it consists of the most commonly occurring comparative lexical data of groups with a range of lifestyles from hunter-gatherers to settled rural communities to urban dwellings, and (b) proto-language reconstructions are necessarily projected back thousands of years to the pre-Metal Age period. Vietnamese words that are also Proto-Austroasiatic etyma have the potential for the deepest time depth of over 4000 BP in the late Neolithic period. There is a rich lexicon in Proto-Vietic for rice production (cf. Alves 2020:xxxi-xxxiii), but there are also words for excavated bronze objects of the Metal Age. In each subsection, brief archaeological descriptions are provided as context for discussion of the lexical data.

2.1 Vietic Terms for Household Structures

Higham (2017b) points out how few details of ancient household structures—crucially, the floorplans/layouts—in mainland Southeast Asia are available in the archaeological record. However, while still lacking details, one study (Oxenham et al. 2015) in southern Vietnam circa 1500 BCE shows evidence of a longhouse with posts, not unlike longhouses of modern Katuic and Bahnaric groups. Archaeological studies of the structures and weaving techniques even from over 3,000 years ago show comparable practices in modern communities (Cameron 2017). Images on Đông Sơn bronze drums show houses raised on posts (Higham 2017b:369). Though not in detail, there is reasonable evidence connecting general practices of household structures of modern Austroasiatic groups in mainland

¹⁴ It is interesting to note that the commonly used Chinese word 馬 mǎ ‘horse’ (SV mã, which is restricted to literary usage in Vietnamese) was not borrowed as the primary word in Vietic, as it was in neighboring Proto-Tai (i.e., *ma:^C ‘horse’ (Pittayaporn 2009:204)). The same ECL was apparently also borrowed into Proto-Hlai, reconstructed as *hja:ʔ (Norquest 2007:393). It is more likely that the domesticated horse was brought from China to northern Vietnam than from the island of Hainan, so it seems reasonable to assume this word in Vietic is from Chinese, not Hlai. This situation suggests early differences in lexical usage for ‘horse’ among various communities of Sinitic speakers, though I know of no evidence in Chinese of this form being used in speech, but rather only in the animal-calendar system.

¹⁵ While claims of loanwords must be considered weaker when onomatopoeia could be a factor, the huyèn tone with a sonorant initial and the // vowel are both features expected if this is indeed a Chinese loanword. Also, considering the number of ECLs for domesticated animals, the notion that this is a Chinese loanword is increased, but never with absolute certainty. Additional archaeological or historical data can hopefully shed light on this.

Southeast Asia with those of the past. Thus, we can attempt to associate relevant Vietic lexical reconstructions based on comparative data from modern languages with practices in that ancient period.

Comparative Vietic data allows reconstructions of core elements such as ‘house’, ‘roof’, ‘pole/post (of a house)’, ‘bamboo panel’, ‘door’, and supplemental parts and materials, as shown in Table 7. This vocabulary shows elements of modern rural Southeast Asian homes. Several items are connected to Proto-Austroasiatic, notably ‘house’ (I offer an alternative reconstruction to Shorto’s in light of data he did not have). This word has attestations in the typologically restructured Munda languages in India and Nicobaric languages in the eastern Indian Ocean, which highlights the major time depth of this word. ‘Roof’ is tentatively reconstructed in Austroasiatic based on data from Bahnaric, Katuic, Khmeric, Monic, Pearic, and Vietic. The verb ‘to open (a door)’ is a solid Proto-Austroasiatic etymon. Proto-Austroasiatic ‘thatch grass’ is based on comparative evidence in several branches of Austroasiatic including Munda. Also, Proto-Austroasiatic *taɲ ‘to weave’ is a solid Austroasiatic etymon in all 13 branches. Based on this lexical data, combined with archaeological evidence, vocabulary for aspects of home structures must have been spread by Austroasiatic peoples at the time of the Neolithic agricultural expansion circa 4000 BP.

A question then is what the sociocultural picture was of the Vietic culture during the late Bronze Age and early Iron Age, towards the end of the first millennium BCE. In Vietic territory around the Red River Delta, certainly at the Cồ Loa archaeological site, major developments in architectural practices are clear. Some of these developments are suggestive of early contact—whether direct or indirect—with groups from northern parts of China, such as the use of rammed-earth practices and Chinese-style roof tiles (Kim et al. 2010, Kim 2015), or of burial objects (Cameron 2014) as noted in Section 1.2. Regardless, the Proto-Vietic etyma seen in Vietnamese in Table 7 are suggestive of a set of common Neolithic cultural practices among Vietic groups, even during that period of sociocultural contact and change, which have continued in various ways to the present, as have some of the words.

Table 7: Vietic terms for household structures

Category	Gloss	PV	Austroasiatic	Vietnamese	Muong
Structural elements	<i>house</i>	*na:	#(C)naaʔ, #(C)naah, #(C)niih ¹⁶	nhà	nhà
	<i>roof</i>	*6a:lʔ	#6VVr(?), #CmVVI(?)	mái	mái
	<i>pole/post (of house); pillar</i>	*go:t	NR	cột	cột
	<i>door</i>	*kiaɦ	NR	cửa	cửa
Extra elements	<i>bamboo panel</i>	*təŋʔ	NR	dùng (wrong tone)	NA
	<i>rattan</i>	*-məɭ	NR	mây	(hè)
	<i>mat (of leaves)</i>	*ŋca:r ʔ	NR	giại ‘bamboo screen’	NA
	<i>thatch-grass</i>	*p-lɛŋ	*[p]laŋ / *[p]lain	tranh / gianh	tlènh ‘bundles (of thatch)’
Actions	<i>to open (a door)</i>	*pəɦ	*puɦ, *puuh, *puəɦ, *pəɦ	mở	bớ
	<i>to weave</i>	*ta:ŋ	*taɲ	đan	tainh

¹⁶ The asterisk * is with all previously published reconstructions of Austroasiatic, Vietic, and Chinese. I use the hashtag symbol # for Vietic and sometimes Austroasiatic reconstructions that I propose based on ample comparative data and phonological patterns described in Section 1.3.2, but which have not yet been fully vetted.

2.2 Vietic Terms for Household Items

The archaeological record in northern Vietnam from the time of the Neolithic agricultural expansion, and presumed spread of Austroasiatic speakers, is rich with stone artifacts. These include tools (e.g., pestles, mortars, chisels, graters, hoes, etc.), sharp implements (e.g., axes, knives, spearheads, arrowheads, saws, etc.), jewelry and decorations (e.g., earrings, ceramic marbles, string beads, bracelets, statues, etc.), and ceramic containers (e.g., pots, vases, jars, bowls, jugs, etc.) (Hán 2009:222-237). Patterns of woven bamboo matting appear on pressed pottery (e.g., Hoàng 2003, Cameron 2017). Notably, the Phùng Nguyên era Xóm Rền archaeological site has pestles, indicating this practice dates to 4000 BP.¹⁷ Many of the Neolithic stone implements were then replicated in bronze from the Metal Age.

The types of household objects in Vietic reconstructions are largely expected based on linguistic fieldwork with modern Vietic groups in rural areas. The subcategories in Table 8 include several implements and musical instruments, a few terms for containers, several miscellaneous items, and a few relevant actions. As a result, many of the reconstructed terms for household items are associated with Neolithic, pre-Bronze-Age lifestyles. However, I have found almost none of these with comparable Proto-Austroasiatic etyma. That makes it difficult to associate these with deeper time depth, but still at the Proto-Vietic level, these potentially date back a few thousand years.

Some of the words, such as ‘axe’, ‘knife’, ‘lamp’, ‘ladle’, and ‘drum’, are connected to items made of bronze found in archaeological excavations. Related archaeological evidence include Đông Sơn era bronze lamp figurines of a person, water buffalo, and deer (Trần 2011:129-131) as well as bronze ladles and axes (Nguyễn Văn Cường 2014:85-103). Đông Sơn bronze figurines of people playing flutes (Nguyễn Văn Cường 2014:182-183) are certainly useful corroborating evidence of the practice of flutes by that time.

Some words are suggestive of early regional exchange, likely in the Metal Age.¹⁸ The Vietic etyma for ‘knife/bush-knife’ *m-ra:ʔ and ‘drum’ #klo:ŋʔ have comparable forms in Proto-Tai, *ɲm.ra:^C and *klo:ŋ^A respectively. This makes it difficult to ascertain whether the words extend to the proto-language level, are later lexical developments, or are loanwords. As for ‘knife/bush knife’, Alves (2015b:52) posits that the Tai word spread into various Austroasiatic languages and assumes that it was also borrowed into Vietic in an early period, as indicated by the tone category. However, many bronze daggers are found in Đông Sơn archaeological sites, and I cannot determine the full geographic extent of the term in Tai.

As for relevant archaeological information about drums, Calo (2009:4-6) suggests that Heger I drums are of an earlier stratum than the Heger II to IV drums. The Heger I Đông Sơn bronze drums were very numerous early on in the Red River Delta (Kim 2015:27) and spread throughout Southeast Asia, whereas the Heger II type drums appear later primarily only in previously Tai-speaking territory of southern China (Churchman 2016:7). Thus, the direction of borrowing of both the objects and the associated words cannot yet be stated with certainty, and borrowing from Vietic into Tai is not an impossibility. Clarifying this matter will require additional exploration of both linguistic and archaeological data.

In other cases, in Southeast Asia, biodegradable objects leave no archaeological traces, and so no archaeological evidence to support reconstructions (e.g., fans, whips, rags, corks/stoppers, handles, etc.). But again, various reconstructed Vietic terms for actions provide data that archeological data cannot directly support. There is no native etymon for ‘bed’, which is an ECL (cf. § 2.2), but there is a Vietic reconstruction #CV.kol for ‘pillow/to lay one’s head on a pillow’. This word has a comparable

¹⁷ This is much earlier than Ferlus’s (2009) hypothesis of the spread of a Vietic word for ‘pestle’ throughout Austroasiatic during the Đông Sơn. The early archaeological date makes it possible that the practice of the stone pestle spread with the dispersal of Austroasiatic from the Phùng Nguyên period.

¹⁸ I have not included a reconstructed word for the musical instrument ‘horn/pipe/khéne’, a tentative Vietic #ge:n, Vietnamese *khèn* or *kèn*. This possible Tai loanword is found throughout Austroasiatic languages (Vietic, Katuic, Bahnaric, and Khmer), but in a distribution that suggests either borrowing from Tai or a later regional innovation within Austroasiatic. I have been unable to locate clear ethnohistorical studies indicating time depth of the *khéne*.

reconstruction in neighboring Katuic *tkual ‘rest head on pillow’. Supporting ethnographic data might help to better interpret the lexical data in Table 8.

Table 8: Vietic Terms for Household Items

Category	Gloss	Proto-Vietic	Vietnamese	Muong
Implements	<i>drum</i>	#klo:ŋʔ	trống	tông
	<i>flute</i>	#khra:wʔ	sáo	khảo
	<i>axe</i>	*m-ri:w	rìu	khìu
	<i>knife/bush-knife</i>	*m-ra:ʔ	rạ / rựa	NA
	<i>spoon</i>	#buaŋ	muỗng (dialect)	(thìa / mớ)
	<i>lamp</i>	#de:n	đèn	tèn
	<i>fan</i>	*gwa:t	quạt	quat
	<i>broom</i>	*la:c	lạt	laich
	<i>lighter</i>	*t-rn-εs	nẻ	NA
	<i>whip</i>	*p-rə:j	roi	roi
Containers	<i>basket (flat, round, for fruits and vegetables)</i>	*-roh	rỏ	(rả, rẻ, rỏ)
	<i>lid / cover of jar</i>	*s-nəp (< s-rn-əp)	nấp	nấp
	<i>lid / cover of pot</i>	#CV.puəŋ	vung	pung
Other items	<i>handle</i>	*ka:nʔ	cán	cản
	<i>bamboo strips</i>	*tʃ-nə:k (< tʃ-rn-ə:k)	nuóc (dialect)	(cỏ quét)
	<i>cork/stopper</i>	*t-n-u:t < t-rn-u:t (?)	nút	nut
	<i>rag</i>	*k-cəh	giẻ	chẹ
	<i>rope/cord</i>	*ja:k	chạc	chac
	<i>stick for digging</i>	*-mɔ:l / muəl	moi ‘to dig out’	NA
	<i>stick for walking</i>	*-gi:ʔ	gậy	cậy
Actions	<i>carve / chisel</i>	*t-kə:c	gọt ‘peel/whittle’	(cạo)
	<i>paint / black varnish tree</i>	*k-rə:n	son	(khon ‘to paint’)
	<i>sweep / broom</i>	*k-cu:s	chổi	(cỏ quét)
	<i>rest head on pillow / a pillow</i>	#CV.kol	gối	(kè)

The semantic domain of containers is surprisingly limited, with little reconstructable lexical data.¹⁹ This is especially surprising considering the many types of jars, pots, and baskets in archaeological excavations. Pottery associated with Austroasiatic movement into mainland Southeast Asia is widely noted in archaeological literature (cf. a brief overview in Lim 2019:3). This shows where additional

¹⁹ In Vietnamese, the term *thạp* ‘jar/situlae’ is specifically used in reference to the commonly excavated bronze situlae in archaeological excavations, but the word is not available in lexical data of other Vietic languages. In the Mon-Khmer Etymological Dictionary, there are some vaguely similar forms meaning ‘bucket’ or a similar container: Proto-Bahnaric *drap; Katuic (Ngeq *ta:p ha:p*); and Khmer *daap* ‘bottle/jar/pitcher/flask’. However, the initial consonants do not match well (e.g., /d/ versus Vietnamese /tʰ/), so we can only note these forms as possible chance similarities for now. A significant problem is that Proto-Vietic lacked aspirated onsets, so the /tʰ/ onset would seem more likely a later Viet-Muong development, and thus centuries later than the Đông Sơn period. It then vaguely resembles *khạp* ‘jar’, but which may just be chance similarity. Whether this represents early sociocultural distinctions between Vietic groups near the Red River Delta versus those in rural uplands would be an interesting matter for archaeologists to explore.

linguistic fieldwork on such vocabulary could be useful. Some terms for pots and jars have spread regionally among branches of Austroasiatic (e.g., Vietnamese *khạp* ‘jar’ versus Khmer *khap* ‘jar’; *ceh* ‘jar’ in Katuic, Mon, and Old Khmer). As will be noted in Section 3.2, a large number of Sinitic terms for containers were borrowed, suggesting changes in such practices among Vietic-speaking groups.

2.3 Vietic Terms for Clothing, Jewelry, and Grooming

In the pre-Qin Southeast Asian archaeological record, little remains of cloth material. However, garments are represented in the imagery of Metal-Age Đông Sơn objects, and worn decorations, such as bracelets and earrings, are frequently excavated from sites of the Đông Đậu (e.g., Vũ 2003:126-133) to Đông Sơn cultures (e.g., Nguyễn Văn Cường 2014) in northern Vietnam. At Phùng Nguyên sites (c. 2000-1500 BCE) in the Red River Delta, the spindle whorl to weave fiber into thread and cloth beaters to fashion bark cloth have been found (Cameron 2002: 94).²⁰ Excavated spindle whorls are indicative of the creation of textiles for clothing, but occasionally, more concretely, remaining bits of fibers of clothing are uncovered, such as the Đông-Son-era woven shroud made of ramie of plants indigenous to the region (e.g., Cameron 2014). Textile fibers that have been identified in Đông Sơn burial sites include cotton, ramie, jute, and possibly hemp (Cameron 2002:106). Overall, while many gaps in the archaeological data remain, there is ethnoarchaeological evidence to at least consider in relation to Vietic reconstructions.

Reconstructed Vietic words related to clothing and grooming, as in Table 9, vary in terms of the amount of supporting archaeological evidence. Still, the items here likely represent types of items worn by Vietic peoples at the time Sinitic-speaking groups arrived. As with architectural words, key elements in this domain of garments are seen in the lexical data, including lower garments and footwear, and which can be seen in bronze objects of the Đông Sơn period. One seeming gap is shirt-like upper-body garments, a term for which there is an early Chinese loanword (cf. § 3.5). The following paragraphs provide additional discussion of some of the words.

Only objects of long-lasting material are seen in archaeological remnants. One reconstructable word for a long-lasting wearable item readily found in the archaeological record is ‘bracelet’. While there are Đông-Son era bronze hairbrush handles plus paddles (Nguyễn Văn Cường 2014:125), I have not found information about combs in the archaeological literature (perhaps made of biodegradable material). Yet, there is a Proto-Vietic word meaning ‘to comb’, Vietic *ca:s ‘to comb’, which has homophonous proto-language reconstructions *caas in neighboring Bahnaric and Katuic. This indicates some time depth of the etymon in this portion of Austroasiatic, though it is not attested in branches outside of this region and may be a shared regional term. As for garments, remnants of loincloths and skirts/sarongs are not in found, but they are seen worn by human images on the Đông Sơn bronze drums (Cameron 2002:103), both of which have reconstructable terms in Vietic.

Vietic words for ‘loincloth’ present a complex situation in the subdomain of lower-body garments. Attestations for Ferlus’s Proto-Vietic *sr-to:jʔ ‘loincloth’ are limited to archaic languages (e.g., Chứt, Thàvưng, and Mǎliêng) and are not seen in Vietnamese or even outside of Viet-Muong and Pong-Cuoi languages in available data. The Vietnamese word *khố* ‘loincloth’ appears to be a direct Chinese character reading of Chinese 褲 *kù* ‘pants’, also seen in various Mường, Cuối, and Thổ lects. The semantic shift from ‘pants’ to ‘loincloth’ seems unexpected, as does the use of a Chinese cultural term for a distinctly indigenous garment. However, there is semantic space for it as Vietnamese *quần* ‘pants’ is also an SV Chinese character reading of 裙 *qún* ‘skirt’. Ferlus reconstructed *k^ho:ʔ ‘loincloth’ in Vietic, but if this were a Proto-Vietic word, it could not be reconstructed with an aspirated onset as Proto-Vietic lacked aspirate onsets. Only the later Proto-Viet-Muong has a reconstructed set of aspirated onsets (i.e., *p^h, *t^h, *k^h (Nguyễn Văn Tài 2005)). One possible scenario is that the original Vietic word

²⁰ Speakers of the Vietic Chứt lects, such as Rục, as well as the Bru people of the Katuic branch, have used bark to make loincloths and skirts (Nguyễn Văn Huy et al. 2014), and Chamberlain (2003) describes the barkcloth manufacturing process among Vietic groups such as the Atel and Thémárou. While Cameron (2002) presents evidence of the ancient history of barkcloth in both mainland and insular Southeast Asia, the historical details and origins of the practice among Vietic groups are uncertain. I have found no reconstructable lexical data specific to this practice.

for ‘loincloth’ has been retained in the archaic lects, while a Chinese loanword was adopted and replaced the native term in Viet-Muong and Pong-Cuoi. *Quần* (originally ‘skirt’ in Chinese, now ‘pants/leggings’ in Vietnamese) and *khố* (originally ‘pants’ in Chinese, now ‘loincloth’ in Vietnamese) were borrowed with slightly different senses and were spread in Viet-Muong and to Pong-Cuoi.

The word for ‘conical hat’ (Vietnamese *nón*) seems to stem to a later regionally spread term. The Proto-Vietic reconstruction **dɔːnʔ* is related to the Austroasiatic reconstruction of **đuən*, though I suspect the Proto-Vietic reconstruction, with a monophthong vowel, is the more likely reconstruction. Regardless, it occurs within a constrained geographic region only in branches of Austroasiatic in eastern mainland Southeast Asia: Vietic, Khmeric, Katuic, Bahnaric, essentially Vietnam and Cambodia. This limited geographic area suggests the spread of this development at a later stage in Austroasiatic history. It is not yet possible to determine the source of the lexical innovation, and I have found no archaeological discussion of this object’s history. One stylized image from the Iron Age (500 BCE to 500 CE) Ban Chiang site in northeast Thailand shows two humans wearing conical hats (p.c. Charles Higham).²¹ Though the images are somewhat abstract, they represent possible evidence for the reconstructed Proto-Vietic form and tentative regional Austroasiatic form. This evidence allows the possibility that the word is from the pre-Qin period.

Table 9: Vietic Terms for Clothing and Grooming

Type	Gloss	PV	Viet	Muong
Clothing	<i>hat, conical</i>	<i>*dɔːnʔ</i>	<i>nón</i>	<i>đòn</i>
	<i>loincloth</i>	<i>*sr-tɔːjʔ</i>	(<i>khố</i>)	(<i>khố</i>)
	<i>sandal</i>	<i>#cep</i>	<i>dép</i>	<i>tép</i>
	<i>skirt</i>	<i>*bɔːlʔ / *valʔ</i>	<i>váy</i>	<i>wải</i>
	<i>bracelet</i>	<i>*p-lam</i>	<i>trâm</i> ‘earring’	<i>tlâm</i>
	<i>bun (of hair)</i>	<i>*c-puːlʔ</i>	<i>búi</i>	NA
Textiles	<i>cloth of cotton</i>	<i>*k-paːs</i>	<i>vải</i>	<i>pái</i>
	<i>thread</i>	<i>*k-rəːjʔ</i>	<i>sợi</i>	NA
Actions	<i>put on/wear clothing</i>	<i>*mak</i>	<i>mặc</i>	<i>mặc</i>
	<i>wear (necklace, ring, glasses, etc.)</i>	<i>#-tɛːw</i>	<i>đeo</i>	<i>tleo</i>
	<i>plait hair</i>	<i>*puːlʔ</i>	<i>búi</i>	NA
	<i>comb</i>	<i>*caːs</i>	<i>chải</i>	<i>chải</i>
	<i>wash one’s hair/shampoo</i>	<i>#-koːlʔ</i>	<i>gội</i>	<i>cổl</i>
	<i>sew/repair</i>	<i>*k-paːʔ</i>	<i>vá</i>	<i>pả</i>
	<i>thread (a needle), to sting, to skewer, brochette</i>	<i>*tʃəh</i>	<i>xỏ</i>	<i>xỏ</i>
	<i>weave</i>	<i>*taːŋ</i>	<i>đan</i>	<i>tainh</i>

A socioculturally significant lexical item is the word for ‘cloth of cotton’, Vietnamese *vải*, a cognate of Proto-Vietic **k-paːs* (note the /v/ onset from complex initial material and the hoi tone but the loss of final *-s). The original Vietic **k-paːs* ‘cotton/cloth’ has cognates in eight Austroasiatic branches (Aslian, Bahnaric, Katuic, Khasic, Khmer, Munda, Pearic), allowing for Shorto’s reconstruction of **kpaas*. However, it cannot be considered a Proto-Austroasiatic word as the arrival of cotton-producing practices post-date the Austroasiatic dispersal likely by over a millennium. Tai **fai^C* ‘cotton’, with its reduced **f* onset, appears to be an even later borrowing. The source for all of these is probably from Sanskrit *कार्पास karpāsa* ‘made of cotton’ (Apte 1957-1959:563) or Pali *kappāsa* (Pali Text Society 1921-1925). This hypothesized Indian lexical source corresponds to archaeological evidence of trade of rice, beans, and other cash crops, including cotton, between India and mainland Southeast Asia in the last first millennium BCE (Castillo et al. 2016), though the details are vague. The 2nd century BCE Chinese *Shiji* 史記 “Records of the Grand Historian” mentions of cotton production in regions of

²¹ Non-specialist, popular writings online posit dates of the origin of the practice variously from two to several thousand years ago. None cite publications of any sort, whether archaeological or otherwise.

modern-day southern China and bordering Indochina (Cameron 2002:57), which matches the lexical geography of the Sanskrit or Pali word. The evidence collectively increases the possibility that cotton-cloth making had been practiced by Vietic speakers by the Han Dynasty.

Finally, the several verbs in Table 9 consist of multiple terms for donning items, producing garments, and for grooming. These proto-language forms support the related aspects of material culture in this domain and again provide ethnohistorical evidence of early lifestyle practices. As noted in Section 2.2, “to weave”, Vietnamese *đan*, is a solid Proto-Austroasiatic etymon with likely extreme time depth as it is in all thirteen branches. While weaving is involved in the creation of baskets and parts of homes (e.g., bamboo panels), it is likely that this also referred to the making of clothing. As noted above, ‘to comb’ occurs in multiple branches of Austroasiatic. I have otherwise been unable to locate other Vietic reconstructions in this category which belong to Austroasiatic etyma.

2.4 Vietic Terms for Foods, Produce, and Betel

This section presents terms for produce first (Table 10), then words for prepared foods (Table 11), and lastly, terms related to the practice of areca-nut chewing (Table 12). Overall, considering that reconstructions represent only a portion of the total lexical range, when Chinese groups arrived, Vietic speakers evidently had a rich variety of means of food production and cuisine.

The complex nature of the history of domestication of fruits, tubers and roots, and seeds and nuts makes it challenging to determine with certainty that some types of produce were domesticated or cultivated at the time of the speciation of Vietic.²² Most Vietic reconstructions for produce are corroborated by botanical and archaeological information and are native to the region of Greater Southeast Asia (e.g., fruits (Blench 2008)). However, the histories of domestication of some types of produce are complex (e.g., the spread of bananas from insular Southeast Asia (Perriera et al. 2011, Castillo and Fuller 2015), but Austronesian etyma do not appear related to Vietic or Austroasiatic in general). Some foods are clearly indigenous to mainland Southeast Asia, while others may have come from India and Southern China (e.g., some types of citrus fruit (Fuller et al. 2018)), or from Insular Southeast Asia (e.g., bananas).

The archaeological record is somewhat clearer regarding the introduction of rice and millet production into mainland Southeast Asia. A commonly noted claim is that, around 4000 BP, groups migrating into Southeast Asia from southern China brought practices of growing millet and rice (e.g., Higham 2017a). Diffloth (2005) notes a set of ten Proto-Austroasiatic terms related to rice and rice production. Correspondingly, in Vietic, both ‘rice’ and ‘millet’ are reconstructed in Proto-Austroasiatic, as in Table 10. Vietnamese *kê* ‘millet’ is reconstructed as *kiel in Vietic, though it appears to be restricted to Viet-Muong and Pong-Cuoi, while the original Proto-Vietic *s-kə:j ‘millet’ seen in several archaic Vietic languages is related to Proto-Austroasiatic *skuəj. This archaeological and lexical data together suggest that most, if not all, such grains were part of the diet of Vietic speakers prior to the southward migration of Chinese groups into northern Vietnam. Other Vietic reconstructions are also reconstructed in Proto-Austroasiatic (e.g., ‘fruit’, ‘squash’, ‘husked rice’, ‘bran’, ‘bamboo shoots’, ‘root’), which suggests substantial time depth of those words. Fruits, roots and tubers are noted in archaeological studies of the region in the period of what can be assumed to be early Austroasiatic history in mainland Southeast Asia (e.g., Oxenham et al. 2015). Taro in particular played a significant role in Austroasiatic, which may represent a center of domestication (Blench 2012).

The Vietic reconstruction for ‘jackfruit’ is indigenous to mainland Southeast Asia and therefore appears to be a likely loanword into Chinese. It would be directly from Vietic or Vietnamese considering the similarity of the phonological form (cf. Blench 2008:119). There is a scattered presence of Vietic #-mi:t ‘jackfruit’ in neighboring Bahnaric and Khmuic languages, suggesting borrowing into them. Of relevance is the distinct reconstructed *pnaas ‘jackfruit’ in Proto-Katuic, and Mon *pənah*. These are possibly related to—and perhaps from—Dravidian languages (e.g., Telugu *panasa*, Oriya *panasa*,

²² The earlier Đa Bút culture (6th to 3rd millennia BCE) is described as a hunting-gathering society, with evidence of consumption of snails, shellfish, and turtles and of fruits, nuts, and other plants (Nguyen Viet 2004). Available information does not specify contributions of Austroasiatic food gathering/producing strategies among these groups.

Marathi *p^hanas* (listed in Blench 2008:119)). I have not found a clear archaeological study positing the early spread of jackfruit cultivation in Southeast Asia. Nevertheless, assuming the Vietic form was borrowed into Sinitic, we can assume a chronology in mainland Southeast Asian prior to the spread of the word into Chinese.

Table 10: Vietic Terms for Produce²³

Type	English	Proto-Vietic	AA	Viet	Muong
Fruits	<i>jackfruit/breadfruit</i>	#mi:t	NR (cf. instances in Bahnaric & Khmuic)	mít	mít
	<i>banana</i>	*cə:jʔ	NR (cf. *t ₁ luuj[])	chuối	chuối
	<i>fruit</i>	*ple:ʔ	*pləjʔ	trái	tlái
	<i>orange</i>	#ka:m	NR	cam	cam
	<i>pomelo</i>	*pa:s	NR	bưởi	puối
	<i>grape, Burmese (Baccaurea sapida)</i>	*p-cu:	NR	giâu	NA
Gourds	<i>squash/vegetable sponge (loofah)</i>	*ɬiəp / buop	NR	mướp	puốp
	<i>waxgourd</i>	*p-luk	NR	tróc	NA
	<i>squash/pumpkin/waxgourd (Bennicasa cerifera)</i>	*k-bi:rʔ / k-pi:rʔ	*cpiir	bí	pí
	<i>gourd/calabash</i>	*-ga:wʔ / -ka:wʔ	NR	gáo	(pù)
Grains	<i>ear (of grain)</i>	*k-cə:rʔ / kje:rʔ	NR	chẹn	NA
	<i>millet (setaria)</i>	*kiəl	NR	kê	NA
	<i>rice, husked</i>	*r-ko:ʔ	*rk[aw]ʔ	gạo	cáo
	<i>bran</i>	*t-ka:mʔ	*skaamʔ	cám	NA
grass stalk	<i>sugarcane</i>	*k-me:ʔ	NR (cf. Proto-Khmuic *kme:ʔ)	mía	mía
	<i>bamboo shoots (edible)</i>	*t-ɬaŋ	*t ₁ ɬaŋ	măng	băng
Roots & tubers	<i>root</i>	*k-ries / k-rəs	*ris	rễ	rach
	<i>tuber</i>	*kuh	NR	củ	củ
	<i>taro</i>	*s-ro:ʔ	(cf. *t ₂ rawʔ)	sọ	xọ
	<i>taro/tuber</i>	*ɬo:n	NR	môn	NA
	<i>cassava/manioc</i>	*s-ranʔ	NR	sắn	khảnh
	<i>galangal</i>	*b-rieŋ	NR	riêng	NA
Nuts & seeds	<i>seeds/kernel</i>	*-he:k	NR	hạch	(hôt)
	<i>sesame</i>	*viŋ	NR	vừng	wâng
	<i>chestnut</i>	*-teh	NR	đẻ	té
Others	<i>mushroom</i>	*dəmʔ	NR	nấm	(chẻ)
	<i>vegetables</i>	*-raw	NR	rau	rau

The history of the word *cam* ‘orange’ is also complex. Vietnamese *cam* is a standard SV reading of the Chinese character 柑 *gān*, but as the OC reconstruction is *[k]^s[a]m, the word could have a much deeper time depth and could be a borrowing in either direction. As for archaeohistorical studies, Fuller et al.

²³ Instances of words for fruits that are widespread in Vietic but cannot be reconstructed to an ancient stage include pineapple and guava, both of which are indigenous to South and Central America respectively and were brought to Southeast Asia only in the period of European colonialization there (Blench 2008:117, 126). The litchi has been considered a fruit domesticated in southern China, with mention in Chinese texts about a thousand years ago. Thus, these words have a much later history in Vietic languages, and while their spread among Vietic languages is interesting, they are not relevant to the historical period in question in this paper.

(2018:33-24) note that Han-Dynasty era texts mention this term, but as it is largely restricted to southern China and northern Southeast Asia (e.g., Proto-Southwest Tai *khwaam^A (Jonsson 1991)), it is reasonable to postulate the term was spread into Sinitic. Indeed, there is archaeological evidence of citrus consumption from the time of the Đông Đậu culture (Nguyễn Thị Mai Hương 2003:116-123). Schuessler (2007:249) hypothesizes that this word is from Austroasiatic, but this form is only seen in Vietic in the Mon-Khmer Etymological Dictionary. It is thus reasonable to consider either Tai or Vietic as the origin of this word and/or associated food-production practice, but this matter is certainly not resolved.

Terms for green leafy vegetables are lacking in Vietic reconstructions, and as to be noted in Section 3.4, there are two ECLs for this type of produce. There is also a possible early Tai loan Proto-Tai *buŋ^C ‘water spinach/morning glory’, for Vietnamese *muống*, Proto-Vietic *bɔːŋʔ. As the distribution of this word is wider in Tai and only seen in part of Vietic and not other Austroasiatic languages, it would seem more likely to be a loanword from Tai. However, pollen and spore evidence at the Đông Đậu archaeological site (c. 1500-1000 BCE), where pottery containers were also unearthed, does indeed suggest the possibility of the consumption of morning glory and amaranth (Nguyễn Thị Mai Hương 2003:116-123). One concern is, as Castillo (p.c.) notes, that pollen can be used to identify family-level produce, not specific produce. Again, this is a matter that requires additional archaeological data to clarify.

In the cultural domain of prepared food and drink, there is little supporting archaeological evidence. One study (Eusebio 2015) tests hypotheses about traditional cooking practices in mainland Southeast Asia with respect to archaeologically excavated cooking objects and residues. The detection of fatty acids in archaeological pot remnants from southern Vietnamese sites from the Late Neolithic to Early Metal Age in comparison with modern culinary practices in the same region indicate their usage in fermenting and cooking plants and/or aquatic materials (Eusebio 2015). However, I can find little detail to associate with the lexical data.

In Table 11, the lexical reconstructions include ingredients (‘salt’, ‘chili’, ‘turmeric’, ‘vinegar’), prepared foods involving rice, a few implements, and several verbs. As noted in Section 2.2, pestles are found in early excavations as far back as 4000 BP. Even if this is not a proto-language etymon, the wide lexical distribution and early archaeological date suggest that the word was quite early in Austroasiatic and Vietic language history. The word *k-pat ‘croquette of rice’ has a complex onset, marking it as potentially older, even if the archaeological evidence cannot support this as an ancient practice. The verbs show a range of food processing techniques (e.g., boil, fry, roast, steam, etc.). The above-mentioned archaeological evidence corroborates words for food preparation in ceramics, while some words may have no clear supporting evidence to connect to deep history.

As for ingredients, the histories in mainland Southeast Asia of salt and turmeric are challenging to clarify, and I can find nothing about the deep histories of chili and vinegar in Southeast Asia. I cannot find archaeological evidence of salt-production specifically in the Red River Delta, but Higham (2014:172) notes evidence of salt processing at the Gò Ô Chùa site in southern Vietnam dated to 1000-500 BCE. The reconstruction of *bɔːh ‘salt’ in Austroasiatic is attested in only four branches (i.e., Aslian, Bahnaric, Katuic, and Vietic), which marks this as a later lexical development in Austroasiatic, but still likely in the pre-Qin period. There is a corresponding Vietic reconstruction of Vietnamese *mắm* ‘salted/to salt (of shrimp or fish)’. I have found no archaeological evidence for this practice, but in light of this form’s occurrences in most Vietic sub-branches, and the possibility of the practice of fermenting noted above, I list it for the possibility that this was in fact a pre-Qin practice.

The history of turmeric appears to start in India 4000 BP, but with some 50 names in Sanskrit (Prasad & Aggarwal 2011)—none of which appear related to the Vietic form—I cannot find a clear historical linguistic source. Elsewhere in the region, the ethnolinguistic history of turmeric in the Austronesian world ultimately carries with it more questions than answers (cf. Kikusawa and Reid 2007), though the recurring association between the word for turmeric and for yellow is seen in both Austronesian and Austroasiatic despite being entirely different etyma. The widespread form *rmiit ‘curcuma species’ and ‘yellow’ among Austroasiatic languages (Bahnaric, Katuic, Khmeric, Khasic, Khmuic, Monic, Palaungic, and Pearic) is not related to the Proto-Vietic *ŋe:lʔ (also the source for the

color term ‘yellow’ in Kri). I tentatively consider this as a possible pre-Qin word as there is a generally deep enough history of turmeric in the region, but later than the proto-language stage.

Table 11: Vietic Terms for Food, Cooking Ingredients, and Cooking

Category	Gloss	PV	AA	Viet	Muong
Ingredients	meat/flesh	*-si:t	*sac	thịt (s>ɛ)	thít
	salt	*ʙɔ:jʔ	*ʙɔɔh ‘salt’	muối	bỏi
	chili	*ʔə:t	NR	ớt	ớt
	turmeric	*ŋɛ:lʔ	NR	nghệ	NA
	vinegar	*-jəmʔ	NR	giấm	dấm
Prepared food	croquette of rice	*-namʔ	NR	nấm	(cỏi)
	croquette of rice	*k-pat	NR	vát	(cỏi)
	gruel/porridge of rice	*ca:wʔ	NR	cháo	cháo
Implement s	mortar (for rice)	*t-ko:lʔ	*guul	cối	cỏi
	pestle	*tʃ-re:	*nrəjʔ, *nrəj[], *rnəjʔ	chày	khày
	tray	*bəm	NR	mâm	bâm
Actions	be salted/to salt (shrimp, fish)	*bəmʔ	NR	mắm	bắm
	to fry	*-ra:nʔ	NR	rán	rán
	to roast (on embers)	*dɑ:ŋʔ	*t ₁ aŋ	nướng	nướng
	to steam (rice)	*so:j	NR	xôi ‘steamed rice’	NA
	to cook/boil	*dɔ:ʔ	NR	nấu	nấu

Finally, lexical evidence in Vietic supports the hypothesis that chewing of areca nut in betel leaf was practiced in the pre-Qin period. Archaeological evidence puts the practice of teeth-blackening in northern Vietnam in the mid-1st millennium CE (Oxenham et al. 2002). The practice of teeth-blackening among the Bai Yue groups was noted in early Chinese texts. Even if the textual description was not based on contact specifically with Vietic speakers, this lexical data shows that, quite likely, betel chewing was in this general region by the Han expansion. The linguistic data demonstrating the early spread of betel-chewing in Southeast Asia has been discussed (cf. Mahdi 1998:403-407, Blench 2008:118). More recently, Alves (2020:xxxiii) notes Vietic reconstructions of three key elements of betel chewing (i.e., areca nut, betel leaf, and mineral lime), all of which have also been reconstructed for Austroasiatic by Shorto (2006). The Proto-Malayo-Polynesian reconstruction for betel leaf *bu-bulu (Blust and Trussel 2010) is a viable source for this word throughout mainland Southeast Asia considering that evidence of teeth-blackening in the Philippines dates to 2600 BCE (e.g., Zumbroich 2007). Thus, this word is likely a later development in Vietic (and Austroasiatic generally), but this practice and these words were probably part of the Vietic lifestyle when Han Chinese arrived in the region.

Table 12: Proto-Vietic terms for betel-chewing

Gloss	PV	AA	Vietnamese
lime, mineral	*k-pu:r	*knpur	vôi
betel leaf	*b-lu:	*m[əw] (or #blu:)	trầu / giầu
areca nut	*kaw	*kaw	cau

3 Early Chinese Loanwords

The ECL data related to household structures and items can be readily connected to Chinese cultural practices and objects of the first millennium CE. Furthermore, some historical linguistic features similarly demonstrate early-period borrowing of words, as described in Section 1.3.2. Han Dynasty and pre-Qin archaeological and historical textual evidence is plentiful, so it is sometimes possible to match proposed ECLs with real-world details. A useful reference is Wang’s (1982) book describing Han culture with ample details and specific items and practices related to agricultural products, domestication of animals and silkworms, lacquerware, ceramics, bronze and iron implements, tombs, and related funeral objects, among others. When historical and/or archaeological information can demonstrate that items or related practices were from the Tang Dynasty or earlier, the associated words at least have the possibility to have been borrowed in the early to mid-first millennium CE.

Descriptions in historical records about details of objects are mostly general, but some ancient period textual descriptions provide specific details, such as the first century mandate of Chinese-style clothing and marriage practices. Population censuses in the region provide enough detail about family households, and indeed, the Vietnamese word *họ* ‘surname/kin/family relationship’ most likely stems to the ECL for ‘household’ (戶 *hù*, SV *hộ*, MC *huX*).²⁴ However, in other cases, such evidence is not readily located, and when those circumstances are particularly problematic, I have moved such words to the Appendix for future consideration.

The borrowing of Chinese loanwords does not mean that such items were necessarily newly introduced sociocultural practices or objects. This may be the case for some objects (e.g., chopsticks), but clearly not others. Bronze bells from the early Đông Sơn period (e.g., Trần 2011:115, Nguyễn Văn Cường 2014:21) indicate that bronze bells may have already been part of Đông Sơn culture by the arrival of the Chinese, and yet, the ECL *chuông* ‘bell’ was borrowed (as in Table 9), with no apparent native Vietic word. Similarly, Vietnamese *tên* ‘arrow’ is an early Chinese loanword (Chinese 箭 *jiàn*, SV *tiên*, MC *tsjenH*, OC *[ts]en-s),²⁵ replacing the original Proto-Austroasiatic word *kam (attested in all 13 branches of Austroasiatic, including Vietic languages other than Viet-Muong languages). Even SV *đồng*²⁶ ‘bronze’ is the only word in Vietic for bronze despite the Bronze Age having begun in the Red River Delta several centuries before the Han Dynasty. There is no trace of a pre-Qin Vietic word for any metal, as is the case in Tai and Hmong-Mien, which similarly lack native terms and have only Chinese etyma in this domain.²⁷

Thousands of additional Chinese words were borrowed from the SV period onward in the second millennium. However, as these are not in the period of sociocultural contact in consideration, they are outside the chronological scope of this study. Some supposed SV words may have also been borrowed in the ECL period, but as their phonetic forms did not change, they are listed in Chinese character reading lists. In light of this situation, there may be more words in this domain in Proto-Vietic, but it might not be possible to ascertain this with certainty except by exploring the semantic domains and identifying seeming gaps that such words might fill.

²⁴ That Vietnamese surnames mostly stem to the SV layer, and therefore belong to the later Middle Chinese period, suggests later widespread adoption of the full Chinese naming system. More historical information about the process of incorporating Chinese names would likely provide many useful ethnohistorical insights.

²⁵ The *ngang* tone, equivalent to a *pingsheng* tone, is expected assuming the word was borrowed after the Old Chinese loss of final *-s but before tonogenesis in Viet-Muong. See Alves 2018 for explanation and dozens more words exemplifying this phenomenon.

²⁶ This is listed as a standard SV reading, but as the Late Han reconstruction (Schuessler 2008: 499) is *duŋ^A, it is possible that this is word was, in fact, borrowed in that early period. If so, that would match other ECLs in the domain of metals. See footnote 25 for more discussion.

²⁷ The use of Chinese words for copper/bronze, iron, steel, gold, and silver is seen in Proto-Tai and Proto-Hmong-Mien, in addition to Vietic (Alves 2019), again with no apparent native words. This is the case even though the Metal Age similarly began in southern China more than several centuries before the Han expansion. However, both Tai and Hmong-Mien have a variety of proto-language terms for metal implements and weapons (Alves 2015b), which does highlight a pre-Qin tradition of metalworking.

3.1 Early Chinese Loanwords for Household Structure

Numerous clay models of terra cotta homes from the 1st to 3rd centuries CE have been found in northern Vietnam (e.g., Wei 2020). Chinese-style roof tiles have been found at the Cỗ Loa site possibly as early as 200 BCE (e.g., Kim et al. 2010). But the Han-style small model homes (a type of míngqí 明器, miniature replicas of daily life) indicate that these words could have been borrowed as well in the early centuries of the first millennium CE. Regardless of the chronological details, such items represent the early import of Chinese-style architectural practices.

Correspondingly, the list in Table 13 is filled with ECLs for architectural structures. The subcategories include household structures and locations (e.g., buildings, rooms, pavilions, etc.), units (e.g., for buildings and for levels/floors), and various parts of the structures (e.g., kingposts, walls, rafters, etc.). As described in Section 2.1, Vietic has a solid lexical core of elements of a home, but among ECLs, we see the expected structural parts of the style of homes and buildings the Han and later Chinese immigrants brought. Notably, none of the architectural terms in Table 13 have comparable reconstructable early Vietic etyma, and only a few are seen in the Mường data. This highlights the different sociocultural circumstances and geographic location of speakers of Vietnamese and its linguistic predecessor.

Table 13: ECLs for Household Elements

Category	Gloss	ECL	SV	Muong	Chinese	OC	MC
Structures and Locations	<i>room</i>	buồng	phòng	puồng	房 fáng	*[Cə-N-]paŋ	bjang
	<i>pavilion</i>	gác	các	các	閣 gé	*C.kʰak	kak
	<i>building</i>	toà	toạ	NA	座 zuò	*[dz]ʰo[j]ʔ-s	dzwaX
	<i>garden</i>	vườn	viên	(cha) (vườn in compounds)	園 yuán	*C.gʷa[n]	hjon
	<i>stall/pen/enclosure</i>	ràn	lan	NA	蘭 lán	*[r]ʰan	lan
Units	<i>unit for buildings</i>	căn	gian	NA	間 jiān	*kʰre[n]	kean
	<i>story/floor/building</i>	lầu	lâu	NA	樓 lóu	NONE	NONE
	<i>level/floor</i>	tầng	tầng	NA	層 céng	*N-s-tʰəŋ	dzong
Parts	<i>tile</i>	ngói	ngoã	ngói	瓦 wǎ	*C.ŋʷra[j]ʔ	ngwaeX
	<i>rafter</i>	rui	suy	NA	椽 cuī	*sruɪ (Schuessler 2009)	ʃwi (Schuessler 2009)
	<i>kingpost</i>	rường	lương	rường (hường)	梁 liáng	*raŋ	ljang
	<i>eaves</i>	thềm	diêm	NA	檐 yán	*Cə.[g]am	yem
	<i>floor</i>	tầng	tầng	thòng	層 céng	*N-s-tʰəŋ	dzong
	<i>wall/partition</i>	vách	bích	nàng	壁 bì	*C.pʰek	pek
	<i>board/plank</i>	ván	bản	ván	板, 版 bản	*C.pʰranʔ	paenX

Chinese textual evidence sometimes demonstrates usage of the ECLs by the era in question. The Chinese words 椽 cuī ‘rafter’, 檐 yán ‘eaves/beam’, 壁 bì ‘wall’, 瓦 wǎ ‘tile’ and other words that are ECLs can be found in Warring States period texts. That is not proof of borrowing by Vietic speakers,

but rather evidence that these could have been used by Sinitic speakers in northern Vietnam in the Han Dynasty. I am not certain of the timing of the unitizing functions of the unit nouns, which would require more careful assessment of texts. However, the phonological features of these strongly indicates ECL status (e.g., the low-register *huyền* tone of *lầu* ‘floor/level’, the vowel [ə] comparable to *ə in Old Chinese in *tàng* ‘floor/level’).

As a final note, as noted in Section 2.1, traditional Austroasiatic highland house structures are connected with past structures. Austroasiatic ‘rafter’ is reconstructed as *crʔoʔ. It is attested in Aslian, Khmuic, Monic, and Palaungic, which does not necessarily demonstrate this is a proto-language level term, but it is geographically widespread enough to show substantial time depth in Austroasiatic. Again, ECLs for architectural elements represent the introduction of Chinese-style practices, not necessarily completely new introduced practices and/or technologies.

3.2 Early Chinese Terms for Household Items, Decorations, and Containers

This section presents multiple tables containing some four dozen terms of objects, implements, containers, and decorations related to the household. Some publications present some details and descriptions of Chinese material culture, including aspects of the household, from the Han era or earlier (e.g., Gernet 1982:129-170, Wang 1982, Ebrey et al. nd, etc.), and collections of art and artifacts similarly show key aspects the material culture (e.g., Smith and Weng 1976, online collections of objects such as that of the British Museum, etc.). By the Han Dynasty, Chinese artisans had already long developed tradition of finely crafted furniture and containers. The Han Dynasty era saw the development of locks with keys (Yan and Huang 2003). The Chinese development of paper is generally attributed to Cai Lun in the early 2nd century CE, but evidence of paper dates back centuries prior. While it is difficult to find detailed information about all the proposed items and actions in Tables 14, 15, and 16, in general, these words match well the overall scenario presented in the archaeohistorical record.

Table 14 contains words of several subdomains of household items, including bedroom items, personal objects, musical instruments, various implements, and items of literacy. The words for ‘bed’, ‘chair’, ‘trumpet (of buffalo horn)’, and ‘paper’ are strong candidates for Han Dynasty loanwords in light of their onsets, which correspond to the Old Chinese presyllabic material. All others have ECL features, but of a wider possible period of borrowing. The ECL for ‘blanket’ is admittedly speculative, as the Chinese word is ‘cotton/quilted with cotton’, but as the word has ECL features (i.e., ‘ê’ instead of SV ‘iê’ and the *huyền* tone instead of the SV *ngang* tone), I propose that this is a reasonable candidate, but possibly later in the first millennium. As for ‘mosquito net’, that word is also attested in Tai (at least Thai and Lao) and six Austroasiatic branches of central mainland Southeast Asia (Katuic, Bahnaric, Khmeric, Monic, Pearic, and Vietic). While I cannot find clear historical textual confirmation, the low-register *huyền* tone is a strong indicator that it is an ECL, but additional ethnohistorical data is needed to verify that it is actually a Chinese loanword of an early period.

Table 14: ECLs for household items

Category	Gloss	ECL	SV	Muong	Chinese	OC	MC
Bedroom items	<i>bed</i>	giường	sàng	chiềng	床 chuáng	*k.dzraŋ	dzrjang
	<i>mattress</i>	đệm	điệm	(lót)	墊 diàn	*[tʰ[i]m-s	temH
	<i>blanket</i>	mền	miên	(ố)	棉 mián	NONE	NONE
Personal objects	<i>chair</i>	ghế	kỷ	gễ	几/機 jī	*C.kr[ə]jʔ	kijX
	<i>parasol</i>	tán; tàn	tản	thàn	傘 sǎn	*[s]ʰarʔ	sanX
	<i>ball</i>	hòn	hoàn	(bông)	丸 wán	*[g]ʷar	hwan
	<i>chess</i>	cờ	kỳ	cờ	棋 qí	*[g](r)ə	gi
	<i>mosquito net</i>	mùng	mông	(pá)	幪 méng	*môŋ (Schuessler 2009)	muŋ (Schuessler 2009)
Instruments	<i>bell</i>	chuông	chung	chuông	鐘 zhōng	*toŋ	tsyowng
	<i>trumpet (of buffalo horn)</i>	giốc	giác	NA	角 jiǎo	*C.[k]ʰrok	kaewk
	<i>pitch-pipe</i>	lã	lữ	NA	呂 lǚ	*[r]aʔ	ljoX
Implements	<i>key</i>	chia	thì	chìa	匙 chí, shi	NONE	NONE
	<i>rope/cord</i>	dây	duy	(chac)	維 wéi	*ɣʷij	ywij
	<i>rope</i>	thừng	thằng	(chac)	繩 shéng	*Cə-m.rəŋ	zying
	<i>torch</i>	đuốc	chúc	(tiêm)	燭 zhú	*tok	tsyowk
	<i>wheeled vehicle</i>	xe	xa	xe	車 chē	*[t.qʰ](r)A	tsyhae
	<i>pulley</i>	rọc (in compound: ròng rọc)	lộc	NA	轆 lù	NONE	NONE
Literacy	<i>paper</i>	giấy	chỉ	chấy	紙 zhǐ	*k.teʔ	tsyeX
	<i>scroll</i>	cuốn	quyển , quyển , quyển	(quyển)	卷 juǎn	*[k](r)o[n] ?	kjwenX
	<i>book cover; frame</i>	bìa	bì	bia	皮 pí	*m-[p](r)aj	bje

Table 15 lists a range of terms for decorations, textiles and materials used in decorations, and words for related actions which are corroborated in the archaeological record. Han Dynasty bronze mirrors are part of the archaeological record in northern Vietnam (e.g., Higham 2014:207). By the Han Dynasty, wax was used in the “lost-wax” technique in the metal casting process, in creating dyeing patterns, and

as a fuel in lamps from the Han Dynasty (Han et al. 2019). Art from the Han Dynasties and subsequent centuries have ample examples of the types of items represented by the words in Table 15. Several verbs related to crafting further supports this as more than just trade, but rather situations of bilingualism.

As for phonological support, some of the words have features suggestive of Old Chinese and thus closer to the Han Dynasty (e.g., *nhuôm* ‘to dye’ with a tone connected to the OC final *-ʔ; *rèm* ‘bamboo curtains/blinds’ retaining the OC onset *r-; *gương* ‘mirror’ with the lenited onset connected to the OC complex onset; *cờ* ‘flag’ retaining the OC vowel; *sáp* ‘wax’ with an /s/ onset connected to the OC onset cluster; etc.). Other words have ECL characteristics, but they are not indicative of how early they were borrowed, especially those which share Middle Chinese consonants and vowels and differ only in the tone (e.g., ‘curtains’, ‘wool/felt’). Historical linguistic details of some terms are complex, such ‘indigo’ and ‘ivory’, which are scattered among the language families in southern China and mainland Southeast Asia. These words are considered ECLs in Vietnamese for this study, but they have more complex linguistic histories in the region that are beyond the scope of this paper.

Table 15: ECLs for decorations and art

Category	Gloss	ECL	SV	Muong	Chinese	OC	MC
Decorations	<i>mirror</i>	gương	kính	cuong	鏡 jìng	*C.qraŋ-s	kjaengH
	<i>bamboo curtain/blinds</i>	rèm	liêm	rèm	簾 lián	*rem	ljem
	<i>rim/brim/coil ring/disk/fringe</i>	vành	viên	wènh	圓 yuán	*C ^w <r>en	hjwen
	<i>curtain</i>	màn	mạn	(pá)	幔 màn	*m ^a a[n]-s	manH
	<i>flag</i>	cờ	kỳ	cờ	旗 qí	*[g](r)ə	gi
Textiles & Materials	<i>wool/felt</i>	nì	ni, nĩ	(dạ)	呢 ní	NA	NA
	<i>cinnabar</i>	đan	đơn	NA	丹 dān	*t ^a an	tan
	<i>ivory</i>	ngà	nha	ngà	牙 yá	*m-c ^s <r>a	ngae
	<i>indigo; blue</i>	chàm	lam	chàm	藍 lán	*[N-k.]r ^a am	lam
	<i>glue/paste</i>	keo	giao	keo	膠 jiāo	*[k] ^r iw	kaew
	<i>coal</i>	than	thán	than	炭 tàn	*[t ^h]a[n]-s	thanH
	<i>oil</i>	dầu	du	rầu	油 yóu	*[l][u]	yuw
	<i>wax</i>	sáp	lạp	kháp	蠟 là	*k.r ^a p	lap
	<i>powder</i>	phấn	phân	phân	粉 fǎn	*mə.pənʔ	pjunX
Actions	<i>plait</i>	bện	biện	(wạnh)	辮 biàn	*m-p ^e [r]ʔ	benx
	<i>carve</i>	chạm	tạm	chạm	鑿 zào	NONE	NONE
	<i>draw a line</i>	gạch	hoạch	gạch	畫 huà	*g ^w rek	hweak
	<i>dye/infect</i>	nhuôm ²⁸	nhiễm	nhuôm	染 rǎn	*C.n[a]mʔ	nyemX
	<i>embroider</i>	thêu	tú	thêu	繡 xiù	*[s]iw(k)-s	sjuwH
	<i>chisel</i>	đục	tạc	tuc	鑿 záo	*[dz] ^a awk	dzak

²⁸ See Alves (2018: lxxxviii) for discussion of the regional nature of this word.

By the Warring States period in the mid-first millennium, lacquer technology was quite advanced (Fu et al. 2020), and tombs of the wealthy from this period contain thousands of finely crafted bronze and lacquerware objects (Ebrey et al. nd, British Museum online), including decorated boxes, cosmetic boxes, round containers, and so on. The large number of ECLs for containers stands out in contrast with the small number of such reconstructed Vietic terms, despite archaeological evidence of various types of pre-Qin containers of woven material, pottery, or metal in the Bronze Age. In Table 16 of ECLs, there are 10 nouns and one relevant verb. The containers are for storage of items, animals, or substances or for processing substances. This variety of functions represents changes in both the practices and material culture, including what was kept in the containers.

Words for boxes and functional items (‘crock’, ‘tub’, and ‘cup/small bowl’) have been borrowed and altogether signal a visually distinct home setting from the pre-Qin period in the Sinicized areas of Vietic. Only ‘jar’ has spread widely into Vietic to be reconstructable in Vietic as *vɔː, though whether this was borrowed into Vietic in that early period or spread from Viet-Muong later cannot be determined. The word for ‘cage’ was borrowed more than once in different eras. While *lông* is a solid ECL, the /l/ onset suggests a later borrowing than *chuông* with an onset suggestive of borrowing of an older form with a complex onset. The regional borrowing of this word in Tai, Austroasiatic, and Tibeto-Burman languages has been discussed in relation to the spread of ECLs for domesticated birds (‘chicken’ and ‘goose’) (Alves 2015a:51).

Table 16: ECLs referring to containers

Categories	Gloss	ECL	SV	Muong	Chinese	OC	MC
<i>Items</i>	<i>box</i>	hộp	hạp	hộp	匣 xiá	*[g]ʳ[a]p	haep
	<i>box/trunk</i>	rương	trương	rương	箱 xiāng	*C.[s]aŋ	sjang
<i>Substances</i>	<i>cup/small bowl</i>	chén	trần	chèn	盞 zhǎn	*[ts]rarʔ	tsreanX
	<i>jar</i>	vò	vu	wò	盂 yú	*[g]ʷ(r)a	hju
	<i>earthenware jug</i>	cong	cang	NA	缸 gāng	NONE	NONE
<i>Animals</i>	<i>cage</i>	chuông	lung, lộng	(cùm)	籠 lóng	*k.rʰoŋ	luwng
	<i>cage</i>	lông	lung, lộng	lông	籠 lóng	*k.rʰoŋ	luwng
<i>Processing</i>	<i>crock</i>	ang	áng	ang	盎 àng	NONE	NONE
	<i>tub</i>	thống	dũng	NA	桶 tǒng	*[ʔ]oŋʔ	thuwnɡX
	<i>cauldron</i>	vạc	hoặç	wac	鑊 huò	NONE	NONE
<i>Action</i>	<i>to contain</i>	chứa	trữ	chía	貯 zhù	NONE	NONE

Related to the household structures and items are manufacturing implements, many of which were made of metal. I have not yet found corroborating archaeological studies with lists of such items specifically in northern Vietnam in this period. The semantics and phonological patterns are all fairly consistent with expectations of ECL vocabulary. Table 17 contains a few instances of triplets as the early Chinese words appear to have been borrowed twice before the SV period. They can be tentatively given a relative chronology. Vietnamese *dùi* ‘awl’ and *ghim* ‘pin’ both have fricative onsets ([z] and [ɣ] respectively), which suggests borrowing at the end of Old Chinese when the Chinese words had reconstructed presyllabic material. As for *kềm* ‘pincers/tongs’, the Old Chinese *e is retained prior to Middle Chinese palatalization. Thus, these were likely borrowed before their counterparts. Also, see Table 25 for a note on the possible ECL *kẹp* ‘pliers; tongs; pincers; vise’.

Table 17: ECLs of tools and implements

Gloss	ECL	SV	Muong	Chinese	OC	MC
<i>hammer; axe</i>	búa	phủ	búa	斧 fǔ	*p(r)aʔ	pjuX
<i>knife</i>	dao	đao	tao	刀 dāo	*C.tʰaw	taw
<i>stove/furnace</i>	lò	lô	lò	爐 lú	*[r]ʰa	lu
<i>saw</i>	cưa	cừ	khura	鋸 jù	*k(r)a-s	kjoH
<i>scissors</i>	kéo	giào	NA	鉸 jiǎo	*mǝ-[k]ʰr[a]wʔ	kaewX
<i>tweezers</i>	nhíp	nhiếp	NA	鑷 niè	NONE	NONE
<i>awl</i>	đùi	trùy, chuy	tùi	椎/槌 chuí	*k.druj	drwij
<i>mallet/hammer/cudgel</i>	chùy	trùy, chuy	NA	椎/槌 chuí	*k.druj	drwij
<i>pin</i>	ghim	châm	(kim)	針/鍼 zhēn	*t.[k]əm	tsyim
<i>needle</i>	kim	châm	kim	針/箴 zhēn	*t.[k]əm	tsyim
<i>pincers/tongs</i>	kềm	kiềm	(kep)	鉗 qián	*C.[g]<r>[e]m	gjem
<i>pliers</i>	kìm	kiềm	(kep)	鉗 qián	*C.[g]<r>[e]m	gjem

3.3 Early Chinese Loanwords for Clothing, Colors, and Silk

This section presents ECLs in the domain of clothing with the related aspects of color terms and terms related to silk and silk production. The latter two aspects are not solely restricted to clothing, of course, but they are strongly associated with clothing in early Chinese cultural practices. Thus, they collectively constitute overlapping semantic and cultural domains portraying a partial picture of early Sinitic-Vietic language contact. The archaeological evidence for clothing during early contact mostly consists of evidence to the north of Vietnam. Early Chinese art and excavations in tombs in China show the range of types of Chinese-style clothing in the period under consideration. However, as with pre-Qin archaeological studies in northern Vietnam, the evidence tends to consist of objects strong enough to withstand the unfriendly soil and climate. The Early Chinese text, the Hou Han Shu from the 5th century CE, describes the mandating of Chinese-style clothing in Jiaozhi in the East Han of the first century CE. We cannot say with any precision how much impact such a mandate had on Vietic society.

Regardless, Table 18 includes ECLs for a full set of clothing, literally from head to toe, from hats to shirt/upper garment to socks (cf., § 2.3 about various words for leggings). Several key Chinese terms for worn items appear to have been borrowed in the early centuries of language contact. Moreover, borrowed verbs of donning garments and headwear again indicate the borrowing was not limited to situations of trade but also bilingualism.

Regarding the verbs, the meanings of the Vietnamese words are clearly related to the posited Chinese source words, and the overall phonological shapes match. There are, however, factors that decrease the degree of certainty. For ‘to don’, the proposed ECL clearly parallels the Middle Chinese form, notably the Tone C type, but the height is lower-register *nǎng* rather than the upper-register *sǎc* tone, though height alternations between the ECL and SV layer do occur occasionally. Still, it seems a probable loanword considering the specificity of the meaning (i.e., wearing of something on the head) and otherwise resembles the source form. As for ‘to dress’, there are no Chinese reconstructions, and the Chinese word 扮 fěn/bàn itself has multiple readings noted in dictionaries, as does Vietnamese. That makes the history of the word more complex and therefore less certain. It is not impossible that the multiple readings represent multiple stages of borrowing. The form with initial ‘v’ suggests the possibility of a complex onset or presyllabic material, meaning an earlier borrowing, but if so, the tone should be *hỏi* or *ngã* as the word is marked as having a Type C *qusheng* tone. We leave these two verbs

here for consideration, as in the context of an entire semantic domain, these are natural candidates as loanwords.

Table 18: ECLs for clothing²⁹

Categories	Gloss	ECL	SV	Muong	Chinese	OC	MC
Clothing	<i>hat</i>	mũ	mạo	mũ	帽 mào	*m ^h uk-s	mawH
	<i>upper garment, shirt</i>	áo	áo (expected *áo)	áo	襖 áo	NONE	NONE
	<i>belt</i>	đai	đái, đới	tai	帶 dài	*C.t ^h a[t]-s	tajH
	<i>shoe</i>	giày	hài	dày	鞋 xié	*[g] ^h re	hea
	<i>wooden clogs</i>	guốc	kịch	guốc	屐 jī	*Cə.[g]rek (cf. *grak (Schuessler 2009))	gjaek
	<i>socks</i>	bít	vạt, miệt	pít	襪 wà	*C.m[a]t	mjot
Actions	<i>put on, don (headwear)</i>	đội	đái	tội	戴 dài	*Cə.t ^h ək-s	tojH
	<i>put on/wear</i>	vận	bán, phần, ban	(mặc)	扮 fèn, bàn	*bjwən(B) (Schuessler 2009)	Late Han *bun(B); OC *bən, bən? (Schuessler 2009)
	<i>dress/put on clothing</i>	bận	bán, phần, ban	(mặc)	扮 fèn, bàn	*bjwən(B) (Schuessler 2009)	Late Han *bun(B); OC *bən, bən? (Schuessler 2009)

Color terms are relevant to aspects of material culture beyond clothing, such as traded items, decorations and metals. Colors played a role in early Chinese culture related to social status as well as philosophical systems. In early Chinese culture, the Wuxing 五行 “Five Phases” conceptual system of natural elements, calendar cycles, and the like includes a set of color terms: 青 qīng ‘blue-green’, 赤 chì ‘red’, 黄 huáng ‘yellow’, 白 bái ‘white’, 黑 hēi ‘black’. The overall Vietnamese system of color terms has been influenced by incorporation of Chinese loanwords (Alves 2019). Only a few native Vietic color terms can be reconstructed (e.g., *k-laŋ? ‘white (of the eyes)’, *t-lək ‘white’ (not in Vietnamese), #tɛ:n

²⁹ The Chinese words for ‘hat’ and ‘shirt/upper garment’ have a widespread and complex regional presence in Mainland Southeast Asia, as noted by Alves (2018b: lxxx-lxxxi, xc). The Tai form *hmuak^D (Li 1977) with a final [-k] appears in every branch of Austroasiatic in Mainland Southeast Asia (thus, only excluding Munda and Nicobaric), except Vietic. The Vietnamese tone in the word indicates a final fricative, without *-k, meaning this was borrowed from Old Chinese at a different time than when Tai borrowed it. The term for ‘shirt/upper garment’ has been reconstructed in Vietic *ʔa:wʔ. This form has spread into Austroasiatic branches surrounding Vietnamese, including Bahnaric, Katuic, and Khmeric, and Pearic (the latter has been noted as borrowing heavily from Khmer). There is no reconstruction of this word by Baxter and Sagart (2014a) or Schuessler (2009). However, the Chinese source word has a *shangsheng* tone category, meaning the SV character reading should have a *hỏi* tone. As the Vietnamese word has a *sắc* tone, and other varieties of Vietic (Muong, Chut, etc.) consist of evidence for a prior final glottal stop, we must assume that this word was borrowed from Chinese when the Chinese form still had a final glottal stop or some lingering glottalization. The possibility of local Chinese populations helping to spread the words cannot be excluded, but neither can it be the sole factor. The final [-k] in the Chinese word for ‘hat’ is not seen in any of hundred-plus varieties of southern Chinese, including the Yue, Pinghua, Minnan, or Hakka dialect groups (cf. the Xiaoxuetang Chinese dialect database).

‘black’, * $\eta\epsilon:l\eta$ ‘yellow/turmeric’, # $\acute{d}\acute{u}$: ‘brown’ (VM and Cuoi)). This leaves uncertainty about the original Vietic system but strongly implies a smaller set of terms than the current Vietnamese one. Indeed, three color term ECLs can be reconstructed in Vietic: ‘white/silver’ * $ba:k$, ‘yellow/gold’ # $C-wa:\eta$, ‘blue-green’ # $\epsilon\eta\eta$, and ‘silver’ * $\eta\acute{o}n$.³⁰ Some words are related to metals (‘white/silver’ and ‘yellow/gold’), while others are likely related to color of cloth. Altogether, there were probable spaces in the original Vietic color term system and multiple sociocultural paths of borrowing ECL color terms.

Table 19: ECLs of color terms

Gloss	ECL	SV	Muong	Chinese	OC	MC
<i>silver/white</i>	bạc	bạch	pac	白 <i>bái</i>	* $b^{\acute{s}}rak$	baek
<i>gold/yellow</i>	vàng	hoàng	wàng	黃 <i>huáng</i>	* $N-k^{w\acute{s}}aj$	hwang
<i>silvery white</i>	ngà	ngân	NA	銀 <i>yín</i>	* $\eta r\acute{o}[n]$	ngin
<i>bluish green</i>	biếc	bích	(xanh ách)	碧 <i>bì</i>	* $prak$	pjaek
<i>indigo, blue</i>	chàm	lam	chàm	藍 <i>lán</i>	* $[N-k.]r^{\acute{s}}am$	lam
<i>purple</i>	tiá	tử	NA	紫 <i>zǐ</i>	NONE	NONE
<i>black</i>	then	thán	NA	炭 <i>tàn</i>	* $[t^{\acute{h}}]a[n]-s$	thanH
<i>green</i>	xanh	thanh	xenh	青 <i>qīng</i>	* $[s.r]e\eta$	tsheng
<i>white clear</i>	bêch	bạch	bêch	白 <i>bái</i>	* $b^{\acute{s}}rak$	baek
<i>reddish</i>	hung ³¹	hồng	(hãng hãng)	紅 <i>hóng</i>	* $g^{\acute{s}}o\eta$	huwng

In relation to clothing are silk and silk-production, a prominent part of Chinese culture by the Han Dynasty. Silk was even a political tool: in several years of the first century BCE, the Han administration gave away dozens of thousands of rolls of silk to neighboring groups (Gernet 1982:132). Wang (1982:58) posits that silk production was spread to the “frontiers”, but I have found no corroborating evidence of early silk-production in the region. However, in the Bắc Bộ region, trace remnants of silk wrapped on metal have been dated to several centuries before the Han Dynasty, and other implements at this site (e.g., halberds, indirect evidence of developed looms, etc.) provide evidence of very early pre-recorded contact with Chinese groups (Cameron 2014).

On the other hand, the corresponding lexical data in Vietnamese is substantial. Table 20 contains terms for silk textiles, insects, and related actions. The word ‘cocoon’ would normally be an unlikely loanword, but in the context of this entire cultural domain, this borrowing is reasonable. Table 20 also contains an entry for ‘sesame; hemp’ as potential relation to production of textiles (not silk, of course), but I have not yet found clear ethnohistorical information that explains the early use of hemp in

³⁰ The Chinese word ‘white/silver’ has a regional presence. Chinese 白 *bái* (Old Chinese * $b^{\acute{s}}rak$) is a possible source of the widespread form in Austroasiatic (Aslian, Proto-Bahnaric, Proto-Katuic, Khmeric, Monic, Pearic, Vietic) and Western Malayo-Polynesian (Blust and Trussel 2010: https://www.trussel2.com/ACD/acd-lo_s.htm#30358). The spread of gold and silver in Southeast Asia largely begins with the Han Dynasty. Similarly, Chinese 銀 *yín* (Old Chinese * $\eta r\acute{o}[n]$, Middle Chinese *ngin*) is in Proto-Southwestern Tai (* $\eta\acute{o}n$) and some Austroasiatic languages (Khmuic, Bahnaric, Mangic, Palaungic). This naturally complicates the linguistic history of these words. However, I take as default the assumption that these words were borrowed directly from Sinitic, pending specific evidence to the contrary. This matches the overall tendency of ECLs in the semantic domains of both metals and color terms.

³¹ This item should have a low-register *huyền* tone, despite the comparable segments and semantics. The upper-level *ngang* tone is factor that suggests either that this item has a distinct history in its word formation origins or else it is chance similarity. I leave this here for now and hope that someone else might explore the issue.

manufacturing materials or sesame for cuisine or even medicine. For now, this item is included in both Table 20 on textiles and Table 22 for produce.

Table 20: ECLs related to silk production

Category	Gloss	ECL	SV	Muong	Chinese	OC	MC
Textiles	<i>silk (substance)</i>	tơ	ti	thơ	絲 sī	*[s]ə	si
	<i>silk (fabric)</i>	lụa	lũ, lâu	lũa	縷 lǚ	*[r]oʔ	ljuX
	<i>brocade/embroidered silk</i>	gấm	cấm	gấm	錦 jīn	*Cə.k(r)[ə]mʔ	kimX
	<i>sesame; hemp</i>	mè	ma	(wâng)	麻 má	*C.mʳaj	mae
Insects	<i>silkworm</i>	tằm	tằm	(đôi dòng)	蠶 cán	*C.[dz]ʳ[ə]m	dzom
	<i>cocoon</i>	kén	kiến	kén	繭 jiǎn	*kʰenʔ	kenX
Action ³²	<i>embroider</i>	thêu	tú	thêu	繡 xiù	*[s]iw(k)-s	sjuwH

3.4 Early Chinese Loanwords for Foods, Food Preparation, and Produce

Unlike the unwritten histories of Vietic (and Austroasiatic) peoples in the BCE era, ancient Chinese textual data contains ample details about food. Many proposed ECLs in this category are confirmed in historical texts and archaeological evidence. Recipes and lists of ingredients were written in Chinese texts from the pre-Qin Zhou Dynasty onward, which highlights centuries of documented culinary practices by the time of Sinitic-Vietic contact. As for archaeological evidence, grave goods from Chinese tombs of early Western Han period contains a variety of foods (Wang 1982:52-53, 206-207). Types of produce relevant to the lexical data presented in Tables 21 and 22 include jujubes, mustard greens, lotus and lotus roots, plums, ginger, beans, cakes, and wine.

This does not, of course, prove that such words were borrowed from Sinitic into northern Vietic. I have not been able to locate archaeological studies of imported produce in northern Vietnam from this period. Still, the archaeological data demonstrates that it is possible for such words to have been borrowed during the Eastern Han or in somewhat later centuries within the timeframe of the ECL period. The specific uses of the implements listed here undoubtedly included more than food preparation (e.g., oven/furnace, cauldron, etc.), but they are included herein for the possible application with respect to food processing.

The main categories in Table 21 include prepared foods (e.g., noodles, salted vegetables, snack, etc.), implements (e.g., cup/small bowl, chopsticks, etc.), and actions (e.g., to fry, to boil, etc.). Among the prepared foods, *gỏi* ‘dish of chopped meat and vegetables’ has an onset and tone category that suggest borrowing in the late Old Chinese period and thus potentially during the Eastern Han. Similarly, *gân* ‘sinew/tendon’, while lacking a distinctive tone, has the same onset, which does allow for the possibility that it was borrowed in the Late Old Chinese period. As for *bún* ‘noodles’, the /b/ onset suggests borrowing during the Middle Chinese stage as the Old Chinese onset would otherwise lead to /v/, which it did not. Regarding *com* ‘cooked rice’, the semantic shift is notable (i.e., from the Chinese sense ‘water from washing rice to boil thick, as gruel’ to the Vietnamese sense ‘cooked rice’), so this is not as strong an ECL candidate. Moreover, as noted, rice products have a long history in Austroasiatic, so if this is an ECL, it must have been borrowed with respect to Chinese-style cultural practices at the time.

As for the debate surrounding the origins of the word for tea in Chinese (e.g., Mair and Hoh 2009:265–267), and the suggestion of borrowing Proto-Austroasiatic ‘leaf’ *slaʔ into Chinese (cf. Proto-Tibeto-Burman *s-la (STEDT)), this must be put aside for proposed ECLs referring to tea.

³² I originally listed the Vietnamese word *lột/lót* ‘to slough’ (SV *thuế*, Chinese 蛻 *tuì*, OC *lʰot-s, MC *thwajH*), as per Baxter and Sagart’s notes (Sagart and Baxter 2011). However, Trần Trí Dõi (p.c.) pointed out to me that comparable forms are seen in Austroasiatic languages. Indeed, for ‘slough’, the Mon-Khmer etymological dictionary turns up viable cognates in Katuic (Proto-Katuic *luat ‘peel skin, slough’), Khmuic, Palaungic, and even Nicobaric. Proto-Vietic has *k.rot ‘to slough’, which is widely attested in all the branches of Vietic, often with the [l] onset, making this an overall likely native etymon in Vietnamese.

Vietnamese *lá* ‘leaf’ is the attestation of the Proto-Austroasiatic etymon *slaʔ, with the expected tone for the Austroasiatic reconstruction. In contrast, the proposed ECLs, possibly multiple instances of borrowings (with acknowledged possible regional variations), have expected onsets considering the Middle Chinese form. While the ethnohistory of tea in the region is complicated, the proposed ECLs are almost undoubtedly from Chinese, regardless of the origin of the word in Chinese.

The terms for actions are on somewhat less solid ground. Phan (2013:342) includes *chiên* ‘to fry’ in a list of what he proposes are modern Chinese loanwords (primarily Cantonese-style cuisine items). However, 煎 ‘to fry’ is found as early as the Liji 禮記 Classic of Rites from the Warring States period. The palatal onset and the diphthong together allow for the possibility that this is an ECL. Vietnamese *luộc* ‘to boil’ has a type of diphthong that is extremely rare in SV words, such that it is reasonable to consider this a probable ECL.

Table 21: ECLs for foods and food preparation

Category	Gloss	ECL	SV	Muong	Chinese	OC	MC
Prepared foods	<i>noodles</i>	bún	phần	pùn	粉 fěn	*mə.pənʔ	pjunX
	<i>dish of chopped meat and vegetables</i>	gỏi	khoái	gói	膾 kuài	*C.[k]ʰ[o][p]-s	kwajH
	<i>pastry, cake, bread</i>	bánh	bính	pènh	餅 bǐng	*peŋʔ	pjiengX
	<i>tea</i>	trà, chà, chè	trà	chè	茶 chá	*ʰra	drae
	<i>salted vegetables</i>	đưa	trư, thư	tư	菹 jū, zū, jù	*tsra (Schuessler 2009)	tsjwo (Schuessler 2009)
	<i>cooked rice</i>	com	cam	com	泔 gān	*kâm (Schuessler 2009)	kâm (Schuessler 2009)
	<i>sinew/tendon</i>	gân	cân	(chích)	筋 jīn	*C.[k]ə[n]	kj+n
implements	<i>cup (small bowl)</i>	chén	trần	chèn	盞 zhǎn	*[ts]rarʔ	tsreanX
	<i>chopsticks</i>	đũa	trú, trợ	tũa	箸 zhù	*d<r>ak-s	drjoH
	<i>spoon</i>	thìa	thì	thìa	匙 chí, shi	NONE	NONE
	<i>stove/kiln</i>	lò	lô	lò	爐 lú	*[r]ʰa	lu
	<i>cauldron</i>	vạc	hoạc	wac	鑊 huò	*gwāk (Schuessler 2009)	*ywāk (Schuessler 2009)
actions	<i>fry</i>	chiên	tiên	(rản)	煎 jiān	tsen (Schuessler 2009)	tsjān (Schuessler 2009)
	<i>boil</i>	luộc	lục	luộc	淥 lù	NONE	NONE
	<i>pour wine</i>	chúóc	chưóc	NA	酌 zhuó	*tewk	tsyak

Table 22 presents possible ECLs in the domain of produce, including fruits, alliums, greens, gourds, roots, and grains. In general, available information indicates that these types of produce were either previously part of Han-era practices or were adopted during that time. While some were in the list of items from Chinese tombs (e.g., plums, mustard greens, beans, lotus roots, bottle gourds and ginger in Wang (1982:53, 206-207)), others are supported by textual evidence and/or archaeological-genetic

studies (e.g., Block (2010:24-26) on alliums). Notably, there are two ECLs for green leafy vegetables, a category which is lacking in Vietic reconstructions as discussed in Section 2.4. I know of no archaeological evidence in early period of Sinitic-Vietic contact that can certify that these types of produce and accompanying words were brought into the Red River Delta. Perhaps archaeological evidence can clarify the implications of this linguistic data.

Some of the words have phonological features that connect to the Old Chinese reconstructions (e.g., ‘bean’, ‘plum’, ‘rootstock of lotus’, ‘lotus’, ‘cabbage mustard plant’, ‘garlic’), whereas for others, the timing as indicated by the phonological material is less precise (e.g., ‘jujube’, ‘sesame’, ‘calabash’). Several of these have been reconstructed in Vietic, which at least allows for the possibility that ECLs spread throughout Vietic in that early period. But of course, these could have spread from Vietnamese or Viet-Muong into other Vietic languages in later periods.

Table 22: ECLs of produce

Category	Gloss	ECL	SV	Muong	Chinese	OC	MC	Vietic
Fruits	<i>plum</i>	mơ	mai	(mận)	梅 méi	*C.m ^s ə	mwoj	NA
	<i>jujube/apple</i>	táo	táo	NA	棗 zǎo	*[ts] ^s uʔ	tsawX	NA
Alliums	<i>leek</i>	kiệu	củ	(ngái)	韭 jiù	*s.[k](r)uʔ	kjuwX	NA
	<i>garlic</i>	tỏi	toán	tói	蒜 suàn	*[s] ^s or-s	swanH	NA
Greens	<i>cabbage mustard plant</i>	cải	giới	cái	芥 jiè/gài	*k ^s r[e][t]-s	keajH	*ka:s
	<i>amaranth</i>	dền, rền, giền	hiện	NA	莧 xiàn	*grêns (Schuessler 2009)	yǎn ^C (Schuessler 2009)	*-ce:n
Gourds	<i>gourd, calabash</i>	bầu	bào	bầu	匏 páo	*[b] ^s ru	baew	*bu:
	<i>eggplant</i>	cà	gia	cà	茄 qié, jiā	NONE	gjà (Schuessler 2009)	NA
Roots	<i>rootstock of lotus</i>	ngó	ngẫu	NA	藕 ǒu	*C.ŋ ^s (r)oʔ	nguwX	NA
	<i>lotus</i>	sen	lien	khen	蓮 lián	*k.[r] ^s e[n]	len	NA
	<i>ginger</i>	gừng	khương	cong	姜 jiāng	*C.qaŋ	kjang	*s- gə:ŋ / s-kə:ŋ
Others	<i>bean</i>	đỗ	đậu	tậu	豆 dòu	*[N.t] ^s o-s	duwH	*duh
	<i>sesame; hemp</i>	mè	ma	(wâng)	麻 má	*C.m ^s raj	mae	NA

The eggplant is a good example of the uncertainty in combining various factors. The results of a genetic study of eggplants suggest multiple domestication events, including in India, the Malay Archipelago, and mainland Southeast Asia, including the region of China, Vietnam, and Thailand (Page et al. 2019:1368). This permits the possibility that this was a local domestication event, but it also allows the possibility of interregional trade. Wang et al. (2008:891) claim that the earliest reference to eggplants in an ancient Chinese text is from 59 BCE, so this produce could have then been shared in northern Vietnam sometime after that. As for the Vietnamese word *cà* ‘eggplant’, it has expected ECL features, and the Vietic reconstruction *ga: is very well attested in several Vietic languages in multiple sub-branches. There is only a Middle Chinese reconstruction, *gjà (Schuessler 2009) (no Old Chinese reconstruction), which is a reasonable match for the Vietic form. The Vietic reconstruction suggests that Old Chinese did not have a palatal *j glide. Austroasiatic data shows no words resembling

Vietnamese *cà* ‘eggplant’, while the Proto-Tai form **khua*^A, with a distinct onset and vowel, suggests a possible distinct borrowing situation. Altogether, despite the minimal segments, the most likely scenario is borrowing of this word somewhere in the first millennium CE, a valid ECL, unless new evidence shows otherwise.

4 Concluding Observations

In the article *From Co-Loa to the Trung Sisters’ Revolt: Viet-Nam as the Chinese Found It*, O’Harrow (1978:140) begins, “Historians and archaeologists ignore each other at their peril,...” We must add to these two disciplines the field of linguistics, which can both benefit from and contribute to archaeology, ethnohistory, and human history broadly speaking. This study has presented historical linguistic data—lexical, phonological, and semantic—and used ethnohistorical and archaeological data to clarify, verify, and sometimes refute hypotheses. Dealing with proto-language etyma and ECLs has been a means of finding further patterns of historical phonology as well as to explore the early language situation in northern Vietnam from about 4000 to 1000 BP.

Characterizing the differences between the Vietic etyma and ECLs in Vietnamese vocabulary of the household is seemingly straightforward. The former dataset represents a local mainland Southeast Asian type of culture, but one tied to incoming Neolithic agriculturalists, while the latter largely represents an introduced Chinese cultural type beginning with the Han Dynasty and continuing into the first millennium. While Chinese cultural elements clearly entered the homes of many of the ancestral speakers of modern-day Vietnamese speakers, many native Vietic lexical retentions demonstrate associated cultural retentions. What the sociolinguistic situation was in, say, 500 CE is impossible to state with precision, but it is safe to assume that, in this pre-Viet-Muong era, the Vietic speech community had significant sociocultural status alongside the growing influential Sinitic-speaking community. And, presumably, 1,500 years ago, much more native vocabulary was part of pre-Viet-Muong northern Vietic.

Characterizing the language situation surrounding the Cồ Loa citadel of, say, 200 BCE is much less straightforward. Words such as ‘drum’, ‘bush-knife’, ‘duck’, ‘orange’, and ‘water spinach’ are possible evidence of pre-Qin Tai-Vietic contact. There are many hints of pre-Qin contact, directly or otherwise, with polities to the north and through early regional maritime trade (e.g., speculation of the Iron Age coming from India, a northern plains-style burial, etc.). Regardless, what resulted of any previous language contact and subsequent Sinitic settlements was a distinct zone of language contact, separate from the southern extent of Vietic. Only a small portion of Vietic reconstructions are ECLs, which highlights the spread of some Chinese words among sub-branches of Vietic in that early period. However, the quantity of ECLs in Vietnamese is highest and thus furthest north in the range of Vietic, and Mường shows a relatively smaller but still significant number, while other Vietic groups to the south and west have notably smaller quantities. This situation strongly indicates that the Vietic speakers in the northern part of the Vietic region were in much more intense language contact with Sinitic speakers than were those to the south. This situation also leads to the conclusion that these distinct situations of both language contact and sociocultural contact contributed to the differentiation of Viet-Muong from the rest of Vietic.

In many places in this discussion, I have pointed out gaps in the data, both of linguistic and archaeohistorical data. I raised issues that I hope ethnohistorians, archaeologists, and linguists in the field will consider as they sift available data and gather new data. Another minimally understood topic is early Tai-Vietic interaction and what the sociolinguistic circumstance was in the region in the mid-first millennium CE. What was the amount and type of early language contact between Tai, Sinitic, and Vietic in centuries leading up to the construction of the Cồ Loa site? Clearly, multiple disciplines are necessary to support research each other’s areas, as well as to answer questions of human history in the region of northern Vietnam. The early ethnohistory of Vietnam is certainly a place that requires collaborative interdisciplinary efforts. I hope that some of the data and methods herein are beneficial not only to historical linguists but also to researchers in ethnohistory and archaeology.

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Appendix B: Excluded items

The words in Tables 23, 24, and 25 have some phonological characteristics of ECLs with semantics similar to Chinese words. However, each has additional complications that render their origin less certain to the degree that it is not appropriate to include them in the discussion in the body of the paper with respect to language contact and implications of sociocultural change. The problems include multiple aspects, rather than just one: (a) small unexpected phonological traits, (b) lack of confirmation in early Chinese texts and/or archaeological studies, (c) lack of Chinese reconstructions leaving no point of comparison, and/or (d) complex regional distribution. The following bullets are representative of the range of possible confounding factors.

1. Phan (2013:342) provides a list of probable recent (e.g., 20th century) Chinese loanwords. While many of these are, for example, transparently Cantonese cuisine terms (e.g., ‘dimsum’, ‘soy sauce’, ‘siumai’, ‘barbequed pork’, etc.). Other words cannot be dealt with easily, such as ‘wheat noodles’ or ‘to stir-fry’, which may have older histories in Southeast Asia (Alves 2017a).
2. While *lèu* ‘hut/tent’ has clear ECL features (e.g., [e] without the diphthongization and the lower-register *huyèn* tone), I cannot find sufficient textual confirmation of the meaning prior to the Song Dynasty in the second millennium.
3. Vietnamese *lợn* ‘pig’ is similar to Old Chinese *lʰu[n]? ‘pig’ (豚 tún, SV đôn). However, the vowel *u in Old Chinese is an unlikely source for Vietnamese ‘o’, and the tone cannot be accounted for. Moreover, archaeological evidence of domesticated pigs as part of the Neolithic agricultural expansion means that it is likely that Vietic speakers their own practice of raising pigs. Thus, while it is certainly possible for the word to have been borrowed, the degree of certainty is reduced to the point that it needs to be put aside for now.
4. Another example is Vietnamese *ong* ‘bee’ seems similar to Chinese 螞 wēng ‘wasp’, with a reasonable phonological form but only vaguely similar semantics. Shorto (2006) reconstructs

*ʔuŋ/*ʔuəŋ/*huŋ/*huəŋ ‘wasp’ in Austroasiatic. Consequently, the Vietnamese word does not precisely match either the Sinitic or Austroasiatic word. The sharing of beekeeping is entirely acceptable (parallel to raising silkworms), while this is not the case for wasps. There is no clear circumstance in which there was cultural exchange between Chinese and Austroasiatic peoples in regard to wasps, so we must consider chance similarity, perhaps due to onomatopoeia. Whether Vietnamese *ong* ‘wasp’ is the result of semantic shift, onomatopoeia, borrowing, or some complex combination of circumstances cannot be answered with any certainty.

Table 23: Excluded ECLs

Gloss	ECL	SV	Chinese	OC	MC	Notes
<i>bee</i>	ong	ông	螞 wēng ‘wasp’	NONE	NONE	Semantic shift, no reconstruction, complex etymology
<i>cloth/towel</i>	khăn	cân	巾 jīn	*krən	kin	Unexpected aspirated onset and vowel, possible recent dialectal borrowing
<i>frame</i>	khung	khuông	框 kuāng	NONE	NONE	Uncertain early attestation, no reconstruction
<i>fringe</i>	diềm	liêm	簾 lián	*rem	ljem	Unexpected onset
<i>gauze/kind of cloth</i>	the	sa	紗 shā	NONE	NONE	No reconstruction, uncertain onset and vowel
<i>hut/tent</i>	lều	liêu	寮 liáo	NONE	(leu (Karlgren))	Unclear attestation in pre-Song texts
<i>mechanism/loom</i>	cửi	cơ, ki, kì	机 jī	*krəjʔ	kijX	Unexpected tone
<i>melon</i>	dua	qua	瓜 guā	*k ^w ra	kwaē	Unexpected onset
<i>pig</i>	lợn	đợn	豚 dùn	*l ^s u[n]ʔ	dwonX	Unexpected vowel
<i>red pink</i>	hường	hồng	紅 hóng	*g ^s oŋ	huwng	Unexpected vowel, possible nativized variant
<i>sip</i>	hóp	hát	喝/飲 hē, xià	*q ^h [ə]p	xop	Non-cultural word, onomatopoeia is likely
<i>snack</i>	quả	quả	糶 guǒ	NONE	NONE	Unexpected tone, no reconstruction
<i>stir-fry</i>	sào, xào	sao	炒 chǎo	*[ts ^h](^ʔ)r[e]wʔ	tsrhaewX	Unexpected onset and tone

The terms related to rice must be treated with care. As noted, Vietic has a rich rice and rice-production vocabulary predating contact with Sinitic. Thus, the phonological patterns must be even more precise. While the Vietnamese word for ‘paddy’ seems similar to the Old Chinese form, the Proto-Vietic form is reconstructed with a presyllable and distinct vowel from that of Old Chinese. For ‘seedling’, the overall word-shape matches, but the Proto-Vietic vowel *a does not match either the Old or Middle Chinese reconstruction. For ‘paddy rice, unhusked,’ the aspirated onset is not expected, and in general, an aspirated onset could be from a Proto-Vietic presyllable, unlike the Chinese reconstruction. There are phonological complications with all of these, and rice production in the region long predated Chinese arrival, so I felt it prudent to place these in the Appendix until other evidence can more firmly support or refute these as ECLs.

Table 24: Questionable ECLs related to rice

Gloss	ECL?	SV	Muong	Chinese	OC	MC	PV
<i>paddy</i>	lúa	đạo	lọ	稻 dào	*[l]ʰuʔ	dawX	*ʔa-lɔ:ʔ
<i>seedling</i>	mạ	mễ	mạ	米 mǐ	*(C.)mʰ[e]jʔ	mejX	*s-ma:ʔ
<i>paddy rice, unhusked</i>	thóc	túc	(lọ)	粟 sù	*[s]ok	sjowk	*t-hɔ:k

Vietnamese has a few words with comparable word shapes and broadly related semantics having to do with pinching to grab. The form *kep* seems to be the most promising ECL, while the others have problematic features but cannot be immediately refuted as ECLs. There are multiple pronunciations in Chinese, suggesting some kind of developments of the word. The situation is further complicated by words in Tai reconstructions, including Proto-Tai *kep^D (Pittayaporn 2009) and Proto-Southwestern Tai *giip^D (Jonsson 1991), which are also possible ECLs. I can find no comparable forms in Tibeto-Burman or Hmong-Mien, so this form is geographically restricted. In Vietnamese, these appear to constitute what Matisoff (1978, etc.) calls an ‘allofam’, though the concept of ‘allofam’ can be debated, and various more precise factors can result in shared forms and meaning (Fellner and Hill 2019). Considering this messy assortment of comparative data (e.g., unclear patterns of onset voicing, vowels, and tone height, as well as semantics), and the regional nature of this, I have put these in the Appendix for future consideration.

Table 25: Questionable ECLs with the sense of pinching to grab something

Gloss	ECL?	SV	Muong	Chinese	OC	MC
<i>squeeze; compress; pair of tongs; pincers</i>	cặp	hiệp, tiệp / giáp	kep	夾/挾 jiā, xié, xiá	*m-kʰep	hep
<i>to take with chopsticks</i>	gắp	hiệp, tiệp / giáp	cáp	夾/挾 jiā, xié, xiá	*m-kʰep	hep
<i>pliers; tongs; pincers; vise</i>	kep	kiệp	kep	鉗 jiá	*m-kʰep	hep

SOUTHWESTERN MIDDLE CHINESE: PRELIMINARY EVIDENCE FROM HUNAN, GUANGXI, AND SINO-VIETNAMESE

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Abstract

We present preliminary evidence suggesting the existence of a southwestern dialect of Middle Chinese, ancestral to several small languages still spoken in the corridor between Hunan and northern Vietnam, and which also ultimately acted as a major source for what now survives as the Late Sino-Vietnamese stratum of vocabulary in modern Vietnamese (i.e., *Hán-Việt*). Our paper presents a set of phonological features systematically represented in Late Sino-Vietnamese vocabulary, and which is variably shared across a number of small languages currently labeled (often problematically) either as Xiang or Pinghua. Our work suggests that a Southwestern Koine was spoken over the medieval period, that was subsequently wiped out by three expanding languages: 1) the “language shift” of the Red River Plain to Proto-Viet-Muong; 2) the westward expansion of the Yue languages; and 3) the southwestern expansion of Mandarin.

Keywords: Sino-Vietnamese, Middle Chinese, Chinese historical phonology
ISO 639-3 codes: vie, csp, cnp, yue, hsn, wxa

1 Introduction

The Vietnamese language currently contains substantial quantities of Sinitic vocabulary of varying chronological strata. The largest stratum is often loosely called *Hán-Việt* 漢越, or what John Phan termed Late Sino-Vietnamese (Phan, 2013).¹ The phonological structure of Late Sino-Vietnamese (hereafter, LSV) points to a relationship with some form of Late Middle Chinese, due to the reflection of well-known phonological innovations such as lenition of p-, p^h-, b-, and m- to continuants, loss of voicing distinction, and tonogenesis (Alves 2001, 2009; Phan 2012, 2013). Phan argued that the primary pathway of borrowing was not via literary transmission, as in the case of major strata of Sino-Korean or Sino-Japanese, but oral transmission, and also theorized that the donor was a regional dialect of Middle Chinese in Annam, which he called “Annamese Middle Chinese” (Phan 2011, 2012, 2013, forthcoming).² However, the main evidence in support of this theory came internally, from Sino-Vietnamese phonology. If the theory of a southwest-centered dialect of Middle Chinese is correct, then there should be evidence for it surviving in other descendant languages of the region—i.e., contemporary southwestern Chinese dialects spoken in Guangxi and Hunan. This paper seeks to test the theory of Annamese Middle Chinese as a variety of Southwestern Middle Chinese by comparing the phonological innovations identified by Phan as indicators of a dialectal donor for Late Sino-Vietnamese, with various contemporary southwestern Sinitic languages, critically adjusting for the

¹ Note that a narrower sense of the term “*Hán-Việt*” refers to a specific conventionalized stratum of Late Sino-Vietnamese.

² The idea of a Southwestern Middle Chinese dialect as donor was first proposed in English by Mantarō Hashimoto (Hashimoto 1978). However, Nguyễn Tài Cẩn also alluded to the concept indirectly (Nguyễn Tài Cẩn 1979: 38). Note also that Phan does not argue against literary borrowing as a contributing pathway of borrowing, but rather that a spoken donor must also have existed.

massive later influx of Mandarin/Northern and Yue/Cantonese languages into the southwest. If the phonological profile of LSV is not shared to any degree with any surviving southwestern languages (excluding recent Mandarin/Cantonese imports), then the argument that the phonological basis for LSV was donated by a regional spoken dialect is incorrect. If, however, the phonological profile of LSV is found to be shared to a significant degree with modern Sinitic languages of the region (again, excluding recent Mandarin/Cantonese imports), then this provides further support for the scenario forwarded by Phan.

Our preliminary findings suggest that indeed, several noteworthy phonological innovations not found in other major subgroups of the Sinitic language family are shared to some extent among contemporary Southwestern languages, primarily in varieties of Xiang and Pinghua, and in Late Sino-Vietnamese. These findings are by no means conclusive, and we did not conduct any novel fieldwork on the (notably poorly described) languages in question. However, we do suggest that these findings provide preliminary evidence for a Southwestern Middle Chinese, and potentially, an “Annamese Middle Chinese” as theorized by Phan. Critically, our findings must be further tested pending more adequate description of the languages in the region.

We will first provide an overview of the Viet-Muong subfamily, from which modern Vietnamese descends. We will then turn to an overview of the relevant Southwestern Sinitic languages. We will then introduce four phonological innovations found in Late Sino-Vietnamese but not shared with the better-known subgroups of the Sinitic language family, nor with the literary prestige forms recorded in the philological record. We will then examine each of these in turn, discussing their presence or absence in the Southwestern Sinitic languages we surveyed. Finally, in our conclusion, we will discuss the portrait drawn from our identified shared innovations, as well as avenues forward for further investigation.

2 The Viet-Muong Language family

The modern Vietnamese language family belongs to the Austroasiatic family, one of five large language families represented across East & Southeast Asia, and the family most associated with mainland Southeast Asia (along with Kra-Dai). Within Austroasiatic, Vietnamese further belongs to what is now usually called the Vietic subfamily. The Vietic family itself includes the Vietnamese and “Mường” languages, as well as a number of small languages spoken by ethnic minority peoples living along the Indochinese Cordillera, on the border between Laos and Vietnam, and near the mountainous southern perimeter of northern Vietnam.

These smaller Vietic languages demonstrate strikingly different phonologies and lexicons when compared with the Vietnamese and Mường languages, notably including the common lack of fully phonologicalized morphosyllabic tone systems, and the maintenance of what is called “sesquisyllabic” structure—i.e., an iambic word structure comprised of a small presyllable typically lacking metrical weight, attached to a major syllable bearing metrical weight. Take for example the Rục word for “to kill”, *kacít*, where *ka-* represents not a full syllable, but an onset plus reduced vowel with no stress. The Vietnamese cognate is <*giét*>, which has lost its presyllable.

Syllable structure is only one indicator of the divergent nature of the Vietnamese and Mường languages within the Vietic family. While the subgrouping relationship among these conservative Vietic languages is not clear, what is almost certain is that what are now called the Vietnamese and Mường languages comprise their own separate subgroup, which may have diverged from the rest of Vietic as speakers migrated north from the mountains, into the basins of the Cả, Mã, and Red (Hồng) Rivers, some time in ancient prehistory, or alternatively spread outward from a nexus in the Red River Plain itself. Thus, most linguists reconstruct a further subgroup within Vietic, now commonly (though somewhat problematically) called the “Viet-Muong” language family.³ Within Viet-Muong, Vietnamese is clearly an innovative subgroup of its own, while the Mường languages represent a

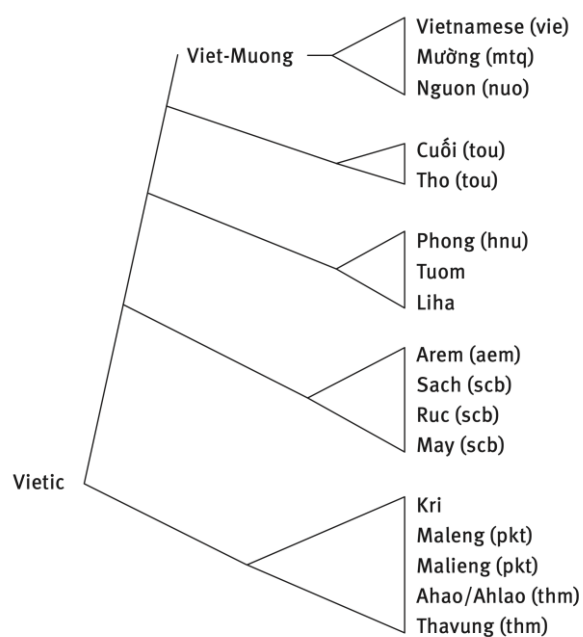
³ Hereafter, unless referring to the ethnonym, we will use the term “Mường” without Vietnamese orthographic diacritics. The Viet-Muong family was previously often called the “Vietic” family, but we will follow more recent convention, which switches these denominators.

number of phylogenetic taxa descended from Proto-Viet-Muong, but not necessarily forming a subgroup of their own (Phan 2012).

Figure 1: Map of Vietic Languages according to Sidwell & Alves (2021)



Figure 2: Vietic Subfamily according to Sidwell & Alves (2021:183)



It was Proto-Viet-Muong and its descendent languages that were most affected by Chinese influence. The separation of Vietnamese from the Mường languages was iterative and complex, but it appears true that the preponderance of Chinese as a spoken language during medieval times was centered in the Red River Plain, both the heart of the medieval Chinese province (of *Giao Chi* or *An Nam*) and the heart of the independent Vietnamese kingdoms up until their early modern expansion into the south. Most likely, those Mường languages spoken on the perimeter of the Red River language continuum underwent language shift to the prestige dialect of the Red River Plain, as it expanded outward. Communities that resisted or remained beyond the reach of this expansion, and which continued to develop linguistically on their own or under separate circuits of influence (notably from Kra-Dai speakers in the highlands) correspond to what we call the “Mường” languages today. It was, meanwhile, the prestige dialect of the Red River Plain that absorbed the greatest impact of Chinese influence, and it was also this dialect that eventually developed into modern Vietnamese.

3 Sino-Vietnamese strata

As discussed elsewhere in this issue, there are high volumes of Chinese loanwords present in modern Vietnamese (e.g., Alves, 2022). The actual percentage of Vietnamese vocabulary that derives from some form of Chinese is difficult to ascertain, since it differs wildly given not only dialect, but also social context. Nevertheless, the Sinitic vocabulary is uncontroversially substantial. Many layers have been described and discussed by many historical linguists, going all the way back to Henri Maspero (1912, 1916). As in Sino-Korean or Sino-Japanese vocabularies, there exists a conventionalized layer of Sino-Vietnamese typically called *Hán-Việt* (hereafter HV), based on a form of Late Middle Chinese phonology (more specifically, Late Annamese Middle Chinese), but conventionalized according to northern Vietnamese phonological norms over the early modern period. What is or is not recognized as HV is not, however, synonymous with Late Middle Chinese borrowing, as many other Sinitic loanwords in Vietnamese vocabulary that conform to this phonological layer are not socioculturally considered HV (especially functional vocabulary). Nevertheless, LMC-era borrowings (regardless of their sociocultural standing) constitute the largest stratum of Sinitic loanwords in modern Vietnamese. That means that the basis for the pronunciation of these words, later conventionalized to some degree over the 17th-18th centuries, was borrowed some time during the late medieval period, i.e., the latter half of the first millennium, and perhaps the first few centuries of the 2nd millennium CE. We will refer to this historical stratum as Late Sino-Vietnamese (or LSV), following Phan (2013). LSV is the largest of four major chronological strata in Sino-Vietnamese borrowed vocabulary, as schematized below:

Table 1: Chronological Layers of Sino-Vietnamese Loanwords

Period of Sino-Vietnamese	Period of Vietic/Vietnamese	Time period
Han Early Sino-Vietnamese	Some form of Proto-Vietic (Proto-Viet-Muong/Proto-Northern-Vietic?)	(Oldest layer) Early 1st millennium
Jin Early Sino-Vietnamese	Some form of Proto-Vietic (Proto-Viet-Muong/Proto-Northern-Vietic?)	Ca. 4th century
Late Sino-Vietnamese	Proto-Viet-Muong/Proto-Northern-Vietic	Early 2nd millennium
Recent Sino-Vietnamese	Middle & Modern Vietnamese	Post 15th century

It was long assumed that these words resulted from literary transmission and subsequent conventionalization, as occurred in the Korean and Japanese cases (Hashimoto 1978). Nguyễn Tài Căn (1979) largely upheld this point of view, but also argued that with regard to Chinese, a “living language” [*sinh ngữ*] must have been learned and spoken during the era of Tang administration (Nguyễn Tài Căn 1979:38). Phan (2009, 2013) subsequently identified a number of phonological features reflected consistently across LSV that appeared to distinguish it from the better-known branches of Sinitic (notably Mandarin and Yue), as well as appearing to violate some basic philological distinctions upheld

in the literary record. This suggests that a spoken language indeed formed some basis for the donation of LSV words.

If this is the case, and if the innovations identified by Phan are in some way reflective of that donor language, then we should be able to find other modern languages that also reflect—to one degree or another—those innovations, at least in some combinations. In this paper, we will focus on four innovations in LSV, as a diagnostic to test for evidence of a Southwestern Middle Chinese common ancestor. These are:

Four diagnostic innovations from Late Sino-Vietnamese

1. Plain stops (i.e., voiceless unaspirated) and non-modal phonation reflexes for Middle Chinese voiced plosive and affricate onsets
2. Palatalization of velar nasals in Grade II
3. Palatalization of velar stops in Grade II
4. High series low-register syllables with sonorant initials

Late Sino-Vietnamese words all consistently reflect these innovations. At the same time, critically, none of these innovations may be attributed to processes native to the Viet-Muong languages themselves. This will be shown below, as we discuss each of these in turn, including their reflection or lack thereof in the Southwestern Sinitic languages in question.

Nota bene:

Reconstruction of Old Chinese [OC] follows that in Baxter & Sagart (2014). *Middle Chinese* [MC] in this chapter refers to Early Middle Chinese [EMC]. MC forms are presented here using a modified form of Baxter's transcription of MC (Baxter & Sagart 2014:12–20; Baxter 1992). Since this is a transcription and not a reconstruction, MC forms are not prefixed by an asterisk *. If needed, Late Middle Chinese [LMC] forms are also presented.

The Sinitic southwest

Before turning to each of these sound-changes, we will first review the geographical region under scrutiny—that is, the Sinitic southwest. North of the Red River Basin is the Pearl River Basin, and further north is the Yangtze River Basin. Sinitic-speaking peoples originated in the Yellow River Basin further north. Due to the terrain, migration of Sinitic-speaking peoples south to the Pearl and Red River Basins was funneled through specific routes. Between the Yangtze and the Pearl River Basins, there were two main corridors of migration: the Hunan–Guangxi Corridor (which further continued into the Red River Delta), and the Jiangxi–Guangdong Corridor to the east.

South of the main stem of the Yangtze are two large tributaries: the Xiang River, and the Gan River to the east, corresponding roughly with Hunan and Jiangxi Provinces respectively. In 214 BCE during Qin Dynasty, the Lingqu Canal (in modern day northeastern Guangxi) was completed, linking the Xiang/Yangtze Basin to the north, and the Pearl River Basin to the south (e.g., Brindley 2015:95; Churchman 2016:54). For the next millennium, the Hunan–Guangxi Corridor was the primary route that Sinitic-speaking migrants took to reach the Pearl River Basin. After traveling south up the Xiang River, migrants would usually take the Lingqu Canal into the Guilin area, or cross the Mengzhu Pass into the Hezhou area (Lin Yi 2004:153). Some migrants stayed in these areas in northeastern Guangxi, while some migrants went further south. Following the Li River south from Guilin, or the He River south from Hezhou, one reached the modern day Wuzhou and Fengkai respectively on the confluence with the West River of the Pearl. From Wuzhou and Fengkai, some migrants followed the West River east towards the Pearl River Delta. Other migrants went south towards the Guangxi coast. To reach the south, people had to go up the West River (west) and then up one of the tributaries towards the south. Most took the Beiliu River, the first major tributary on the southern side. On the upper reaches of the Beiliu River, at modern day Beiliu City, people crossed a short portage across the Ghost Gate Pass [Guimen-guan] west to modern day Yulin (Yuzhou District). From there, following down the Nanliu River (south) is Hepu Port on the coast. From there, people went along the coast west to the Red River Delta (Churchman 2016:57–58; Li Tana 2011).

For the Pearl River Basin, the situation changed in the eighth century CE. In 716 CE during the Tang Dynasty, the Plum Pass Road [Meiguan-dao] was built in northern Guangdong. To the north of this military-grade road was the Gan River Valley of Jiangxi, and to the south was the North River of the Pearl. A relatively short distance further south is the Pearl River Delta. This Jiangxi–Guangdong corridor (the Gan River and the Plum Pass Road) very quickly overtook the Hunan–Guangxi corridor to the west as the primary route that Sinitic migrants took to reach the Pearl River Basin. Within decades of the opening of the Plum Pass Road, the Sinitic population in just northern and central Guangdong had surpassed that of Guangxi. Large numbers of Northern Chinese migrants continued to arrive in Jiangxi and Guangdong (de Sousa 2022).

There are linguistic correlations with these two corridors. Southwestern Middle Chinese is associated with the Hunan–Guangxi corridor. Xiang and Pinghua are two modern Sinitic dialect groups that are primarily associated with the Hunan–Guangxi corridor. To the east, Gan, Hakka, and Yue are three modern Sinitic dialect groups that are primarily associated with the Jiangxi–Guangdong corridor. Traits of this Southwestern Middle Chinese are not necessarily obvious in the modern Sinitic languages in the southwestern region (roughly Hunan, Guangxi, western Guangdong); many of the original traits of Southwestern Middle Chinese would have been leveled out by later Sinitic influences from the north, namely northern varieties of LMC, and since the fourteenth century (early Ming Dynasty), Southwestern Mandarin, which now dominates the northern half of Guangxi, and the northern, western, and southern flanks of Hunan.⁴ Other than from the north, there have also been massive amounts of migration from the east, due to the population pressure created by the massive number of Northern Chinese migrants that entered Jiangxi and Guangdong: from Jiangxi (Gan and Hakka) into Hunan and Guangdong, and from Hunan (Mandarin, various varieties of Tuhua, and Xiang) and Guangdong (Yue, Hakka) into Guangxi. In terms of numbers of speakers, Xiang (35 million) is still the largest Sinitic dialect group in Hunan, but Southwestern Mandarin (19 million) and Gan (10 million) are also prominently represented in Hunan. On the other hand, in Guangxi, Pinghua (4.1 million) has been overtaken by Yue (16 million), Southwestern Mandarin (5.4 million), and Hakka (4.9 million) (Zhang Zhenxing et al. eds. 2012).

The following are some diagnostic phonological traits of MC, SV, and some modern Sinitic languages in the Hunan–Guangxi corridor, roughly from south to north.⁵ These basic phonological traits are useful when the traits of LSV are discussed later.

MIDDLE CHINESE [MC]

EMC commonly refers to the phonological system of the early medieval period, a synthetic diasystem of which is presented in the rime dictionary *Qieyun* (601 CE). LMC commonly refers to the phonological system of the late medieval period, the reconstruction of which linguists have generally based on the rime tables *Yunjing* and *Qiyinlüe* (the earliest known version of both are dated 1161 CE). Amongst Sinitic languages, only Min and Xianghua (and Caijia, if it is indeed Sinitic) preserved a significant amount of pre-MC phonological traits (so we might talk about correspondence rather than reflex when a trait is not, or less clearly, a reflex of a trait in MC).

1. Sonorant onsets are voiced; obstruent onsets can be voiced or voiceless, and voiceless plosives and affricates can be aspirated or unaspirated. The development of the MC voiced obstruent onsets is frequently discussed in Chinese dialectology: in this chapter, when we say *MC voiced obstruent onsets are devoiced and un/aspirated*, that means that the MC

⁴ See Wang Hongjun (2009) on dialect leveling caused by Northern Chinese immigrants to Southern China.

⁵ Not discussed in this paper are Gan, Hakka, and Southern Min. These Sinitic languages are also represented in Hunan (Gan, Hakka) and Guangxi (Hakka, Southern Min), but they have their cores elsewhere. The core of Gan is in northern and central Jiangxi; it has “spilled over” into the eastern flank of Hunan, and there is also a large Gan exclave in southwestern Hunan. The core of Hakka is in southern Jiangxi, western Fujian to the east, and northeastern Guangdong to the south; from southern Jiangxi, Hakka has extended to southeastern Hunan, and there are also many Guangdong Hakka migrants in Guangxi (within the last 400 years), to the level that the number of Hakka speakers in Guangxi has exceeded the number of Pinghua speakers. The core of Southern Min is in southern Fujian further to the east. There are many small enclaves of Southern Min speakers in Guangxi, primarily within the Pearl River Basin. (See, e.g., Zhang Zhenxing et al. eds. 2012.)

voiced plosive, affricate and fricative onsets are devoiced, and the devoiced plosive and affricate onsets are un/aspirated (fricatives are always unaspirated);

2. There are tones A, B, C, and D: tone A, B, and C syllables are sonorant-ending, while tone D syllables are obstruent-ending;
3. There are the consonantal codas of -m, -n, -ŋ, -^wŋ, -p, -t, -k, -^wk;

SINO-VIETNAMESE [SV]

1. MC voiced obstruent onsets are devoiced and unaspirated;
2. Tones A, B, and D are split into two; there are two tone Cs in the North, and one tone C in Central and Southern Vietnam (i.e., the Northern Vietnamese tone C1 and C2 are not distinguished in the Center and South);
3. There are the consonantal codas of -m, -n, -ŋ, -p, -t, -c, -k.

SOUTHERN PINGHUA-YUE

Pinghua and Yue have different origins, but they developed into a dialect continuum (except for the recent (mostly < 200 years) Cantonese migrants in Guangxi; de Sousa 2015, 2021, 2022, forthcoming). Only Southern Pinghua and Yue are discussed in this section (see below for Northern Pinghua). SV shows many similarities with Southern Pinghua (e.g., Li Lianjin 2002).

1. All MC voiced obstruent onsets are devoiced (except in some odd Yue dialects). As for whether they are aspirated or not, there are three main patterns: a) within the Pearl River Basin, from Pinghua in the west to many Yue dialects in the east close to the Pearl River Delta, they are unaspirated in all tones; b) further east in the core of the Pearl River Delta, Cantonese for instance, and also most Yue dialects on the Guangdong coast west of Macau, they are aspirated in tones A and B, and unaspirated in tones C and D; c) the (non-Cantonese) Yue dialects on the Guangxi coast and some nearby inland parts of Guangdong are aspirated in all tones (similar to Hakka and Gan);
2. Tones A, B, and C are usually split into two, and having three or four tone D's is the norm. In most Yue and Southern Pinghua dialects, vowel length (or vowel quality difference of sorts) is one of the splitting factors for tone D,⁶ similar to Tai and Kam-Sui languages. (However, Pinghua dialects from Nanning westward are different; they split their lower tone D by the sonority of the onset in Middle Chinese);
3. Consonantal codas of -m, -n, -ŋ, -p, -t, -k; Southern Pinghua and Yue dialects have medium-high to high level of conservatism with these consonantal codas;

NORTHERN PINGHUA AND TUHUA

Northern Pinghua is spoken in northeastern Guangxi, and it is basically Pinghua that has been Mandarinized. (Many Guangxi linguists nowadays consider Pinghua dialects further north or east of Guilin as Tuhua; see de Sousa forthcoming.) Tuhua (lit. “vernacular”) refers to the plethora of divergent Sinitic dialects spoken in northern Guangdong, southern Hunan, and neighboring parts of northeastern Guangxi. The various Tuhua varieties have different admixture of features from the surrounding Sinitic languages of Xiang, Gan, Hakka, Yue, and Northern Pinghua. There are also influences from Southwestern Mandarin, which is the lingua franca in most of this area. The mutual intelligibility among the Northern Pinghua and Tuhua varieties is very low.

1. MC voiced obstruent onsets are most usually devoiced: towards the West (the “Pinghua-end”), being unaspirated is more common; towards the East (the “Gan-Hakka-end”), there are more cases of aspiration. Towards the East, there are many cases of MC b- d- behaving differently from the other obstruent onsets; the simplest of such cases is that MC b- d- are devoiced and unaspirated, while the other MC voiced obstruent onsets are devoiced and aspirated;

⁶ The vowel length contrast in Cantonese and the other Yue dialects are not indicated by a vowel length symbol in this paper. In Cantonese, the long vowels have the qualities of [a i e u ɔ œ y], while their short counterparts are [ɐ ɪ ~e ʊ ~o ɵ] ([y] has no short counterpart).

2. The development of tones varies hugely; many have no tone D; having two tone Ds is the maximum (most have lost their plosive codas, but these syllables that used to have a plosive coda may still have a tone that is different from the other tones);
3. Most dialects have -n and/or -ŋ, while -m is very rare. Having nasal vowels (i.e., nasality of the nasal coda transferred to the vowel, and the nasal coda is lost) is very common. Total loss of nasality in the rime is also very common throughout this area. Most dialects have no plosive codas. A small number of dialects have -ʔ, and there are isolated cases with -t -k. Dialects with plosive codas tend to be found towards the southern edge, closer to where Hakka, Yue, and/or Southern Pinghua are spoken.

XIANG

There are two prototypes: New Xiang in the north, and Old Xiang in the south.

1. The prototypical New Xiang dialect has all the MC voiced obstruent onsets devoiced, while the prototypical Old Xiang dialect has preserved the MC voiced obstruent onsets in tones A, B, and C (the voicing is often lost in tone D). When the MC voiced obstruent onsets are devoiced, the plosives and affricates are aspirated to various degrees in tone D, and usually unaspirated in tones A, B, and C;
2. Having two tone As, one tone B, and two tone Cs is common. As for tone D, although MC plosive codas have disappeared in all Xiang dialects, many New Xiang dialects have maintained a tone D that is contrastive with tones A, B, and C. On the other hand, most Old Xiang dialects have not maintained a tone D;
3. Xiang dialects have -n and -ŋ, but not -m. Nasalized vowels are common. Plosive codas are absent.

XIANGHUA

Also known as Waxiang or Waxianghua. Xianghua is a small Sinitic language spoken in northwestern Hunan. It is in contact with Southwestern Mandarin, Xiang, North Hmongic and Tujia. While the synchronic typological profile of Xianghua is not very remarkable for that region, and that Xianghua is not all-round conservative, the pre-MC conservatism in its phonology (onsets and nucleus) and lexicon makes Xianghua extraordinary amongst Sinitic languages. Xianghua is so divergent that it had to be explicated (Wang Fushi 1982) that Xianghua is in fact Sinitic.

1. Xianghua dialects have voiced obstruent onsets. Xianghua has preserved many pre-MC elements, and hence whether an obstruent onset is voiced, voiceless aspirated or voiceless unaspirated does not necessarily match those in MC. There is also the strong influence from both Mandarin and Xiang, which further muddies the pattern. (The type of Xiang spoken in this western part of Hunan is itself also “mixed” in the sense of being in between the New Xiang and Old Xiang prototypes);
2. Nearly all Xianghua dialects have two tone As, one tone B, one tone C, and one tone D;
3. The norm is having an -ŋ and some nasalized vowels. Total loss of nasality in the rime is also common. Some dialects have a -ʔ, while others have no plosive codas.

SOUTHWESTERN MANDARIN

Spoken in northern, western, and southern Hunan, and northern half of Guangxi. Small enclaves of Southwestern Mandarin speakers can be found in southern Guangxi, Guangdong coast, and Hainan Island. Mandarin is a later arrival in the area (since about fourteenth century CE, during Ming Dynasty);

1. MC voiced obstruent onsets are devoiced; the onset is aspirated when the MC tone is tone A, and unaspirated in when the MC tone is C or D (voiced obstruent tone B syllables have very mostly shifted to tone C). Some Southwestern Mandarin dialects near the western or southern edge of Xiang have voiced obstruent onsets, similar to Old Xiang;
2. There are two tone As, one tone B, and one tone C. It is quite common for the dialects in northern Hunan to have two tone Cs, similar to Xiang. Some Mandarin dialects have a separate tone D. (If not, MC tone D syllables usually have tone A2 in Southwestern Mandarin dialects);

3. As for consonantal codas, there are -n -ŋ, and nasalized vowels are also common. Plosive codas are absent.

5 LSV Innovations in the Sinitic Southwest

We will now discuss each of the four phonological innovations found in LSV in depth, and examine whether or not they are reflected in the contemporary Southwestern Sinitic languages just introduced. For clarity's sake, we have numbered each of the innovations in accordance with the list provided earlier.

1. Plain (voiceless unaspirated) stops and non-modal phonation reflexes of MC voiced obstruents

EMC distinguished between voiced, voiceless aspirated, and voiceless unaspirated series for plosive and affricate onsets, e.g., b- p^h- p-. The voicing distinction of the obstruents started to disappear in some Chinese dialects after the Early Middle Chinese period. This process of devoicing was often accompanied by a splitting or doubling of the tonal system. As initial voicing was lost, there emerged dialectal variation regarding the feature aspiration in the resulting devoiced onset inventory. The most common patterns are described in Table 2 below:

*Table 2: Reflexes for originally voiced MC onsets in modern Sinitic languages
(Phan 2013, Phan forthcoming)*

	Pattern of onset reflex for MC voiced initials	Language
1.	Aspirates in syllables with both level (A) & oblique (BCD) tones	Hakka, Gan
2.	Plain onsets in syllables with both level (A) and oblique (BCD) tones	Some Xiang, most Pinghua, some Yue
3.	Aspirates in syllables with level (A) tones but not oblique (BCD) tones	Most Mandarin
4.	Aspirates in syllables with level (A) or rising (B) tones but not in departing (C) or entering (D) tones	Some Yue
5.	Three-way onset contrast retained	Wu, some Xiang

Type 2, i.e., having unaspirated onsets, was most probably the norm in this southwestern corner of the Chinese empire during the MC period. In the Hunan-Guangxi corridor, the older Sinitic languages in this area tend to be unaspirated (whether devoiced or voiced). LSV also falls into this category; the voiced obstruent onsets in LMC are devoiced and unaspirated in LSV. The labial/anterior plosives are also implosivized, but this change (p- t- > ɓ- d-) is a later development not directly connected to the devoicing.⁷ The low level tone also demonstrates a form of non-modal phonation (breathiness) in the northern dialects of Vietnamese. Non-modal voicing for the MC voiced obstruent onsets has also been reported in some Xiang dialects in Hunan (see below). Critically, LSV does not demonstrate aspirated reflexes for MC voiced onsets, as do both the Northern Sinitic branch (including Mandarin) and some dialects of the Yue branch (including Cantonese), i.e., numbers 3 and 4 above. LSV also contrasts with the Jiangxi-Guangdong corridor to the east, where the Gan and Hakka dialects are mostly devoiced, but have aspirated onsets with all tones, as in number 1 above.

Having devoiced and unaspirated reflexes for MC voiced obstruent onsets is the norm in Pinghua and Goulou Yue dialects.⁸ Having unaspirated reflexes is the older state of affairs in both Pinghua and Yue in general; Cantonese is one of the Yue dialects that has lost this older trait. Instead, Cantonese has the innovative trait of aspirated onsets in tones A & B, and unaspirated onsets in tones C & D. This is perhaps related to the huge influx of Early Mandarin migrants in the thirteenth century at the end of the Song Dynasty (Lau Chun-Fat 2001). The original trait of unaspirated onsets in all tones is still present

⁷ This sound change is also found throughout Hainán, and in many Yue dialects along the Guangxi-Guangdong border. See, e.g., de Sousa (forthcoming).

⁸ Goulou Yue forms a chain between Southern Pinghua in central Guangxi and Cantonese in central Guangdong, and its territory covers at least one third of the Yue territory.

to a degree deep within the Pearl River Delta, for instance in Shunde and Nanhai Districts of Foshan (e.g., Chen Weiqiang & Hou Xingquan 2016). In the Table 3 below, Yulin is a Goulou Yue dialect in Guangxi, Taishan is a Siyi Yue dialect in Guangdong, and Cantonese is what is commonly considered the most widespread variety of Yue.⁹ Yulin Yue patterns like Nanning Pinghua and SV, and Taishan Yue patterns like Cantonese. Mandarin examples are also given here for reference.

Table 3: MC voiced plosive and affricate onsets in Southern Pinghua and Yue

	MC		SV	Nanning Pinghua	Yulin Yue	Taishan Yue	Cantonese	Mandarin
桃 ‘peach’	daw ^A	平	đào ^{A2}	tauɿ ^{A2}	tœuɿ ^{A2}	hauɿ ^{A2}	t ^h ouɿ ^{A2}	táo ^{A2}
被 ‘quilt’	bje ^B	上	bì ^{B2}	pəiɿ ^{B2}	piɿ ^{B2}	p ^h iɿ ^{B2}	p ^h eiɿ ^{B2}	bèi ^C
弟 ‘y. brother’	dej ^B	上	đẽ ^{C2} đê ^{B2}	tɛiɿ ^{B2}	taiɿ ^{B2}	aiɿ ^C	tɛiɿ ^{C2}	dì ^C
被 PASSIVE 局 ‘department’	bje ^C gjo ^{wk} _D	去 入	bì ^{B2} cục ^{D2}	pəiɿ ^{C2} køkɿ ^{D2b}	piɿ ^{C2} køkɿ ^{DS2}	piɿ ^C kø ^w kɿ ^{D2}	peiɿ ^{C2} køkɿ ^{D2}	bèi ^C jú ^{A2}

The situation with Northern Pinghua and Tuhua is complex. Nevertheless, the trend is similarly unaspirated towards the western end (the Northern Pinghua/Guangxi-end), and aspirated towards the eastern end (the northern-Guangdong-end). In Table 4 below, Guilin is in Guangxi, Shuangpai is in Hunan, and Shaoguan is in Guangdong.¹⁰ In Shuangpai Tuhua, MC b- d- became devoiced and unaspirated, while other MC voiced obstruent onsets became devoiced and aspirated.

Table 4: MC voiced plosive and affricate onsets in Northern Pinghua and Tuhua

	MC		SV	Guilin Pinghua	Shuangpai Tuhua	Shaoguan Tuhua
平 ‘flat’	bjæŋ ^A	並	bǎng bình ^{A2}	paiɿ ^{A2}	piəɿ ^{A2}	p ^h iɛɿ ^{A2} _白
被 ‘quilt’	bje ^B	並	bì ^{B2}	piɿ ^B	paɿ ^{B2}	p ^h aiɿ ^{C1}
定 ‘steady’	deŋ ^C	定	định ^{B2}	taiɿ ^{C2}	tioɿ ^C	t ^h iɛɿ ^{C2} _白
笛 ‘flute’	dek ^D	定	địch ^{D2}	təuɿ ^{C2}	tioɿ ^C	t ^h iɛɿ ^{D2} _白
查 ‘investigate’	dzæ ^A	崇	tra ^{A1}	tsuəɿ ^{A2}	ts ^h uoɿ ^{A2}	ts ^h aɿ ^{A2}
跪 ‘kneel’	gjwe ^B	群	quy ^{B2}	kueiɿ ^{C2}	k ^h uaɿ ^{B2}	k ^h uaiɿ ^{C2}
住 ‘live’	dju ^C	澄	trư ^{B2}	tsyɿ ^{C2}	ts ^h uoɿ ^C	ts ^h ɿɿ ^{C2}
席 ‘seat’	zjek ^D	邪	tịch ^{D2}	tsaiɿ ^{C2}	tɕ ^h ioɿ ^C	ts ^h eiɿ ^{D2} _白

Further north is Xiang. Within the Xiang territory, MC voiced obstruent onsets usually remain voiced in the southwest (“Old Xiang”) but devoiced in the northeast (“New Xiang”). Usually tone D syllables have their voiced obstruent onsets devoiced first, and tone A syllables last. In Table 5 below are examples from four Xiang dialects: Changsha in the northeast (prototypical New Xiang), Luxi in the northwest, Shuangfeng in the center (prototypical Old Xiang), and Dong’an in the south.¹¹ They show

⁹ Yue and Pinghua also have the “Mandarin trait” of tone B2 syllables shifting into tone C2 to some degree, but a significant number of such syllables have remained tone B2.

¹⁰ In Guilin and Shuangpai, the *lingua franca* is Southwestern Mandarin. These Tuhua varieties pattern differently from Mandarin. In Shaoguan, the majority speaks Hakka, and there is also Shaoguan Cantonese in the city. The vast majority of Tuhua varieties in the Shaoguan area have the aspirated pattern, similar to Hakka (Li Dongxiang and Zhuang Chusheng 2009: 37).

¹¹ Dong’an Tuhua is considered a type of Southern Hunan Tuhua in the first edition of the Language Atlas of China (Wurm & Li et al. eds. 1987), but it was reclassified as Xiang in the second edition (Zhang Zhenxing et al. eds. 2012). Dong’an Tuhua is the northern-most Tuhua variety. It shares some similarities with the Tuhua

a gradation of the MC voiced onsets being devoiced, from tone D, then to tones BC, and then to tone A.

Table 5: MC voiced plosive and affricate onsets in Xiang

	MC		SV		Changsha Xiang	Luxi Xiang	Shuangfeng Xiang	Dong'an Xiang
糖 'sugar'	daŋ ^A	平	đường ^{A2}		tanɿ ^{A2}	daŋɿ ^{A2}	daŋɿ ^{A2}	duŋɿ ^{A2}
被 'quilt'	bje ^B	上	bj ^{B2}	peiɿ ^{C2}	piɿ ^{C2}	biɿ ^{C2}	biɿ ^B	
舊 'old'	gjuw ^C	去	cũ ^{C2} cju ^{B2}	teiəuɿ ^{C2}	teiɿuɿ ^{C2}	dziəuɿ ^{C2}	dziəuɿ ^{C2}	
賊 'thief'	dzok ^D	入	giắc tặc ^{D2}	ts ^h əɿ ^{C1}	ts ^h aiɿ ^{C1}	te ^h iaɿ ^{C1a}	zaiɿ ^D	

When devoiced, the onsets in a significant number of tone D syllables are aspirated. The percentage varies, e.g., in Changsha it is about 40%, in Shuangfeng it is about 90%. In tones A, B, and C, they are most usually unaspirated (Chen Hui 2006:25–48).

In Hunan, some Xiang dialects are reported to have voiced obstruent onsets which are breathy (see Chen Hui 2006:48–54). In Qiyang and Qidong in southern central Hunan, voiced obstruents can vary freely between modal and breathy phonation. Other Xiang dialects with breathy voiced obstruents are Xinhua in mid-western Hunan, and migrant Xiang speakers in Yongxing and Zhugao in Sichuan.¹²

To summarize, the tendency in the south is for devoiced onsets to manifest as aspirated in the east, but as unaspirated in the west. The strongest correlations are with Pinghua dialects spoken in the western end of the continuum (e.g., Guilin Pinghua, and Shuangpai Tuhua). Toward the Yue-dominated regions (except Gouloug Yue), one finds more aspirated reflexes. Old Xiang, spoken in the southwest of Hunan, maintains some voicing contrast, while New Xiang, under heavy Mandarin influence, tends to demonstrate voiceless reflexes. Thus, there is some evidence for an older layer of plain unaspirated reflexes for devoiced MC initials, now surviving in LSV and the Pinghua languages—spoken exactly where we would expect them to be, in the southwestern corner of the medieval empire.

The Four Grades and the Chongniu phenomenon

The next two diagnostic innovations involve a system of medieval Chinese philological reckoning known as the Four Grades or Four Divisions 四等 (Viet. *tứ đẳng*; pinyin *sìděng*). Before discussing diagnostic innovations 2-3, it is therefore useful to pause and review this phenomenon. The Four Grades refers to four rows in the tabular philological records known as the Rime Tables 韻圖 (Viet. *vận đồ*; pinyin *yùntú*), composed beginning in the Song Dynasty to decode the phonology of the older Rime Dictionaries or Rime Books 韻書 (Viet. *vận thư*; pinyin *yùنشū*) of the early medieval period. The Rime Tables organized each syllable in the Sinitic language according to columns by initial and rows by rime. The rows were grouped into four large clusters according to the four traditional tones of Middle Chinese, and each of these tonal clusters of rows were comprised of four individual rows according to “Grade” 等.

varieties further south (e.g., frequent total loss of nasality in the rime, speakers being bilingual in Southwestern Mandarin). However, Dong'an Tuhua is on the whole not very different from the Xiang dialects found to the north, east, and west of Dong'an (Bao Houxing 2002), and by now the claim that Dong'an Tuhua is Xiang is not controversial. Nonetheless, the terms “Dong'an Tuhua” and “Dong'an-type Tuhua” are still commonly used amongst Hunanese linguists, especially when contrasting them with Dong'an Mandarin and other nearby “normal” Xiang varieties.

¹² In these latter cases, due to their language contact environments, it is not easy to tell whether the breathiness / aspiration of the voiced onsets is an innovation or a retention. Xinhua in Hunan is next to the huge Gan exclave in southwestern Hunan, while Yongxing and Zhugao in Sichuan are dominated by Southwestern Mandarin. The Xiang dialects there are strongly influenced by Gan and Southwestern Mandarin respectively. See Chen Hui (2006: 48–54).

Figure 3: First page of the Yunjing 韻鏡, showing the -ong rime. Note the four major tonal clusters, each headed by an exemplar character on the left. Within each of these clusters are the four rows corresponding to each Grade 等. Empty circles refer to syllables that are possible, but not attested in the Sinitic language.

	齒音	舌音	音	喉音	音	齒音	次清	濁	清	濁
東	○	龍	○	洪	烘	翁	○	穰	養	為
	○	○	○	○	○	○	○	崇	○	終
	戎	隆	彤	雄	○	慵	○	充	○	終
	○	○	融	○	○	嵩	○	○	○	○
董	○	瓏	○	懶	噴	轟	○	敵	○	總
	○	○	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○
送	○	弄	○	闕	烘	瓏	○	送	敵	總
	○	○	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○
屋	○	祿	○	穀	鳩	屋	○	遠	族	疾
	○	○	○	○	○	○	○	縮	○	玃
	肉	六	○	育	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○

What these four rows actually represented phonologically is quite controversial. However, it is generally accepted today that they represented some kind of medial information (i.e., segments between the onset and the nucleus), in interaction with the following vowel. In particular, the Grades appear to have expressed medial information from Early Middle Chinese, that sometimes developed into vocalic expressions by Late Middle Chinese. Table 6 below is loosely based on the summary by Guillaume Jacques, with some modification (Jacques 2006:9).

Table 6: Summary of the Four Grades

	Ex.	Man.	LSV	LMC ¹³	Medial	Vowel	EMC > LMC
Grade I	豪	hawA2	hawA2	haw	-Ø- / -w-	-a-, -o-, -u- (back vowels)	-Ø- / -w-
Grade II	爻	jawA2	hawA2	hæw	-ɣ- (?)	-æ-, -ɛ-	-ɣ[-æ-, -ɛ-] > merged front vowel
Grade III	宵	sjawA1	tiuA1	sjew	-j-	high vowels	-j-
Grade IV	蕭	sjawA1	tiuA1	sew	-i-	-i-, -ɛ-, -a- (front vowels)	-ɛ- > ie

As shown above, Grade I appears to have borne no medials and corresponded to syllables with back vowels. Grade II appears to have contained some kind of guttural medial followed by a fronted vowel. Grade III appears to have borne some kind of palatal medial (-j-), coupled with high vowels, while Grade IV appears to have borne some kind of weaker palatal medial element (or perhaps no medial) followed by front vowels. By Late Middle Chinese, Grade IV front vowels had diphthongized into -ie-.

The concept of *chongniu* 重紐 or “double-buttoning” enters this system when syllables belonging to the Grade III according to earlier Rime Books appear in both the Grade III and IV spaces in the Rime Tables. When this happens, the writers of the Rime Tables would insert a small circular diacritic or “button” (i.e., *niu* 紐) next to the character. These *chongniu* doublets are complete homonyms in virtually all modern Sinitic languages, as well as sino-xenic reading pronunciation systems. Late Sino-Vietnamese robustly maintains the distinction; however, it is not kept in the rime, but in the onset: *Chongniu III* rimes causes the labial onset to remain labial ($p p^h b m > b f b m$), whereas *Chongniu IV* rimes causes the labial onset to become coronal ($p p^h b m > t^h t z$).

Table 7: Chongniu rhymes in Late Sino-Vietnamese (Phan 2013, forthcoming)

#	字	Gloss	LMC	Grade	Mandarin	HV
1.	秘	secret	pj ^h	III	pi ^l	bi ^l
2.	庇	cover	pji ^h	IV	pi ^l	ti ^l
3.	貧	poor	bin	III	pin ^l	bən ^l
4.	嘖	frown	bjin	IV	pin ^l	tən ^l
5.	縻	ox halter	mje	III	mi ^l	mi ^l
6.	彌	extensive, full	mjie	IV	mi ^l	zi ^l
7.	岷	toponym	min	III	min ^l	mən ^l
8.	民	people, subjects	mjin	IV	min ^l	zən ^l

This is generally understood as a kind of palatalization, and the core effect seems to have been a lenition of the bilabial and shifting of the place of articulation backward towards the palate (i.e., palatalization) under the influence either of a medial or the positioning of the vowel. Grade IV rimes all possessed fronted vowels, which diphthongized by Late Middle Chinese. What is striking is that virtually no other Sinitic systems seem to preserve the distinction (with the marginal exceptions noted above)—never mind in such a dramatic fashion.

¹³ In the Middle Chinese transcription used in the rest of this paper, which is largely based on Baxter’s transcription of Middle Chinese (Baxter & Sagart 2014: 12–20; Baxter 1992), the four grades are rendered as follow: Grade I finals begin with $-(w)a$, $-(w)o$, or $-u$; Grade II finals begin with $-(w)\epsilon$ or $-(w)\alpha$; Grade III finals begin with $-j(w)$ or $-(w)i$; Grade IV finals begin with $-(w)e$. As this is a transcription and not a reconstruction, this system makes no solid claims on the exact phonetic details of the segments and tones involved.

This retention of the *Chongniu* distinction with the onsets is probably unique to LSV. The *Chongniu* distinction is retained in the vowels in isolated cases in Sino-Japanese, Sino-Korean (e.g., Arisaka 1962:58), Min (see Pan 2000:21–45 and references therein), Wu (Mei Tsu-Lin 2012), and perhaps also Sino-Zhuang (Zheng 2013). In the Hunan-Guangxi corridor, probably the only distinction made is that between 乙 *jit* ‘second of the heavenly stems’ and 一 *jit* ‘one’: the vowel distinction is quite often maintained in Yue dialects (e.g., Cantonese 乙 *jyt*², 一 *jət*⁵), and not uncommonly maintained in Xiang, Pinghua, and Tuhua.

While we have not yet found a Southwestern Chinese language that maintains a similarly robust distinction between Grade III and IV *chongniu* doublets, there are two other palatalization effects that occur along Grade differentiations that do appear reflected to varying degrees among these languages. These are the palatalization of initial velar nasals in LSV Grade II, and the palatalization of initial velar plosives in Grade II.¹⁴

2 Palatalization of nasals in Grade II

LSV velar consonants—both nasals and stops—appear to palatalize in Grade II. In LSV, *ŋ*- <ng> is fronted to *ɲ*- <nh> when MC *ŋ*- immediately precedes a MC “Grade II” vowel *æ* or *ɛ*, while *ŋ*- remains *ŋ*- when it precedes a MC “Grade I” vowel *a* or *o*. As for the vowel itself, the reflexes of *æ/ɛ* and *a/o* are often the same—that is, in LSV, the distinction between Grade II and I is not maintained on the vowel itself (Phan 2013:101–103). In other words, the distinction between Grade I and II is entirely carried by the initial. This is basically also the situation in many Southern Pinghua varieties in Guangxi.¹⁵ LSV and the Pinghua varieties shown in Table 8 below also share the exception that *ŋ*- does not front to *ɲ*- when the coda is velar, and that the reflex of the vowel in MC *-æŋ* is different from other cases of MC *æ* in Nanning Pinghua. Dialects towards the eastern-end of the Pinghua-Yue continuum, exemplified here by Taishan Yue and Cantonese, does not front *ŋ*-, and the distinction between Grade II *æ~ɛ* and Grade I *a~o* is often maintained. Also shown here are Binyang Pinghua and Yulin Yue, which show mixed developments. With the onsets, Binyang and Yulin resemble the west by fronting *ŋ* to *ɲ* more often with Grade II *æ/ɛ*;¹⁶ with the nucleus, Binyang often has the eastern trait of distinguishing Grade II and I vowels, while Yulin sometimes shows the western trait of not distinguishing Grade II and I vowels, and sometimes the eastern trait of distinguishing Grade II and I vowels.

3 LSV velar stop palatalization in Grade II

LSV also fronts MC *k*- <c> to *z*- <gi> in the same Grade II environment. However, the fronting of *k*- is rare in Southern Pinghua and Yue in this environment. One Pinghua variety that fronts MC *k*- in this environment is Binyang, in Nanning Prefecture.¹⁷ With the two sets of MC vowels, they are similarly less often distinguished in the west, and more often distinguished in the east. LSV again patterns similarly with Nanning and Binyang Pinghua with its vowels.

¹⁴ This is what Pulleyblank (1981) called “velar softening”.

¹⁵ The situation in Pinghua is slightly less clear-cut. Firstly, the palatalization of *ŋ*- to *ɲ*- in Pinghua also occurs to a small degree with Grade III rimes; see the next section. Secondly, there are often influences from Cantonese and Southwestern Mandarin which muddy the situation slightly.

¹⁶ With the other group of vowels/ Grade I vowels, *ŋ*- is sometimes dropped; *ŋ*- >*o* is very common amongst Yue dialects, widely heard in, e.g., Hong Kong Cantonese.

¹⁷ Also similar in Nanning Prefecture is Sino-Zhuang of Wuming, with *k*- > *kj*- (Chen Hailun and Lin Yi eds. 2009).

Table 8: Palatalization of Grade II velar nasals in Pinghua and Yue

	MC		LSV	Nanning Pinghua	Binyang Pinghua	Yulin Yue	Taishan Yue	Cantonese
牙 ‘tooth’	<i>ŋæ</i> ^A	假開二	<i>nha</i> ^{A1}	<i>ŋa</i> ↓ ^{A2}	<i>ŋa</i> ↓ ^{A2}	<i>ŋɔ</i> ↓/ <i>ŋɔ</i> ↓ ^{A2}	<i>ŋga</i> ↓ ^{A2}	<i>ŋa</i> ↓ ^{A2}
崖 ‘cliff’	<i>ŋɛ</i> ^A	蟹開二	<i>nhai</i> ^{A1}	<i>ŋa</i> ↓ ^{A2}	<i>ŋai</i> ↓ ^{A2}	<i>ŋɔ</i> ↓ ^{A2}	<i>ŋgai</i> ↓ ^{A2}	<i>ŋai</i> ↓ ^{A2}
咬 ‘bite’ ¹⁸	<i>ŋæw</i> ^B	效開二	<i>giáo</i> ^{C1}	<i>ŋau</i> ↓ ^{B2}	<i>ŋau</i> ↓ ^{B2}	<i>ŋɔu</i> ↓ ^{B2}	<i>ŋgau</i> ↓ ^{B2}	<i>ŋau</i> ↓ ^{B2}
雁 ‘wild goose’	<i>ŋæn</i> ^B	山開二	<i>nhən</i> ^{B2}	<i>ŋan</i> ↓ ^{C2}	<i>ŋan</i> ↓ ^{C2}	<i>ŋɔn</i> ↓ ^{C2}	<i>ŋgan</i> ↓ ^C	<i>ŋan</i> ↓ ^{C2}
硬 ‘hard’	<i>ŋæŋ</i> ^C	梗開二	<i>nganh</i> ^{B2}	<i>ŋɛŋ</i> ↓ ^{C2}	<i>ŋaŋ</i> ↓ ^{C2}	<i>ŋa</i> ↓/ <i>ŋa</i> ↓ ^{C2}	<i>ŋgaŋ</i> ↓ ^C	<i>ŋaŋ</i> ↓ ^{C2}
我 ‘I’	<i>ŋa</i> ^B	果開一	<i>ngã</i> ^{C2}	<i>ŋa</i> ↓ ^{B2}	<i>ŋɔ</i> ↓ ^{B2}	<i>ŋœ</i> ↓ ^{B2}	<i>ŋg^uɔ</i> ↓ ^{B2}	<i>ŋɔ</i> ↓ ^{B2}
礙 ‘obstruct’	<i>ŋoj</i> ^C	蟹開一	<i>ngai</i> ^{B2}	<i>ŋai</i> ↓ ^{C2}	<i>ŋɔ</i> ↓ ^{C2}	<i>ɔ</i> ↓ ^{C2}	<i>ŋg^uɔ</i> ↓ ^C	<i>ŋɔ</i> ↓ ^{C2}
熬 ‘cook down’	<i>ŋaw</i> ^A	效開一	<i>ngao</i> ^{A1}	<i>ŋau</i> ↓ ^{A2}	<i>ŋɔu</i> ↓ ^{A2}	<i>œu</i> ↓ ^{A2}	<i>ŋgau</i> ↓ ^{A2}	<i>ŋou</i> ↓/ <i>ŋau</i> ↓ ^{A2}
岸 ‘shore’	<i>ŋan</i> ^C	山開一	<i>ngən</i> ^{B2}	<i>ŋan</i> ↓ ^{C2}	<i>ŋɔn</i> ↓ ^{C2}	<i>ŋɔn</i> ↓ ^{C2}	<i>ŋg^uɔn</i> ↓ ^C	<i>ŋɔn</i> ↓ ^{C2}
昂 ‘upright’	<i>ŋaŋ</i> ^A	宕開一	<i>ngang</i> ^{A1}	<i>ŋaŋ</i> ↓ ^{A2}	<i>ŋɔŋ</i> ↓ ^{A2}	<i>ŋuŋ</i> ↓ ^{A2}	<i>ŋgɔŋ</i> ↓ ^{A2}	<i>ŋɔŋ</i> ↓ ^{A2}

Table 9: Palatalization of Grade II velar plosives in Pinghua and Yue

	MC		LSV	Nanning Pinghua	Binyang Pinghua	Yulin Yue	Taishan Yue	Canto.
嫁 ‘marry’	<i>kæ</i> ^C	麻開二	<i>giá</i> ^{B1}	<i>ka</i> ↓ ^{C1}	<i>tsa</i> ↓ ^{C1}	<i>kɔ</i> ↓ ^{C1}	<i>ka</i> ↓ ^{A1}	<i>ka</i> ↓ ^{C1}
階 ‘stair/step’	<i>kej</i> ^A	蟹開二	<i>gai</i> ^{A1}	<i>kai</i> ↓ ^{A1}	<i>tsai</i> ↓ ^{A1}	<i>kɔi</i> ↓ ^{A1}	<i>kai</i> ↓ ^{A1}	<i>kai</i> ↓ ^{A1}
交 ‘intersect’	<i>kæw</i> ^A	效開二	<i>giao</i> ^{A1}	<i>kau</i> ↓ ^{A1}	<i>tsau</i> ↓ ^{A1}	<i>kɔu</i> ↓ ^{A1}	<i>kau</i> ↓ ^{A1}	<i>kau</i> ↓ ^{A1}
奸 ‘sly’	<i>kæn</i> ^A	山開二	<i>gian</i> ^{A1}	<i>kan</i> ↓ ^{A1}	<i>tsan</i> ↓ ^{A1}	<i>kɔn</i> ↓ ^{A1}	<i>kan</i> ↓ ^{A1}	<i>kan</i> ↓ ^{A1}
更 ‘change’	<i>kæŋ</i> ^A	梗開二	<i>canh</i> ^{A1}	<i>kɛŋ</i> ↓ ^{A1}	<i>kɛŋ</i> ↓ ^{A1}	<i>ka</i> ↓ ^{A1}	<i>kaŋ</i> ↓ ^{A1}	<i>kaŋ</i> ↓ ^{A1}
歌 ‘song’	<i>ka</i> ^A	果開一	<i>ca</i> ^{A1}	<i>kɔ</i> ↓/ <i>ka</i> ↓ ^{A1}	<i>kɔ</i> ↓ ^{A1}	<i>kœ</i> ↓ ^{A1}	<i>k^uɔ</i> ↓ ^{B1}	<i>kɔ</i> ↓ ^{A1}
該 ‘ought to’	<i>koj</i> ^A	蟹開一	<i>cai</i> ^{A1}	<i>kai</i> ↓ ^{A1}	<i>kɔ</i> ↓ ^{A1}	<i>kɔi</i> ↓ ^{A1}	<i>k^uɔi</i> ↓ ^{A1}	<i>kɔi</i> ↓ ^{A1}
高 ‘high’	<i>kaw</i> ^A	效開一	<i>cao</i> ^{A1}	<i>kau</i> ↓ ^{A1}	<i>kɔu</i> ↓ ^{A1}	<i>kœu</i> ↓ ^{A1}	<i>kau</i> ↓ ^{A1}	<i>kou</i> ↓ ^{A1}
乾 ‘dry’	<i>kan</i> ^A	山開一	<i>can</i> ^{A1}	<i>kan</i> ↓ ^{A1}	<i>kɔn</i> ↓ ^{A1}	<i>kɔn</i> ↓ ^{A1}	<i>k^uɔn</i> ↓ ^{A1}	<i>kɔn</i> ↓ ^{A1}
崗 ‘mound’	<i>kaŋ</i> ^A	宕開一	<i>cuong</i> ^{A1}	<i>kaŋ</i> ↓ ^{A1}	<i>kɔŋ</i> ↓ ^{A1}	<i>kuŋ</i> ↓ ^{A1}	<i>kɔŋ</i> ↓ ^{B2}	<i>kɔŋ</i> ↓ ^{A1}

The fronting of *k-* also happens in other Sinitic languages in the region, but the conditioning factors are different from that in LSV. With Pinghua and Yue, the fronting of *k-* to *ts-* or *tf-* occurs in some eastern Pinghua and western Yue dialects. However, the fronting does not occur with Grade II (*-æ/-ɛ*) rimes; the fronting occurs instead with some characters with certain MC Grade III rimes (*-juw~-jiw* 流, *-(j)im* 深, *-(j)in~-jin* 臻), e.g., 九 *kjuw*^B ‘nine’ Binyang Pinghua /tsəu↓^{B1}/, Yulin Yue /tsau↓^{B1}/, vs. SV *ciru*^{C1}, Nanning Pinghua /kəu↓^{B1}/, Taishan Yue /kiu↓^{B1}/, Cantonese /kœu↓^{B1}/). In Xianghua, palatalization of *k-* occurs with most MC Grade III (*-j_*) and Grade IV rimes (*-e*), and usually not with Grade II (*-æ/-ɛ*)

¹⁸ The true etymon for the word for ‘bite’ in most modern Sinitic languages is 齧 (MC *ŋæw*^B), but this word is universally “erroneously” written as 咬. In *Qieyun*, the character 咬 has the pronunciations of *kæw*^A and *ʔæw*^A. The LSV form of *giáo*^{C1} has the reflex of the segments in MC *kæw*^A, but the tone in MC *ŋæw*^B.

rimes. In Xiang, palatalization happens with Grade III and Grade IV rimes, and sometimes also with Grade II rimes. In most Mandarin dialects, palatalization of *k-* occurs with MC Grade II, Grade III, and Grade IV rimes. In all Sinitic languages discussed above, fronting of *k-* tend not to occur when a MC -*w-* medial is involved. With Mandarin, we know that the palatalization of *k-* to *tɕ-* is a late development: earliest signs of *k-* > *tɕ-* in Mandarin were recorded in late Ming Dynasty (the early seventeenth century) rime books (e.g., *Yuanyunpu* 元韻譜 1611 CE); historical Korean textbooks of Mandarin show signs of palatalization in Mandarin starting in the eighteenth century (Chu 1992:126, 160).

To summarize, Grade II nasal and velar palatalization of initials is most robustly evidenced in Binyang Pinghua amongst the Sinitic languages in the region. It is somewhat puzzling that Guilin Pinghua does not also reflect this innovation, as it patterned with LSV regarding devoicing. However, as we have not conducted any novel fieldwork for this study, nor explored the internal developments of these languages, this mismatch must await further study for resolution.

4 High-series tone in low-register syllables with sonorant initials

All the nasal and liquid onsets in MC were voiced. As the voicing contrasts of the obstruent onsets were lost and the tones split into two, the norm is for the syllables with nasal and liquid onsets to pattern with the originally voiced obstruent onsets, and these syllables would have “Yang” or “Lower” tones (tone A2 / B2 / C2 / D2). A trait of LSV is that in tone A, syllables with MC sonorant onsets have tone A1, instead of tone A2. The only other language with the same behavior (that we know of) is also found in the Hunan-Guangxi region: Xianghua, as demonstrated below. This is a striking correspondence between Xianghua and LSV, and is one of the most compelling finds given the rarity of this reflex.

That the sonorant onsets behave differently from the MC voiced obstruent onsets is itself not rare. For instance, in Mandarin dialects, nearly all *voiced obstruent tone B syllables have shifted to tone C, while *sonorant tone B syllables remained in tone B, together with the *voiceless tone B syllables.¹⁹ With tone D, Pinghua dialects in Nanning and further west have separate *sonorant and *voiced obstruent tone D2's. However, with tone A, the splitting of tone A2 based on the sonority of the onset is exceedingly rare; having MC sonorant onsets patterning with voiceless onsets is only known (to us) to happen in LSV and Xianghua. One possible earlier scenario in LSV and Xianghua is that MC syllables in tone A with sonorant onsets had a tone that was different from *both* syllables with voiceless onsets and voiced obstruent onsets. This situation is actually found in some dialects of Xiang, such as Xiangxiang and Shuangfeng (Bao 2006:72–75).

¹⁹ This trait is also found near-universally in Xiang, to some degree in Gan, and sporadically in Wú (Xin Shibiao 2004: 30–34). Many such syllables in Pinghua and Yue are also in tone C2. However, Pinghua and Yue dialects have usually maintained a significant number of such syllables in tone B2.

Table 10: Sonorant vs. other onsets in tone A

	MC		LSV	Guzhang Xianghua	Shuangfeng Xiang	Luxi Xiang	Cantonese	Mandarin
	鮮 ‘fresh’	<i>sjen</i> ^A	心	<i>tiên</i> ^{A1}	<i>eiɛ</i> ^{A1}	<i>eyɛ</i> ^{A1}	<i>siŋ</i> ^{A1}	<i>xiān</i> ^{A1}
	鞭 ‘whip (n.)’	<i>pjien</i> ^A	幫	<i>tiên</i> ^{A1}	<i>piɛ</i> ^{A1}	<i>pĩ</i> ^{A1}	<i>pin</i> ^{A1}	<i>biān</i> ^{A1}
	癲 ‘crazy’	<i>ten</i> ^A	端	<i>diên</i> ^{A1}	<i>tai</i> ^{A1}		<i>tin</i> ^{A1}	<i>diān</i> ^{A1}
	偏 ‘oblique’	<i>p^hjien</i> ^A	滂	<i>thiên</i> ^{A1}	<i>p^hie</i> ^{A1}		<i>p^hin</i> ^{A1}	<i>piān</i> ^{A1}
	天 ‘sky’	<i>t^hen</i> ^A	透	<i>thiên</i> ^{A1}	<i>t^hai</i> ^{A1}	<i>t^hĩ</i> ^{A1}	<i>t^hin</i> ^{A1}	<i>tiān</i> ^{A1}
	棉 ‘cotton’	<i>mjien</i> ^A	明	<i>miên</i> ^{A1}	<i>mie</i> ^{A1}	<i>mĩ</i> ^{A2a}	<i>miɛ</i> ^{A2}	<i>mián</i> ^{A2}
	年 ‘year’	<i>nen</i> ^A	泥	<i>niên</i> ^{A1}	<i>lai</i> ^{A1}	<i>jiĩ</i> ^{A2a}	<i>niɛ</i> ^{A2}	<i>nián</i> ^{A2}
	便 ‘cheap’	<i>bjien</i> ^A	並	(<i>tiên</i> ^{B2})	<i>bie</i> ^{A2}	<i>bĩ</i> ^{A2b}	<i>bie</i> ^{A2}	<i>pián</i> ^{A2}
	田 ‘field’ ²⁰	<i>den</i> ^A	定	<i>diên</i> ^{A2}	<i>lai</i> ^{A2}	<i>dĩ</i> ^{A2b}	<i>diɛ</i> ^{A2}	<i>tián</i> ^{A2}
	錢 ‘money’	<i>dzjen</i> ^A	從	<i>tiên</i> ^{A2}	<i>dzai</i> ^{A2}	<i>dzĩ</i> ^{A2b}	<i>dzie</i> ^{A2}	<i>qián</i> ^{A2}

	MC		LSV	Guzhang Xianghua	Shuangfeng Xiang	Luxi Xiang	Canto.	Mand.	ESV
	東 ‘east’	<i>tu^wŋ</i> ^A	端	<i>đông</i> ^{A1}	<i>tau</i> ^{A1}	<i>tən</i> ^{A1}	<i>toŋ</i> ^{A1}	<i>toŋ</i> ^{A1}	<i>dōng</i> ^{A1}
	通 ‘penetrate’	<i>t^hu^wŋ</i> ^A	透	<i>thông</i> ^{A1}	<i>t^hau</i> ^{A1}	<i>t^hən</i> ^{A1}	<i>t^hoŋ</i> ^{A1}	<i>t^hoŋ</i> ^{A1}	<i>tōng</i> ^{A1}
	欄 ‘fence’	<i>lan</i> ^A	來	<i>lan</i> ^{A1}	<i>lɿŋ</i> ^{A1}	<i>nã</i> ^{A2a}	<i>nɛ</i> ^{A2}	<i>lan</i> ^{A2}	<i>lán</i> ^{A2}
	龍 ‘dragon’	<i>ljo^wŋ</i> ^A	來	<i>long</i> ^{A1}	<i>liau</i> ^{A1}	<i>nən</i> ^{A2a}	<i>noŋ</i> ^{A2}	<i>loŋ</i> ^{A2}	<i>lóng</i> ^{A2}
	籠 ‘cage’	<i>lu^wŋ</i> ^A	來	<i>lung</i> ^{A1}	<i>lau</i> ^{A1}	<i>nən</i> ^{A2a}	<i>noŋ</i> ^{A2}	<i>loŋ</i> ^{A2}	<i>lòng</i> ^{A2}
	同 ‘together’	<i>du^wŋ</i> ^A	定	<i>đông</i> ^{A2}	<i>dau</i> ^{A2}	<i>dən</i> ^{A2b}	<i>doŋ</i> ^{A2}	<i>t^hoŋ</i> ^{A2}	<i>tóng</i> ^{A2}
	糖 ‘sugar’	<i>daŋ</i> ^A	定	<i>đường</i> ^{A2}	<i>lɿŋ</i> ^{A2}	<i>daŋ</i> ^{A2b}	<i>daŋ</i> ^{A2}	<i>t^hoŋ</i> ^{A2}	<i>táng</i> ^{A2}
	蟲 ‘insect’	<i>dju^wŋ</i> ^A	澄	<i>trùng</i> ^{A2}	<i>liau</i> ^{A2}	<i>dzin</i> ^{A2b}	(<i>dzoŋ</i> ^{A2} _{C1})	<i>ts^hoŋ</i> ^{A2}	<i>chóng</i> ^{A2}

²⁰ Baxter & Sagart (2014:109) claim that Xianghua faithfully preserves OC laterals, and give Guzhang Xianghua examples like 田 ‘field’ /lai/ MC *den*^A OC **l^hiŋ* (i.e., Xianghua escaped the sound change of OC **l^h-* > MC *d-*). Nonetheless, this is probably not true or not entirely true, at least with the tone A syllables. We have seen that at some point in the history of Xianghua, in syllables with a voiced onset, tone A split based on the sonority of the onset: syllables with sonorant onsets have tone A1, whereas syllables with obstruent onsets have tone A2. The tone A2 syllable 田 ‘field’ /lai/, and the other Xianghua tone A syllables exemplified in Baxter & Sagart (2014:109), therefore, had an obstruent onset. (Unlike tone A1 年 ‘year’ /lai/; MC *nen*^A OC **C.n^hi[ŋ]*.) Hence the onset in 田 ‘field’ /lai/ is not (simply) a retention of OC **l^h-*; it is a case of MC *d-* > *l-*. Other than this sound change of *d-* > *l-*, the reverse *l-* > *d-* also exists in some Xianghua dialects (Yang Wei 2010: 66–67). In neighboring Xiang, there are also plenty of examples of both *d-* > *l-* and *l-* > *d-*. An intermediate realization *d^l* is also found (Chen Hui 2006: 62–65).

6 Summary & Conclusions

The aforementioned features are summarized in Table 11.

Table 11: Summary of features in LSV and some Sinitic languages discussed

	MC *voiced obstruents become voiceless unaspirated in all tones	Non-modal reflex for MC *voiced obstruents	Palatalization of velar onsets primarily in Grade II		*Sonorant onset tone A2 ≠ *Obstruent onset tone A2	*Sonorant tone A2 = tone A1
			nasals	stops		
LSV	✓ ⁺	✓	✓	✓	✓	✓
Nanning Pinghua	✓		✓!			
Binyang Pinghua	✓		✓!	✓!		
Yulin Yue	✓ ⁺		✓!!			
Guilin Pinghua	✓					
Shuangpai Tuhua	✓					
Shuangfeng Xiang					✓	
Qiyang Xiang		✓				
Changsha Xiang	(✓)					
Guzhang Xianghua					✓	✓
Taishan Yue						
Standard Cantonese						
Standard Mandarin						

Notes:

1. ✓⁺ LSV and Yulin Yue: $p-t > b-d$ (But recently in Yulin, $b-d > p-t$; Zhou Lieting 2002:35–42);
2. (✓) Changsha Xiang: around 40% of the *voiced obstruents are voiceless aspirated in tone D (Chen Huī 2006:34);
3. ✓! Nanning and Binyang Pinghua: palatalization also occurs to a small degree in Grade III
4. ✓!! Yulin Yue: pattern slightly irregular.

As shown above, no languages surveyed reflect all four of the innovations identified in Late Sino-Vietnamese in the same exact manner. However, there does appear to be a tendency to reflect either the same or related innovative reflexes for each of these four innovations in a number of languages clustering to the southwest and lying upon the older migration routes from Hunan down into the Red River Plain (as discussed above). This is especially suggestive given the comparatively systematic lack of these innovative features in any other dialectal group of Sinitic. Given the under-described nature of these languages, and the poor understanding of their phonological history, we cannot claim these partial correspondences as definitive evidence of a Southwestern Middle Chinese Dialect, what Phan called “Annamese Middle Chinese”. Nevertheless, we argue that the correspondences above show promising leads, pending further adequate description of the languages in the region. What is needed is greater fieldwork on the languages in question, including phonological analysis of their individual histories for a richer comparison with Late Sino-Vietnamese. At present, we can only conclude that current

descriptions of contemporary Southwestern Chinese languages—specifically those varieties of Xiang and Pinghua described above—support the hypothesis that a Southwestern Middle Chinese dialect continuum stretching from the Red River Plain to Hunan is reconstructable.

Data sources:

1. Sino-Vietnamese: authors' knowledge and standard dictionary references
2. Mandarin, Standard: common knowledge
3. Pinghua Southern, Nanning Weizilu: field data collected by de Sousa
4. Pinghua Southern, Binyang Xinqiao: Chen Hailun & Lin Yi eds. (2009)
5. Pinghua Northern, Guilin Dahe: Chen Hailun & Liu Cunhan eds. (2009)
6. Tuhua Northern Guangdong, Shaoguan Xiangyang: Li Dongxiang & Zhuang Chusheng (2009)
7. Tuhua Southern Hunan, Shuangpai Jiangcun: Chen Hailun & Liu Cunhan eds. (2009)
8. Xiang / Tuhua Southern Hunan, Dong'an Huaqiao: Bao (2006)
9. Xiang, Changsha: Bao (2006)
10. Xiang, Luxi Pushi: Bao (2006)
11. Xiang, Shuangfeng Heye: Bao (2006)
12. Xianghua (Waxiang), Guzhang: Wu Yunji & Shen Ruiqing (2010), Yang Wei (2010)
13. Yue, Standard Cantonese: de Sousa's native knowledge
14. Yue, Taishan: Zhan Bohui et al. eds. (2012)
15. Yue, Yulín: Zhou Lieting (2002)

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INDIVIDUAL AND TASK-CONDITIONED VARIATION IN THE INTONATION OF SOUTHERN VIETNAMESE

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Abstract

The investigation of Vietnamese intonation has largely focused on the phonetic properties that distinguish sentence modality. However, previous results are contradictory because they rely on different types of corpora and methodology. This paper provides an overview of previous research on Vietnamese intonation and argues, based on two corpora of Southern Vietnamese, that conventionalized intonational modulation is limited in spontaneous Southern Vietnamese and that the categorical intonational patterns reported in some studies are largely due to the participants' attempts at contrasting sentence types in ambiguous contexts. Inter-speaker variation could be caused by the lack of conventionalization of intonational targets, that leads participants to use their own idiosyncratic intonational strategies. This is not to say that Vietnamese has no intonation, but rather that it is highly variable and does not seem very grammaticalized, which contrasts with intonation in Western European languages and in many Chinese varieties.

Keywords: Southern Vietnamese, intonation, production, variation

ISO 639-3 codes: vie

1 Introduction

Vietnamese has attracted a lot of attention from researchers trying to tackle the old problem of the simultaneous realization of tone and intonation, two phonological properties that should in theory compete for the same phonetic cue, pitch (Chao 1933). The investigation of Vietnamese intonation has largely focused on the phonetic properties that distinguish sentence modality. However, those results seem to be contradictory, because they rely on different types of corpora and methodology.

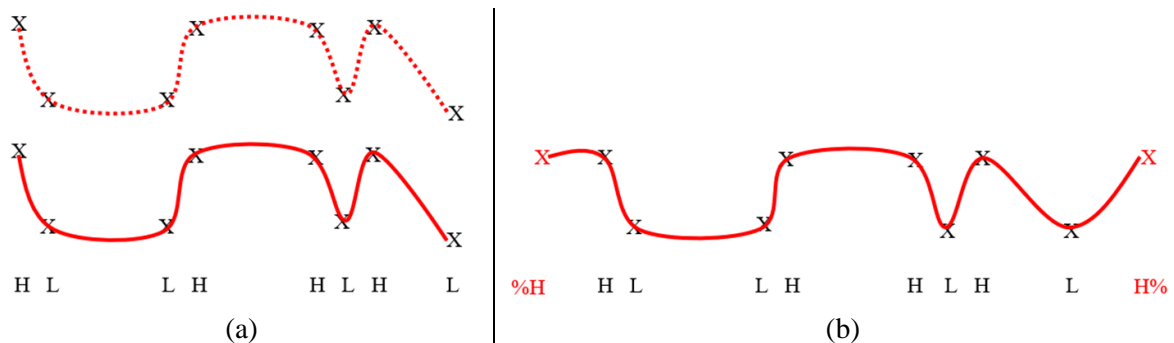
This paper has two main goals: (1) provide an overview of what is known about Vietnamese intonation and (2) illustrate with preliminary evidence the variation conditioned by speech style and individual speakers in the realization of intonation in Southern Vietnamese.

The fact that pitch is the main property of intonation has long raised the question of how a tone language can accommodate lexical tone and intonation at the same time, since these two phonological properties are based on a common primary acoustic property. In theory, there are two main possible strategies modeled in figure 1. The first one (figure 1(a)), superposition, was first formulated by Chao (1933:131) as “the algebraic sums or resultants of two factors, the original word-tone and the sentence intonation proper”. In one utterance, each syllable has one specific lexical tone (labeled by “H” and/or “L”). The X's represent the phonetic targets of these lexical tones between which a melodic contour is interpolated. When speakers want to modify their intonation, they simply move the entire melodic contour up or down. An interrogative sentence, for instance, could differ from a declarative because its pitch is raised. In other words, lexical tone and intonation would be superimposed and melodic contour of an utterance would result from overlaying lexical tones onto intonation.

The second strategy, interpolation, is modeled in figure 1(b). It consists in adding boundary tones (or intonational tones, marked with the percentage sign “%”) at the edges (mostly at the end) of prosodic

constituents. In this strategy, lexical tones and postlexical boundary tones operate at the same level and the melodic contour is formed from the interpolation between those tonal targets.

Figure 1: Modeling interaction between lexical tone and intonation in tonal languages: a) superposition (or change in pitch register); b) interpolation (or addition of tone targets).



Reports from previous literature show that most East and Southeast Asian tonal languages use both strategies to different magnitudes. In addition, other phonetic properties, like duration, intensity and voice quality, can also be used to convey intonation, but have not been studied as thoroughly as pitch. In the next section, we will review previous research on intonation in several East and Southeast Asian tonal languages such as Mandarin, Cantonese, Kammu, Thai, Lao, and Vietnamese.

1.1 Intonation in several East and Southeast Asian lexical tone languages

1.1.1 Mandarin

Both superposition and interpolation strategies have been described in Mandarin. Chao (1968) posited that Mandarin has two intonational endings - a rising and a falling one - and treated them as “particles” since they do not affect the intonational pattern of the whole utterance, but only the voiced part of its last syllable. More recently, Zeng *et al.* (2004) claimed that Mandarin interrogatives have higher sentence-final melodies than declaratives, and that the duration of the last syllable in interrogatives is shorter than in declaratives.

By contrast, it was argued by Ho (1976) and Shen (1990) that Mandarin intonation is superimposed onto lexical tones, but the basic tone shapes are preserved and that “sentence intonation does not consist of a succession of lexical tones but results from its own pitch movement, which varies in accord with modality and attitude” (Shen 1990:78). Along the same lines, Yuan *et al.* (2002) showed that the melodic curves associated with interrogatives and declaratives tend to be parallel and that boundary tones are not necessary for modeling the differences between the two intonational types in Mandarin.

However, in more recent production and perception studies, Yuan (2004, 2006) pointed out that both superposition and final boundary tones are found in Mandarin. He proposed that three mechanisms are involved in interrogative intonation: an overall higher phrasal pitch (the whole interrogative sentence has higher f₀ curve than statement), a greater strength of sentence final tones (wider pitch range at the end of the sentence), and a tone-dependent mechanism that flattens the falling slope of the final falling tone and steepens the rising slope of the final rising tone.

1.1.2 Cantonese

Ma *et al.* (2004) investigated the influence of intonation patterns on lexical tone identity and pointed out that both tone height and tone contours are modified by intonation in Cantonese. For instance, the pitch contour of the final syllable of questions always becomes rising, independent of the canonical contour of the lexical tone, while pitch height is lowered towards the end of statements. In a similar manner, Wong *et al.* (2005) claimed that Cantonese uses boundary tones that are added at the end of an intonational phrase to express various pragmatic meanings.

In contrast, Fox *et al.* (2008) showed that Cantonese uses both superposition and interpolation. The superposition (also called “utterance body intonation”) is best described in terms of pitch declination (a gradual fall in pitch during the intonational phrase) with possible variation along the parameters of pitch height (initial pitch of the phrase), pitch range (width of the pitch band in which lexical tones are realized), and pitch slope (the amount of declination that occurs). The authors posited two declination patterns (utterance declination and phrase declination) and argued that pitch is reset at the beginning of each phrase but usually at a lower level than the previous phrase. However, this study also emphasized that interrogative sentences are consistently pronounced with overall higher pitch and rising slope. In terms of interpolation (also called “utterance final intonation”), the authors found four final patterns (neutral, falling, rising, and rising-falling) that help distinguish sentence types. For instance, all lexical tones become rising at the end of questions while they become rising-falling at the end of “contrastive” sentences (except for the mid-level tone).

1.1.3 Kammu

Kammu (also written *Khamu* and/or *Khmu*), a Mon-Khmer language spoken in Northern Laos, is one of few languages with two dialects that phonologically differ in the presence or absence of surface lexical tones (Svantesson and Karlsson 2004; Svantesson and House 2006). Karlsson *et al.* (2007, 2010) and Karlsson *et al.* (2012) showed that the language tends to use final boundary tones (a high pitch in tonal dialect and a high falling pitch in non-tonal dialect) to mark focus and some expressive meanings and suggested that these minor differences are adaptations of intonation patterns to lexical tones when the identity of these tones is at risk.

Besides pitch, House *et al.* (2009) provided evidence showing that the general patterns of intonation are similar in the two dialects and that prosodic boundaries (i.e., pauses) have three linguistic functions: focus realization, phrase marking and speaker engagement. Recently, Karlsson *et al.* (2015) suggested that Kammu uses boundary tones to mark the boundary between topic and comment, and borders between larger discourse units.

1.1.3 Thai and Lao

There is evidence that both superposition and interpolation are used in Thai. Abramson (1979) showed that the contours of lexical tones are much influenced by sentence intonation, and that the language uses pitch junctures, often occur on particles in which lexical tones are lost, to distinguish statements from some types of questions. Luksaneeyanawin (1983, 1998) found a raised and narrower pitch range accompanied by shortness and loudness in interrogative sentences, and a lower and narrower pitch range accompanied by shortness and lower intensity in short utterances that express agreement. These studies also showed that questions are marked by higher f_0 (and high intensity) towards the end of the utterance.

In a study of related Lao, Gårding and Svantesson (1994) illustrated the overall effect of intonation on lexical tones by positing a frequency scale that constrains the height and shape of lexical tones in a given intonation. Lexical tones in phrase-final position have narrower range and larger slope compared to their counterparts in citation form.

In short, previous studies of intonation in East and Southeast Asian tone languages suggest that they typically combine superposition and interpolation. In the next section, we will see that this is also the case in Vietnamese.

1.2 Experimental work on Vietnamese intonation

Since the 1960s, a number of studies on Vietnamese intonation has been published both in Vietnam and overseas. As far as we know, this research has only studied the two main varieties: Northern and Southern Vietnamese, and most of them are production studies. We will review this literature assuming a functional point of view according to which intonation can be divided into four types: pragmatic function, phrase marking, expression of attitudes and emotions, and grammatical function (Michaud *et al.* 2021).

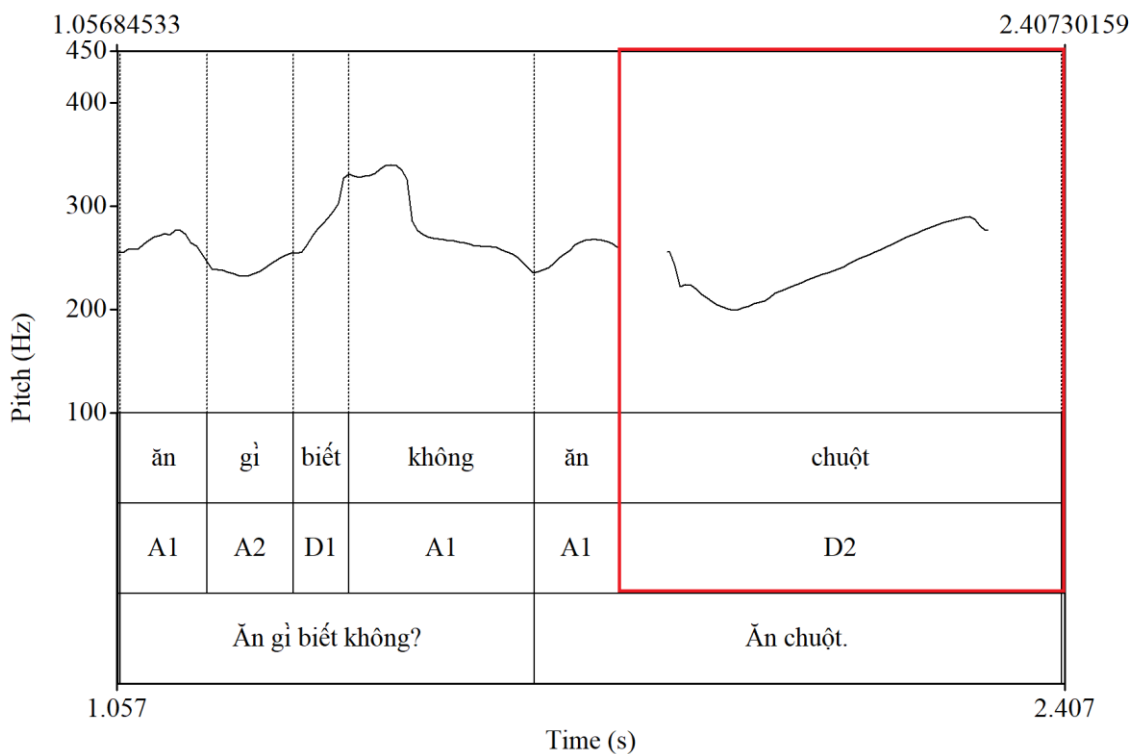
In Vietnamese, pragmatic intonation is mostly used to mark corrective focus: syllables under corrective focus have a higher or expanded pitch range and a longer duration (Đô *et al.* 1998; Michaud

2005; Jannedy 2007, 2008; Brunelle *et al.* 2015; Brunelle 2017). Other types of focus do not seem to be marked intonationally but are rather marked by syntactic devices or morphosyntactic means (Michaud and Brunelle 2016).

The second type of intonation that is found in languages is phrase marking. It is important to mark the boundaries of prosodic phrases because it gives information about syntactic structure. In Vietnamese, as in most languages, this seems primarily done through phrase-final lengthening (Brunelle 2016; Brunelle 2017; Đào and Nguyễn 2018).

The third type of intonation is the expression of emotions and attitudes. Some studies showed that raised pitch and/or raised intensity and longer duration can be used to mark attitudes (Hoàng 1985; Brunelle *et al.* 2012). Figure 2 is an example of a very marked intonation in a short utterance showing that there are important modulations in terms of pitch and duration, since the topic is emotionally charged. Mac *et al.* (2012) proposed a prosodic model to encode the attitudinal function of Vietnamese prosody claiming that each attitude has a f_0 melody that can be divided into three parts: initial, middle and final, and that the differences between attitudinal f_0 contours are mainly represented in the initial and final parts while the middle one remains stable.

Figure 2: Pitch track of the emotional intonation on the word *chuột* ‘mouse’, in the short utterance *Ăn chuột* ‘(They) eat mice’ as produced by a Southern Vietnamese female speaker in her fifties. The tone of *chuột* would normally only have a weak final rise in Southern Vietnamese.



The fourth type of intonation is the grammatical intonation used in marking sentence types (declarative, interrogative, imperative, etc.) In this current paper, we focus on this kind of intonation in Vietnamese. Previous literature shows that: In terms of superposition, there is a globally higher f_0 and intensity in interrogatives and imperatives. This has been found in lots of studies on both Northern Vietnamese (Hoàng 1985; Đô *et al.* 1998) and Southern Vietnamese (Nguyễn and Boulakia 1999; Đào and Nguyễn 2018). There is also evidence that interpolation is used in both varieties of Vietnamese. There is typically a rising pitch in final syllables of interrogative sentences (Nguyễn and Boulakia 1999; Vũ *et al.* 2006; Ha and Grice 2010). Another type of phonetic marking of grammatical intonation comes from duration. Interrogatives have been reported to be shorter than declaratives (Nguyễn and Boulakia 1999; Đào and Nguyễn 2018) whereas imperatives are even shorter (Nguyễn and Boulakia 1999).

Generally speaking, it seems that both superposition (e.g., overall f_0 , intensity and duration) and interpolation (e.g., f_0 rises at the end of interrogatives) take part in distinguishing sentence types. Some studies find consistent strategies, but in recent studies in which there is a breakdown by speakers, it is found that this is not necessarily systematic. Most speakers use some of these intonational cues, but they do not necessarily use them all and to the same extent, especially in more natural speech (Brunelle *et al.* 2012; Đào and Nguyễn 2018; Phạm and Brunelle 2019).

Besides individual variation, there is evidence that speech style and recording setting affects intonational realization. Overall, in the read speech studied in most previous work, there is a pool of possible strategies for marking intonation. If intonation is marked, speakers choose from these strategies, but whether they decide to mark intonation or not and what specific strategies they use seems speaker-specific (Brunelle *et al.* 2012). In the few studies of Vietnamese intonation in natural speech, on the other hand, there does not seem to be much intonation marking and individual variation seems more limited, with the notable exceptions of Ha and Grice (2010), Ha (2012), Ha and Grice (2017)'s research on discourse particles and short utterances (from spontaneous telephone conversations in Northern Vietnamese). These studies revealed that in very short (monosyllabic) utterances in which speakers use acknowledgement particles such as *đạ*, *vâng*, *ừ* and *ờ* as repair strategies and backchannels, intonation tends to override lexical tones in faster speech rates while it may be sequenced with lexical tones in slow or careful speech. Brunelle (2016) suggested that these patterns are also found in Southern Vietnamese.

In short, Vietnamese, has intonation as any language, but it is highly variable and does not seem to be as categorical as in Western European languages, possibly because its final particles and syntactic devices do most of the work that grammatical intonation does in other languages (Brunelle *et al.* 2012; Phạm *et al.* 2020). In Vietnamese, final particles are normally used to indicate sentence types, like *không* for yes-no question; *đi/cho/nghe/nhé* for imperatives, and so forth. Interestingly, some of these particles have homonymous lexical counterparts, such as *không* 'empty, plain', *đi* 'go', *cho* 'give', *nghe* 'listen', a homophony that can be used to create minimal pairs of sentences differing only by their intonation.

1.3 Research questions

Given the variable conclusions reached by previous studies and the fact that these differences could reflect differences in types of corpora and methodology, we will be asking two questions:

- Are there differences in the realization of grammatical intonation across speech styles? Practically, is grammatical intonation realized differently in different experimental tasks?
- How much individual variation is there in the realization of grammatical intonation in different speech styles? Do all participants show the same amount of variation and do they vary the same way across experimental tasks?

In order to answer these questions, we undertook a production study gathering data from thirty-nine Southern Vietnamese speakers producing speech in six different speech styles. We will report data on three acoustic properties known to matter for intonation: f_0 , intensity and duration. In the next two sections, we will present our methodology and results. The significance of our results will be discussed in the last section.

2 Methods

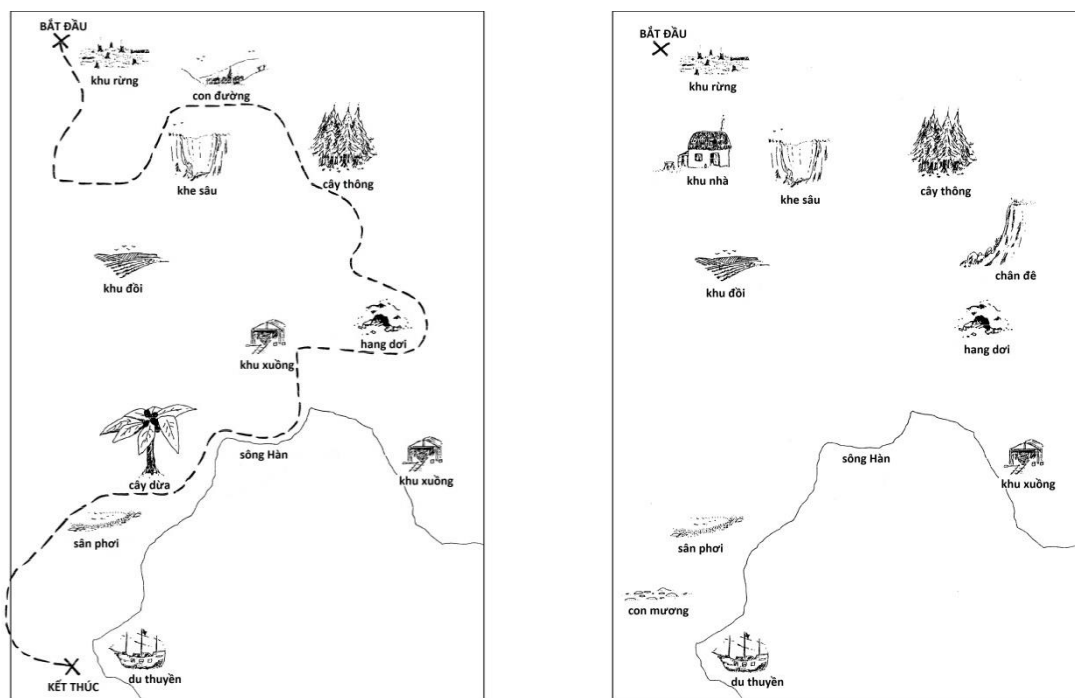
2.1 Data collection

The acoustic results reported in this study were extracted from two corpora of Southern Vietnamese speech collected in Hồ Chí Minh City with speakers originally from Hồ Chí Minh City and/or the Mekong Delta: a corpus of non-read speech collected in 2013-2014, and a corpus of controlled experimental speech collected in 2020.

The first corpus is a collection of eight hours of relatively spontaneous speech produced by nineteen speakers in which each speaker only takes part in one speech task. This corpus is made up of three major parts: The first part comprises four natural conversations between pairs of speakers who were of the same age, same sex and knew each other well (two men in their sixties, two women in their fifties, two men and two women in their twenties). The second part consists of two interviews between a TV show host and two singers (two women and one man, all in their twenties). These recordings sound normal but formal. The third part includes two comedy skits broadcasted on TV in which the intonation is expected to be exaggerated (eight speakers, four men and four women, ranging from their twenties to their fifties).

The second corpus is a collection of twelve hours of speech produced by twenty speakers who completed three different tasks in tightly controlled experimental settings. The first task is a map task in which participants were asked to work in pairs to complete a pre-defined map drawing task. This is a way of obtaining spontaneous speech while orienting the speech act towards certain types of intonation and topics of conversation. The participants were given pairs of maps which were adapted from the HCRC Map Task Corpus (Anderson *et al.* 1991). A participant had a route marked on his or her map and had to describe this route to the other participant; the latter had no route on his or her map and had to trace the route on it with a pencil. To make the task more difficult, the participants did not have identical maps and could not see each other's map. Figure 3 contains an example of one pair of maps used in our experiment. The left panel is the instruction giver's map and the right one is the instruction follower's map. Each map contains twelve landmarks which are marked by two-syllable words that carry either level tone *ngang* (A1) or falling tone *huyền* (A2). Word list of these landmarks is given in Appendix 1.

Figure 3: One of the four pairs of maps used in the map task experiment.



The second task is a guided reading task. This experiment was conducted with each of the participants separately. Participants were asked to read short contextual dialogues that included target sentences presented in random order. Each of these sentences has five syllables that all bore level tone (A1) except the penultimate one which could either bear a level tone (A1) or a falling tone (A2). Tones were controlled in order to keep tonally conditioned f_0 variation simple and relatively constant within the whole sentence. Our target sentences were composed of root clauses (Subject-Verb-Object), with either a final particle or a homonymous lexical word, yielding pairs of sentences with identical words but

different modalities. This type of semi-spontaneous data was used in Brunelle *et al.* (2012). Below are two examples (target sentences are bold):

- (1) A: *Nam hay ăn xôi với gì?*
 Nam often eat sticky rice with Q
 ‘Nam, what do you usually eat with sticky rice?’
- B: ***Nam hay ăn xôi không.*** *Nam ít ăn xôi chả lắm.*
 Nam often eat sticky rice plain Nam rare eat sticky rice sausage very
 ‘I (Nam) usually eat plain sticky rice. I rarely eat sticky rice with sausage.’
- (2) A: *Nam hay ăn phở không?*
 Nam often eat phở Q
 ‘Nam, do you usually eat phở?’
- B: *Có, gần như sáng nào Nam cũng ăn.*
 yes almost morning every Nam also eat
 ‘Yes, I (Nam) eat phở almost every morning.’
- A: ***Nam hay ăn xôi không?***
 Nam often eat sticky rice Q
 ‘Nam, do you usually eat sticky rice?’
- B: *Không, Nam ghét xôi lắm.*
 no Nam hate sticky rice very
 ‘No, I (Nam) hate sticky rice.’

The last task is the unguided reading task in which participants were simply asked to read pairs of sentences that differed only by punctuation (i.e., “.” indicates declaratives, “?” indicates interrogatives, and “!” indicates imperatives). For example:

- (1a) *Nam hay ăn xôi không.*
 Nam often eat sticky rice plain
 ‘I (Nam) usually eat plain sticky rice.’
- (1b) *Nam hay ăn xôi không?*
 Nam often eat sticky rice Q
 ‘Nam, do you usually eat sticky rice?’

These sentences were identical to those used in the previous guided reading task (see Appendix 2 for full sixteen sentence pairs). This task was carried out after the map task and the guided reading task. The output is fairly artificial and the intonation is very contrastive because participants were quickly aware of the goal of the task. Note that previous studies of Vietnamese intonation have predominantly used this style of artificial speech.

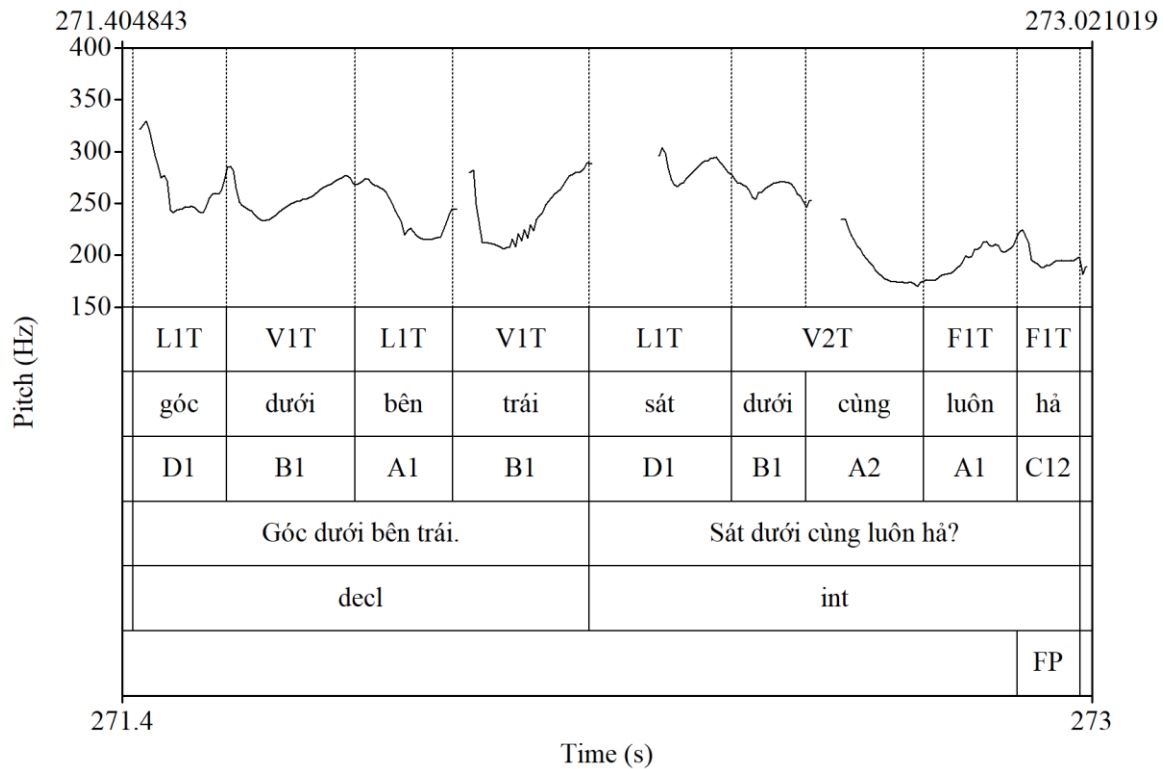
2.2 Acoustic and statistical analysis

2.2.1 Annotation

The entire corpora, making up a total of twenty hours of speech, were transcribed and annotated manually in Praat (Boersma and Weenink 2010). Five types of information were marked in Praat Textgrids as illustrated in figure 4:

- The word type (lexical, functional or positional) and number of syllables in each word (first tier).
- The Vietnamese transcriptions of each syllable (second tier) and each sentence (fourth tier).
- The lexical tone of each syllable (third tier).
- The position of intonational phrase boundaries and their type (fifth tier). More details in this tier are given below.
- The presence of a final particle at the end of an intonational phrase (sixth tier).

Figure 4: Annotation of two example intonational phrases produced by a young woman in her twenties.



Intonational phrases (henceforth IP) were parsed following Brunelle (2016). Basically, these IPs match the syntactic clauses, following mainstream models of the prosodic hierarchy (Nespor and Vogel 1986; Selkirk 2011). However, they can be affected by rhythmic restructuring: several syntactic clauses can be merged into a single IP at fast speech rates, no pause, final lengthening or other intonational event marking the presence of a boundary between them. By contrast, syntactic clauses can also be split into different IPs if they are too long or are interrupted by hesitations. Each IP was categorized according to its grammatical function: continuative, declarative, imperative, interrogative, and so forth. Interrogatives were categorized into various sub-types based on their semantics or pragmatics (alternative, yes-no, open questions, etc.), but these sub-types do not seem to differ phonologically (Phạm and Brunelle 2019) and are therefore lumped together in the results.

2.2.2 Data selection and acoustic analysis

Since this paper is primarily meant as a state-of-the-art, we will report aggregated data without inferential statistics (such statistics will be reported in further publications). However, to avoid gross biases in our results, we had to make certain decisions about the data to be included in our investigation. First of all, we have decided to focus on the intonation categories for which we have sufficient data and have therefore limited our investigation to the four most common types of IPs: continuatives (14,675 tokens), declaratives (10,536 tokens), interrogatives (3,787 tokens), and imperatives (2,600 tokens).

Since this study deals only with grammatical intonation, phrases that contains words under prosodically marked focus were also excluded.

We then decided to focus exclusively on last five syllables of each IP, because there were too few IPs with more than five syllables, especially in interrogatives and imperatives (our thirty-nine speakers produced a total of 2,070 continuatives, 2,233 declaratives, 788 interrogatives, and 481 imperatives). This focus on the last five syllables rests on the assumption, confirmed by a visual inspection of the pooled results, that the last five syllables of a long IP are intonationally comparable to those of an IP with fewer than five syllables. The only obvious exception to this generalization is monosyllabic utterances, that have been shown to be more affected by intonation than other sentences (Ha and Grice 2010; Ha 2012; Brunelle 2016; Ha and Grice 2017) and were for this reason not included in this current paper. Finally, if a speaker had fewer than twenty tokens for a certain IP type, this combination of speaker and IP was excluded to avoid attributing too much weight to eventual outliers.

A Praat script was used to automatically extract three phonetic properties: f0 (in Hertz), intensity (in decibels) and duration (in seconds). F0 was measured over five equidistant sampling points in the voiced portion of each syllable. Mean intensity was obtained for each syllable by average the intensity of five equidistant sampling points. We also measured duration of each syllable.

In order to maximize the comparability among speakers with different phonetic ranges, actual acoustic values (f0, intensity and duration as described above) were normalized per speaker using the formula:

- $z = (x - \mu_s) / \sigma_s$
where x is the actual value, μ_s is the speaker mean, and σ_s is the speaker's standard deviation.

However, as z-scales make interpretation of the results difficult, z-scores were then converted back to familiar scales, called r-scales, using the formula:

- $r = \mu + z\sigma$
where z is the z-score, μ is mean of all speakers, and σ is standard deviation for all speakers.

R-scales will be used for data display.

3 Results

3.1 Research question 1: Speech style variation

3.1.1 F0 patterns

Figure 5a reports f0 movements in the last five syllables regardless of their lexical tones, in the four most common IP types in six different speech conditions. It can be seen quite clearly that the different IP types overlap considerably in all unread speech conditions (i.e., free conversation, map task, interview and comedy). However, in unguided reading condition, there is an obvious distinction between a globally higher f0 (mean over all syllables) in interrogatives (226.7 Hz) and imperatives (227 Hz) as opposed to a globally lower f0 in declaratives (182.8 Hz). Moreover, the bottom two panels show a local f0 effect in read speech: a noticeable final rise in the last syllable of interrogatives (red lines, f0 slope = 51.2 Hz in guided reading and 43.7 Hz in unguided reading) and a final rising or rising-falling pattern in the final syllable of imperatives (purple lines).

In figure 5b, we filter out the variation caused by lexical tone by looking exclusively at syllable with the level tone (A1), the most common tone in our dataset (34.6 percent of all syllables). All panels corresponding to unread speech conditions have saw-tooth f0 patterns because all other types of lexical tones have been dropped out. Figure 5b basically confirms the patterns presented in figure 5a. Aside from the patterns already found in figure 5a, it can be noted that in the interview data in figure 5b, the global f0 of interrogatives is higher than that of declaratives (f0 gap = 10.7 Hz). This is largely due to the fact that interrogative sentences in this category come exclusively from a single speaker, the interviewer (83 interrogative IPs).

Figure 5a: F0 movements in the last five syllables of each IP for all tones. There are 5 sampling points per syllable and monosyllables are excluded. The panels are ranked by naturalness from upper-left to lower-right panel. Thin color lines indicate individual tokens, bold color lines indicate IP group means.

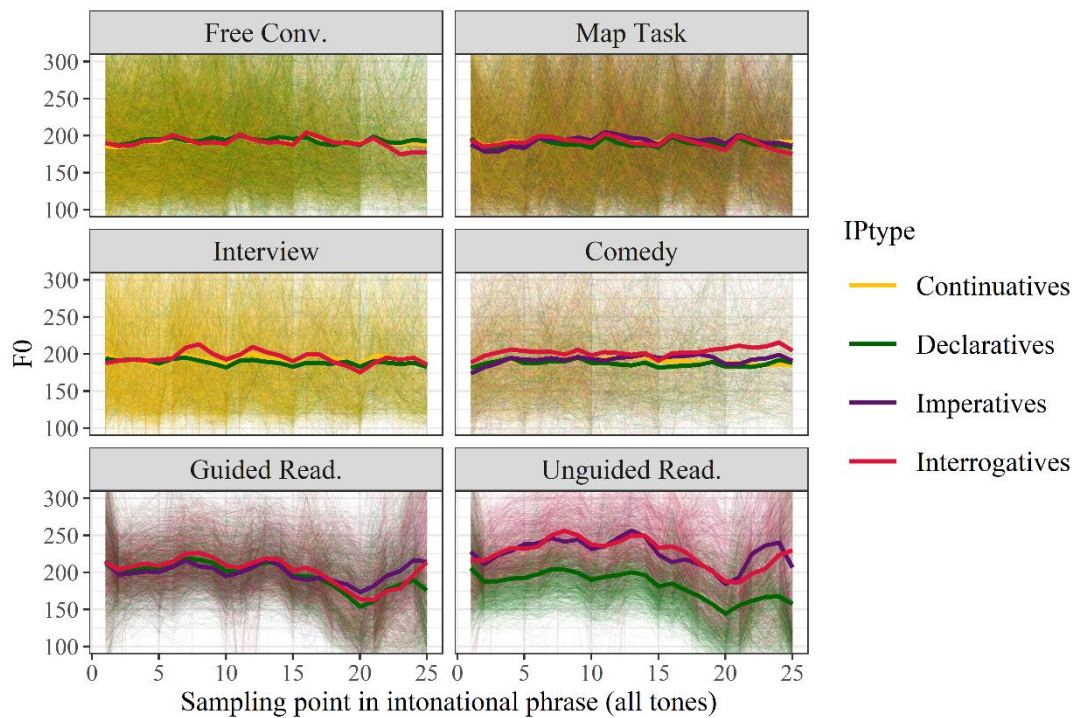
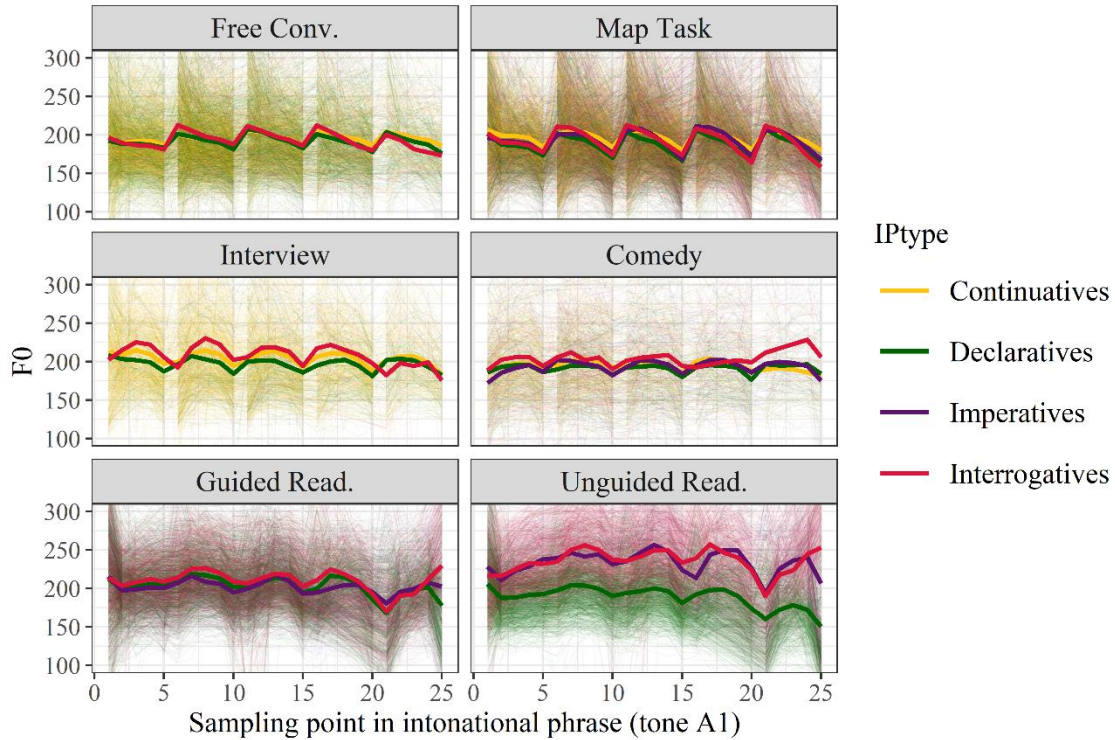


Figure 5b: *F0* movements in the last five syllables of each IP, after excluding all syllables that do not bear tone A1. There are 5 sampling points per syllable and monosyllables are excluded. The panels are ranked by naturalness from upper-left to lower-right panel. Thin color lines indicate individual tokens, bold color lines indicate IP group means.



3.1.2 Mean intensity

Figures 6a and 6b demonstrate mean intensity in the last five syllables of IPs, irrespective of lexical tone (6a) and in syllables with lexical tone A1 only (6b). They generally show a situation similar to what was found for *f0*: there is an obvious overlap in global intensity between IPs in spontaneous speech styles. In unguided reading, on the other hand, intensity is globally higher in interrogatives (71.5 dB) and imperatives (72.1 dB) than in declaratives (67.7 dB), and this ± 4 dB difference between these sentence types should be salient. We can also see a tendency towards a slightly higher intensity in continuatives than in other types of IPs in the interview condition (intensity gap = 1.3 dB), although a full statistical model would be needed to determine if it is significant.

Figure 6a: Mean intensity of IP’s last five syllables for all tones (monosyllables are excluded). The panels are ranked by naturalness from left to right panel. Thin color lines indicate individual IPs, bold color lines indicate IP group means.

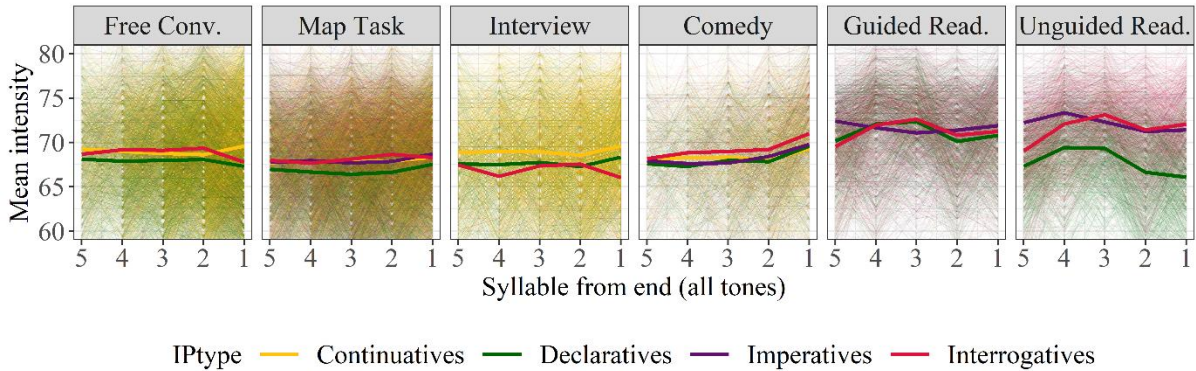
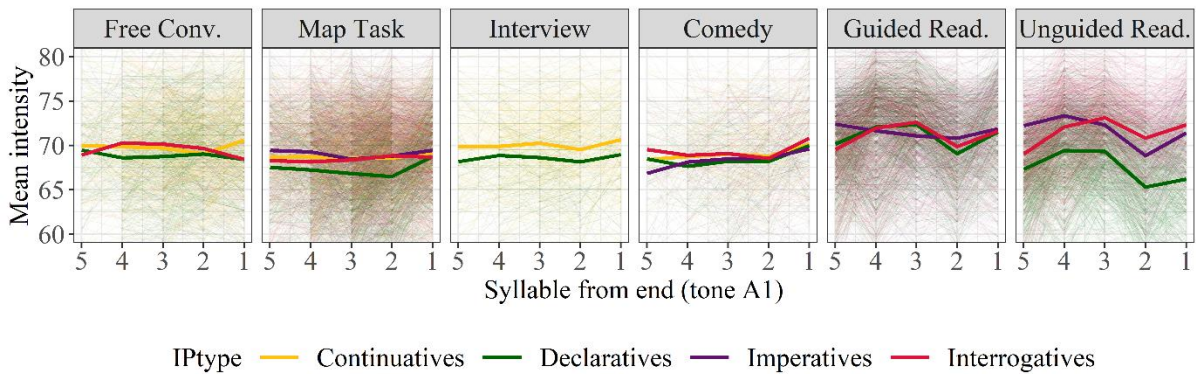


Figure 6b: Mean intensity of IP’s last five syllables after excluding all syllables that do not bear tone A1 (monosyllables are also excluded). The panels are ranked by naturalness from left to right panel. Thin color lines indicate individual IPs, bold color lines indicate IP group means.



3.1.3 Duration

Figures 7a and 7b confirm the presence of phrase-final lengthening, which may be a language-universal phenomenon, across IP types and speech conditions. Syllables in final position are longer than those in internal positions (1.45 times). In read speech, and more especially in guided reading, the second syllable of imperatives (purple lines) is significantly longer than its counterparts in other speech conditions (duration gap = 29.4 milliseconds). This is because a majority of speakers produced prosodic focus on the verb in the reading conditions, especially in the guided reading context in which the pragmatics of imperative sentences were clearest.

Figure 7a: Duration of IP’s last five syllables for all tones (monosyllables are excluded). The panels are ranked by naturalness from left to right panel. Thin color lines indicate individual IPs, bold color lines indicate IP group means.

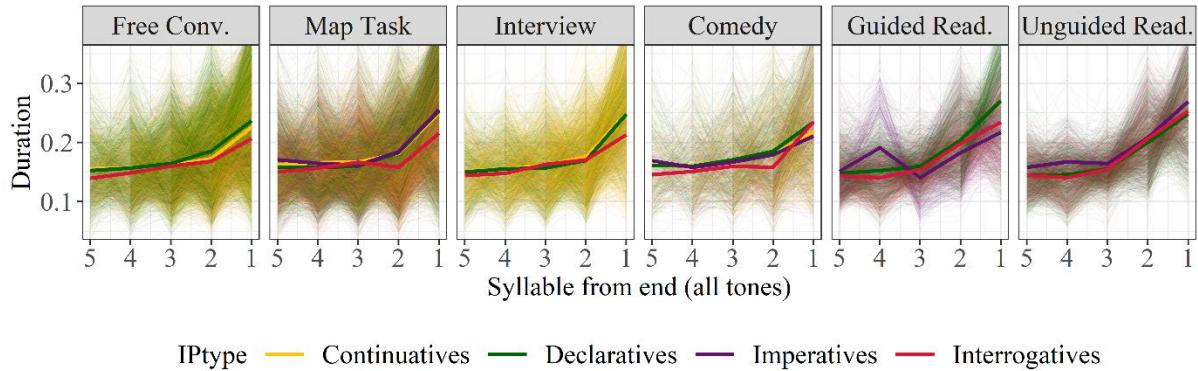
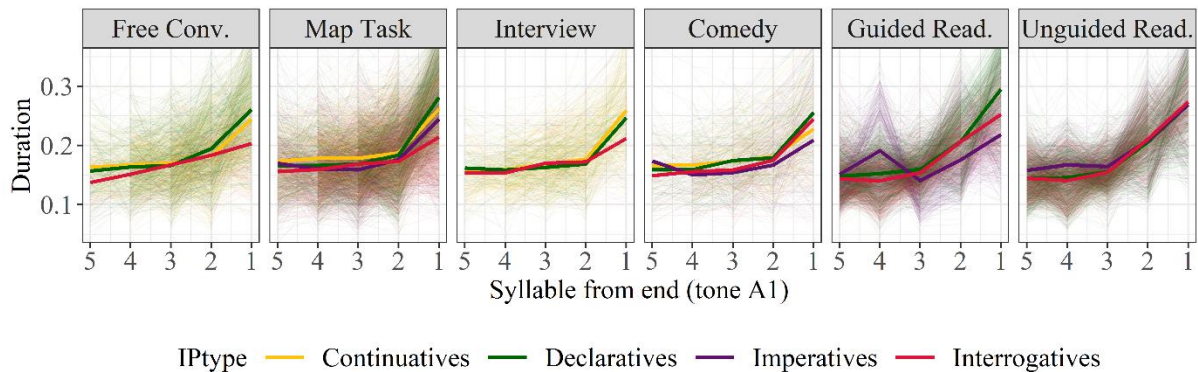


Figure 7b: Duration of IP’s last five syllables after excluding all syllables that do not bear tone A1 (monosyllables are also excluded). The panels are ranked by naturalness from left to right panel. Thin color lines indicate individual IPs, bold color lines indicate IP group means.



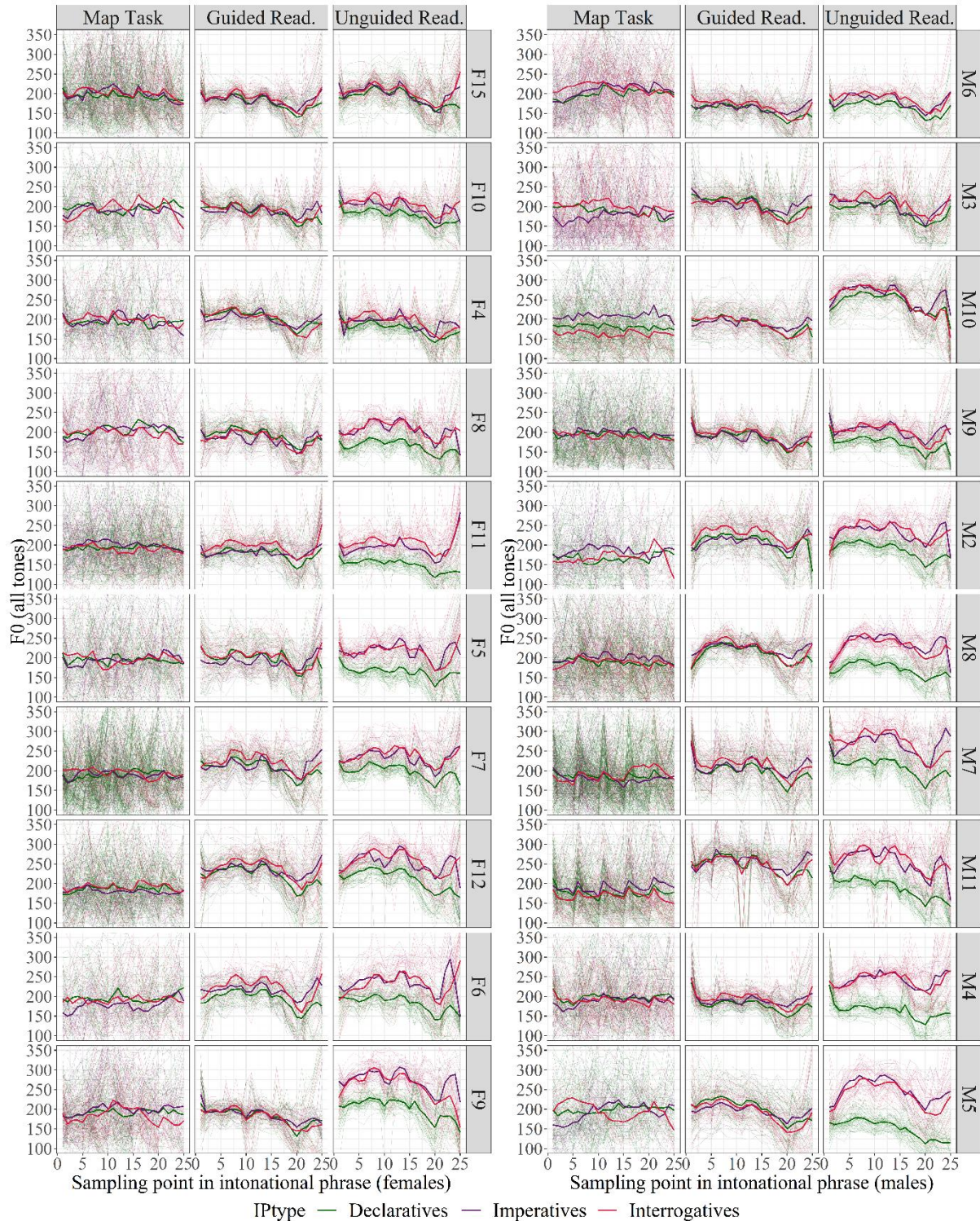
3.2 Research question 2: Individual variation

In this section, we only use data from experimental corpus of twenty speakers recorded in the three tightly controlled conditions: map task, guided reading, and unguided reading.

3.2.1 F0 patterns

Speaker-specific f0 patterns are given in detail in figure 8. Generally, in the more spontaneous map task and contextual guided reading conditions, speakers tend to produce similar global f0 patterns across IP types. In contrast, in unguided reading condition, global f0 realization varies over a broad continuum from no difference (F15, F10, F4, M6, M3 and M10) to a large amount of contrast between higher f0 in interrogatives and imperatives versus lower f0 in declaratives (F6, F9, M4, and M5).

Figure 8: F0 contours within last five syllables in IPs, per speaker and speech task (left panels for females, right panels for males). There are 5 sampling points per syllable and monosyllables are excluded. The panels are ranked by magnitude of task’s effect from top to bottom panel.



As for local f0 effects, it seems limited to phrase-final syllables (sampling points 21 to 25). We see that: In map task, nine out of twenty speakers (i.e., F15, F8, F11, F7, F12, M6, M9, M8, and M4) show similar final f0 patterns in all three IP types while other speakers have their own idiosyncratic realizations. Contrastingly, this kind of diversity is significantly reduced in the two reading tasks: almost all speakers (except F10 and M5) have f0 final rise tendency in all three sentence types in guided reading

task; almost all speakers (except F9 and M10 in unguided reading condition) raise the f_0 at the end of interrogatives; and interestingly, in unguided reading task, imperatives have either a final rise or a final rising-falling f_0 pattern across all speakers.

3.2.2 Mean intensity

Figure 9 (see the next page) demonstrates a typical trend with respect to global intensity: in unguided reading condition, speakers tend to expand the intensity gap between interrogative and imperative sentences on the one hand, and declaratives on the other especially towards the end of IPs. Most of the times, they choose to lower their voice while reading a declarative. Whereas, in more spontaneous map task condition, although some speakers raise their voice whenever they produce interrogatives (F7, M3, M6, and M9) or imperatives (F10, M2, M7, M4, and M5), many speakers do not have such a tendency. Especially, in guided reading task, almost all participants (except M4 and M5) show no intensity difference in all three sentence types. Therefore, it can be said that only result found in context-free reading style can confirm the findings presented in previous literature.

3.2.3 Duration

Generally, figure 10 (see the next page) shows that in reading style, there is a relatively consistent pattern of duration in all three types of IPs across speakers. This, by some means, goes in the opposite direction of what was found in Nguyễn and Boulakia (1999) claiming that questions are significant shorter than statements and that imperatives are even shorter. However, in map task, many speakers (except F7, F15, M6, M8, M3, M7, and M4) tend to have clearly shorter syllable duration in interrogatives. This is in line with the findings in Nguyễn and Boulakia (1999), Đào and Nguyễn (2018) but less consistent than what these studies claimed.

Particularly, similar to what was seen in figure 7a and 7b, across all speakers in guided reading, the second syllable of imperatives is significant longer than its counterparts in other speech conditions. This, again, can be explained by the fact that speakers tend to produce verbal focus when they read imperative sentences given in pragmatic context.

3.3 Summary of acoustic results

With respect to the first research question about variation conditioned by speech styles, our results reveal that in most speech conditions, the different IP types seem to overlap considerably (and have undistinguishable means). It is only in the two artificial reading tasks that intonational contrasts are clear, and they are even greater in the least natural unguided reading condition. We can clearly see that in the unguided reading task, speakers use the phonetic cues previously described in the literature (e.g., globally higher f_0 and intensity in imperative and interrogative sentences, f_0 final rise in interrogatives, final rise and/or final rising-falling f_0 in imperatives).

With respect to the second research question, inter-speaker variation, our study shows that f_0 is globally higher in imperatives and interrogatives than in declaratives. This effect is large in unguided reading, moderate in guided reading, but not clear in the map task. Secondly, in terms of local f_0 (or f_0 on phrase-final syllables), we find that: (a) interrogatives fall in the map task but rise in reading conditions; (b) imperatives fall moderately in the map task, but have a rising and/or a rising-falling pattern in reading tasks; and (c) the intonation-conditioned f_0 effects are greater in unguided than in guided reading. Thirdly, intensity is globally higher in imperatives and interrogatives than in declaratives in the unguided reading task, but no such effect is visible in the guided reading task or the map task. Finally, durational effects are expected: there is phrase-final lengthening across sentence types, tasks and speakers (with a possibly stronger effect in declaratives). This seems to correspond to a universal linguistic property.

Figure 9: Mean intensity of last five syllables in IPs, per speaker and speech task (left panels for females, right panels for males). Monosyllables are excluded. The panels are ranked by magnitude of task's effect from top to bottom panel.

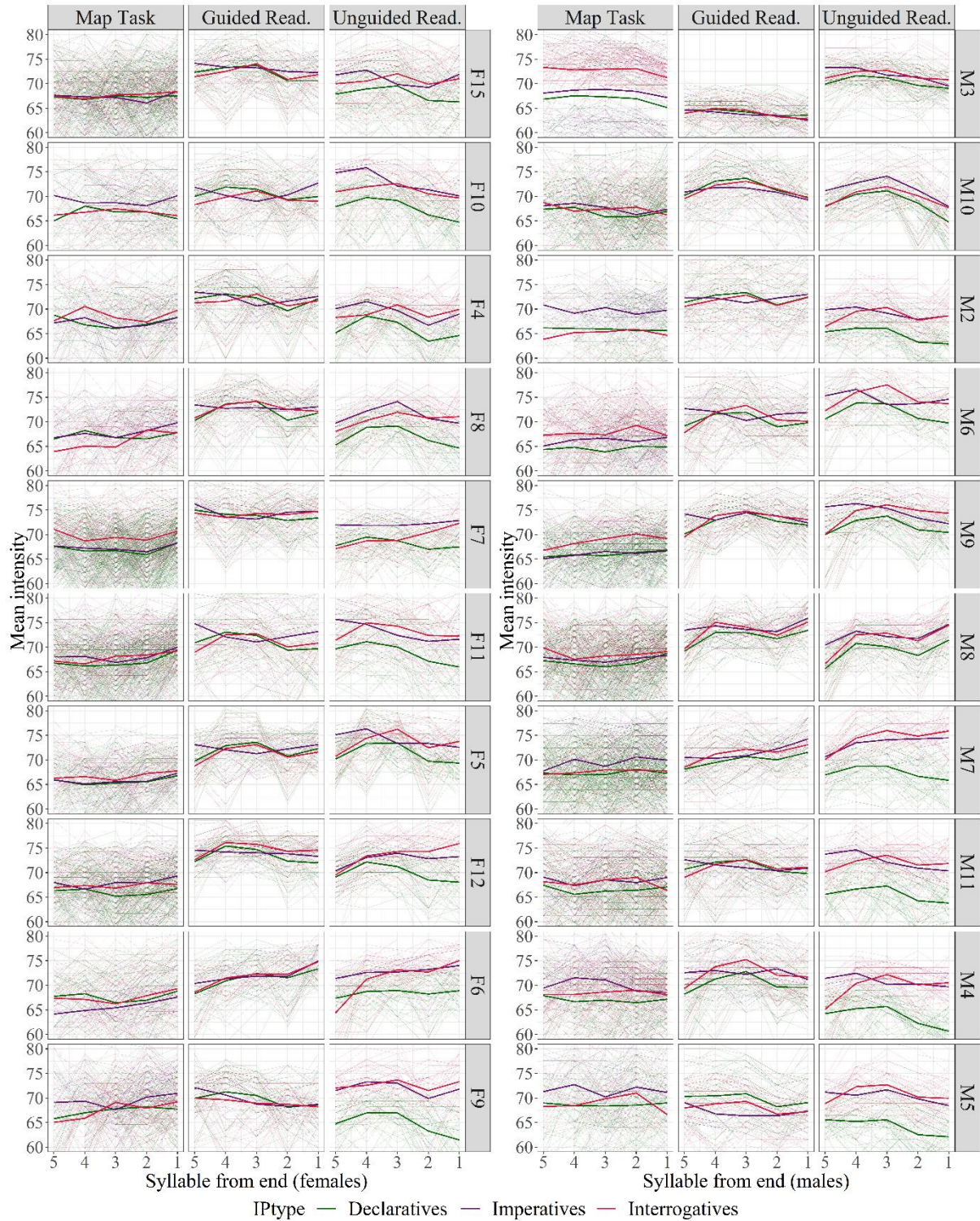
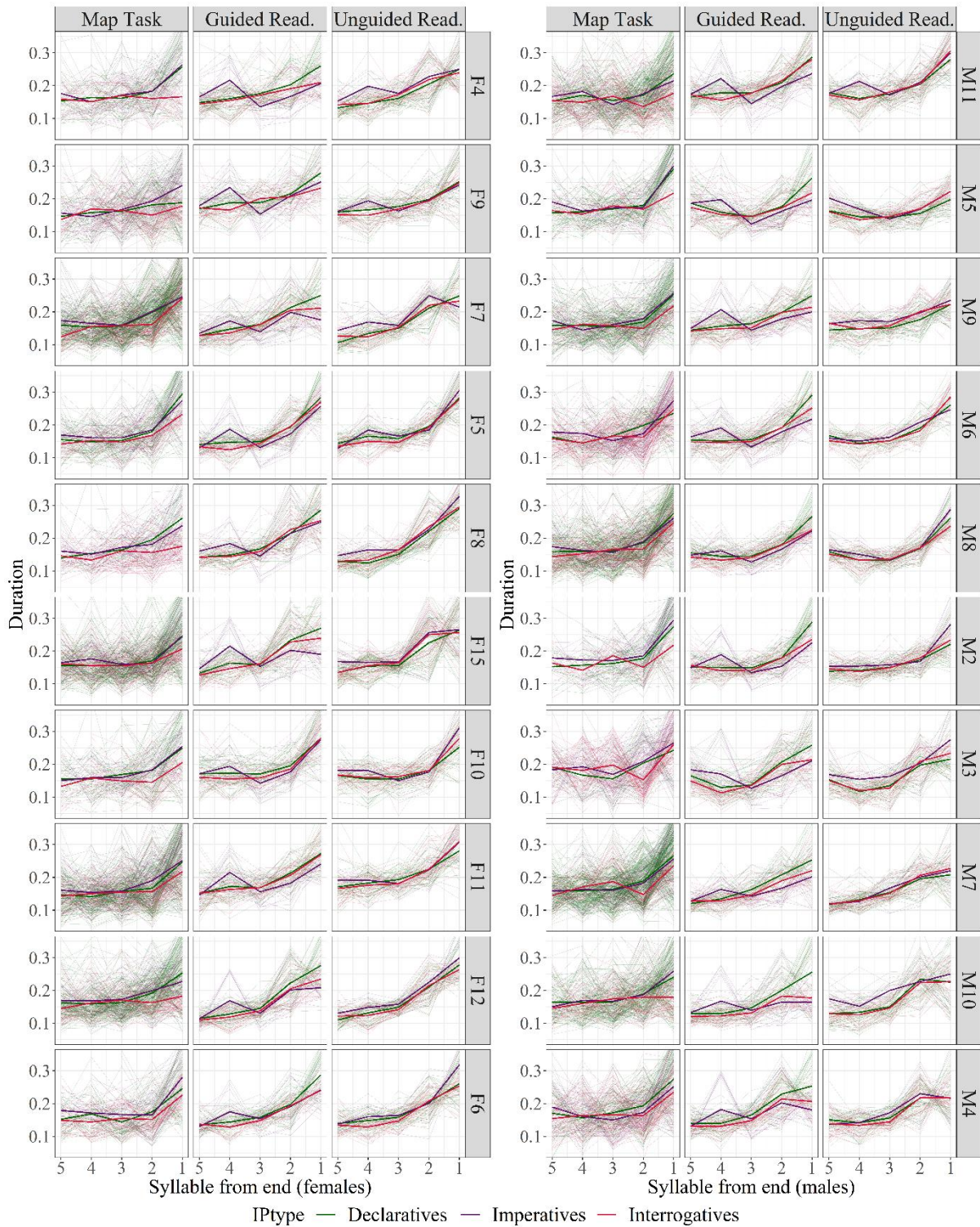


Figure 10: Duration of last five syllables in IPs, per speaker and speech task (left panels for females, right panels for males). Monosyllables are excluded.



4 Discussion and conclusion

Our results suggest that task and speaking style do affect the realization of intonation (research question 1): there is a much more distinct intonation in more artificial reading tasks, especially in unguided reading. The likeliest explanation is that speakers are aware of the nature of these tasks and try to contrast IP types as clearly as possible. The contrastive nature of the task is probably even more obvious

in unguided reading, where sentences only differ by their punctuation signs and are produced without any pragmatic context.

The existence of such a strong reading effect is a major problem since the large majority of studies of Vietnamese intonation are based on this style of speech. Consequently, what we think we know about Vietnamese intonation might be not very representative of real spontaneous speech. In fact, we find very little conventionalized grammatical intonation in more spontaneous and connected speech styles. This does not mean that there is no intonation in Vietnamese, but that intonation does not seem to be grammaticalized as much as it is in other languages. To put this differently, if we look at the thin lines in the background of the charts in the results section, we can see significant pitch movement in some tokens, but little evidence for focalized strategies concentrated in a narrow phonetic range. This could be because the grammatical functions realized by intonation in Western languages are monopolized by syntactic restructuring and final particles in Vietnamese, making grammatical intonation optional or largely irrelevant. However, in more artificial speech styles, especially when reading fixed sentences in which final particles or syntactic restructuring are not available strategies to distinguish sentence types, speakers have no choice but to resort to intonational strategies that are present in their repertoires, even if marginally. Interestingly, the intonational patterns we found in such contexts do tend to match those uncovered in previous studies.

This raises a little conundrum: how do Vietnamese speakers come to learn what intonation to use in unguided reading if it is not fully conventionalized in connected speech in real life? There are several possibilities. First, they could learn these strategies in read speech in school, in news broadcasting and in formal speeches. A second possibility would be that they overextend the strategies they use in the marginal context like the monosyllabic utterances (e.g., *đạ, vâng, ừ*) to other sentences intonation is the only way to distinguish sentence types. A third possibility would be that there are soft intonational universals that are not usually important in Vietnamese, but surface when speakers need to mark intonation. Ohala (1983) and Gussenhoven (2004) proposed three biological codes for intonation. Ohala (1983) first proposed the **frequency code**. He argued that unassertiveness or uncertainty are naturally associated with a high f_0 because in the natural world, small, and therefore unassertive, creatures tend to have small body sizes and thus smaller vocal tract and vocal folds resulting in a generally higher f_0 . As interrogatives are inherently unassertive, they would tend to be realized with a high f_0 . The second universal intonation code, the **effort code** proposed by Gussenhoven (2004), is the greater vocal effort naturally used to realize emphasis or focus that tenses the laryngeal musculature and results in a higher f_0 , a higher intensity and a longer duration. The third biological code is the **production code** (Gussenhoven 2004), that explains why we tend to have a f_0 declination in declaratives. Its basic rationale is that as one produces an utterance, the amount of air pressure in the lungs gradually drops, which favors a drop in the rate of vibration of the vocal folds and thus a lower f_0 . As declaratives are the most common and the least marked type of IP, they would be associated with this f_0 declination by default.

These hypotheses obviously open up a number of new questions and hypotheses that would have to be tested experimentally, but we would like to emphasize our lack of collective understanding of the perception of intonation in Vietnamese. As far as we know, the only perception study of Vietnamese grammatical intonation so far is a forced choice perception experiment conducted by Nguyễn and Boulakia (1999) in which twenty-two (Northern and Southern Vietnamese) listeners had to identify four sentence pairs (produced by a male Southern speaker) as questions, statements or imperatives. Sentences with a shorter duration, a raised overall f_0 and a final f_0 rise tended to be identified as interrogatives, while a high intensity and a high f_0 were associated with imperatives.

To conclude on a larger picture question: would we get the task effects found in Vietnamese in a corpus collected in a non-tonal language with a well-established conventionalized intonation? There are many studies on non-tonal languages that reveal that there is a strong tendency to realize a more marked intonation in read speech than in spontaneous speech. For examples, a rising intonation in yes-no questions is more prevalent in read speech but less systematic in spontaneous speech (Grice *et al.* 1997 on Bari Italian; Hirschberg 2000 on American English). Similarly, a declarative final fall (or final lowering) is claimed to be more common in read speech than in spontaneous speech (Swerts *et al.* 1996 on Swedish; Hirschberg 2000 on American English; Face 2003 on Spanish) while more final rises are

found in spontaneous speech (Mixdorff and Pfitzinger 2005 on German; Sadat-Tehrani 2017 on Persian). It thus appears that in most languages, there are distinct intonational patterns in read speech, but that these intonations are less marked and have a lesser magnitude in spontaneous speech. Although this could partly be due to methodological differences, Vietnamese seems more categorical in that there appears to be discernible intonation patterns in read speech, but very little conventionalized intonation in spontaneous speech.

Appendix 1: List of landmarks used in figure 3

1. *cây dừa* ‘coconut tree’
2. *cây thông* ‘pine’
3. *con đường* ‘road’
4. *con mương* ‘ditch’
5. *chân đê* ‘dike foot’
6. *du thuyền* ‘yacht’
7. *hang dơi* ‘bat cave’
8. *khe sâu* ‘chasm’
9. *khu đồi* ‘hill area’
10. *khu nhà* ‘housing area’
11. *khu xuồng* ‘canoe area’
12. *sân phơi* ‘drying yard’
13. *sông Hàn* ‘Hàn river’

Appendix 2: Sentence list for guided and unguided reading tasks

	Interrogatives	Declaratives	Imperatives
1	<i>Anh đang thuê xe đâu?</i> 2SG-KIN PRS rent car Q 'Where do you rent the car?'	<i>Anh đang thuê xe đâu.</i> 1SG-KIN PRS rent car NEG 'I'm not renting the car.'	
2	<i>Anh đang thuê nhà đâu?</i> 2SG-KIN PRS rent house Q 'Where do you rent the house?'	<i>Anh đang thuê nhà đâu.</i> 1SG-KIN PRS rent house NEG 'I'm not renting the house.'	
3	<i>Anh không ăn xôi gì?</i> 2SG-KIN NEG eat sticky rice Q 'What sticky rice don't you eat?'	<i>Anh không ăn xôi gì.</i> 1SG-KIN NEG eat sticky rice NEG 'I don't eat sticky rice.'	
4	<i>Anh không ăn mì gì?</i> 2SG-KIN NEG eat noodle Q 'What noodle don't you eat?'	<i>Anh không ăn mì gì.</i> 1SG-KIN NEG eat noodle NEG 'I don't eat noodle.'	
5	<i>Anh mua bia lon chớ?</i> 2SG-KIN buy beer can Q 'You bought beer in can, didn't you?'	<i>Anh mua bia lon chớ.</i> 1SG-KIN buy beer can NEG 'No, I bought beer in can.'	
6	<i>Anh mua bia thùng chớ?</i> 2SG-KIN buy beer barrel Q 'You bought beer in barrel, didn't you?'	<i>Anh mua bia thùng chớ.</i> 1SG-KIN buy beer barrel NEG 'No, I bought beer in barrel.'	
7	<i>Ba không ăn xôi ạ?</i> 2SG-KIN NEG eat sticky rice POL 'You don't eat sticky rice, do you?'	<i>Ba không ăn xôi ạ.</i> 3SG-KIN NEG eat sticky rice POL 'Dad doesn't eat sticky rice.'	
8	<i>Ba không ăn mì ạ?</i> 2SG-KIN NEG eat noodle POL 'You don't eat noodle, do you?'	<i>Ba không ăn mì ạ.</i> 3SG-KIN NEG eat noodle POL 'Dad doesn't eat noodle.'	
9	<i>Nam hay ăn xôi không?</i> Nam often eat sticky rice Q 'Nam, do you usually eat sticky rice?'	<i>Nam hay ăn xôi không.</i> Nam often eat sticky rice plain 'I (Nam) usually eat plain sticky rice.'	
10	<i>Nam hay ăn mì không?</i> Nam often eat noodle Q 'Nam, do you usually eat noodle?'	<i>Nam hay ăn mì không.</i> Nam often eat noodle plain 'I (Nam) usually eat plain noodle.'	

	Interrogatives	Declaratives	Imperatives
11	<i>Anh đi mua cho ai?</i> 2SG-KIN go buy for Q 'Whom do you buy it for?'	<i>Anh đi mua cho Ai.</i> 1SG-KIN go buy for Ai 'I buy it for Ai.'	
12	<i>Anh đi mua cùng ai?</i> 2SG-KIN go buy with Q 'Whom do you go with?'	<i>Anh đi mua cùng Ai.</i> 1SG-KIN go buy with Ai 'I go with Ai.'	
13		<i>Nam mang xôi chiên đi.</i> Nam bring sticky rice fry go 'I (Nam) bring fried sticky rice.'	<i>Nam mang xôi chiên đi!</i> Nam bring sticky rice fry IMP 'Nam, you bring fried sticky rice!'
14		<i>Nam mang xôi gà đi.</i> Nam bring sticky rice chicken go 'I (Nam) bring chicken sticky rice.'	<i>Nam mang xôi gà đi!</i> Nam bring sticky rice chicken IMP 'Nam, you bring chicken sticky rice!'
15		<i>Nam mang bia đi cho.</i> Nam bring beer go give 'I (Nam) bring beer to give to other people.'	<i>Nam mang bia đi cho!</i> Nam bring beer go IMP 'Let's me bring beer!'
16		<i>Nam mang bia về cho.</i> Nam bring beer go home give 'I (Nam) take beer home for other people.'	<i>Nam mang bia về cho!</i> Nam bring beer go home IMP 'Let's me take beer home!'

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EXPLORING STATISTICAL REGULARITIES IN THE SYLLABLE CANON OF SINO-VIETNAMESE LOANMORPH PHONOLOGY

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Abstract

We consider the question of whether phonotactic criteria can be used to identify a Vietnamese syllable as being Sinitic in origin, focusing on the layer of Sino-Vietnamese (*từ Hán Việt*) borrowings. We first assembled a corpus of 8,148 phonologically unique Vietnamese syllables, of which 1,939 are Sino-Vietnamese (i.e., have a Chinese character reading stemming to Late Middle Chinese). We then applied statistical and computational methods to identify phonotactic patterns of both native and Sino-Vietnamese syllables and considered them in their historical phonological context. We find that while there are features that are reliable indicators of native forms, the Sino-Vietnamese stratum has been largely nativized, with little to distinguish it phonotactically from native syllables. Our findings reflect the tight integration of Sino-Vietnamese borrowings into the modern Vietnamese lexicon and phonological system over many centuries.

Keywords: historical linguistics, loanword phonology, phonotactics, Sino-Vietnamese
ISO 639-3 codes: vie, zho

1 Introduction

1.1 Chinese loanwords and defining ‘Sino-Vietnamese’

While the core of the Vietnamese lexicon is Austroasiatic in origin (cf. Alves 2006, 2009), it contains multiple layers of Chinese loanwords (Wang Li 1948; Haudricourt 1954; Phan 2013; Alves 2017; Nguyễn Văn Khang 2018; Phạm Hùng Việt et al. 2018). The question of what percentage of words in Vietnamese are of Chinese origin depends in part on the dataset in question. Rates of 60 percent and higher based on dictionary counts have been noted, but without focus on types of vocabulary or textual genres (e.g., newspapers, scientific texts, a spoken corpus, etc.). However, a summary of recent studies (Phạm Hùng Việt et al. 2018:348–351) show a range of percentages of Sino-Vietnamese vocabulary according to the datasets: studies of two different dictionaries (26% and 35%), a study of technical terminology (72%), and a study of vocabulary in newspapers (67%). In a study of 1,477 select word meanings of a broad range of select semantic domains, only about 28% of the corresponding Vietnamese words were identified as Chinese loanwords of different historical periods (Alves 2009). While overall percentages appear lower than previously speculated, the matter cannot be considered fully resolved.

Identification of loanwords is further complicated by Vietnamese bisyllabic compounds in which one morph is from Chinese while the other is not (e.g., *bà con* ‘relatives’¹ in which *bà* ‘grandmother/old

¹ A note on formatting: in this work, we use italics when citing Vietnamese forms in the *Quốc ngữ* orthography (e.g., *huyền*, *bà con*) and single quotes when providing glosses (e.g., ‘relatives’, ‘to understand’) or referencing *Quốc ngữ* glyphs (e.g., ‘â’, ‘ngh’). Phonological representations are enclosed in forward slashes (e.g., /a:ŋ/, /-w-/) unless contained in a table. Historical reconstructions are preceded by an asterisk (e.g., *pla:ŋ, *-p).

woman’ is from Chinese 婆 *pó*,² while *con* ‘child’ is an Austroasiatic etymon), and of the multiple layers of Chinese loanwords in Vietnamese. Indeed, what constitutes a “word” is not always easily or consistently determined, making statistical claims about the number of loanwords even less reliable. Dictionaries of Vietnamese pronunciations of Chinese characters include hundreds—if not thousands—of syllables that are bound morphemes (i.e., not stand-alone words), not free morphemes (i.e., stand-alone words). While there are indeed hundreds of monosyllabic Sino-Vietnamese free morphemes in Vietnamese (*ác* ‘cruel’ from 惡 *è*, *bệnh* ‘sick’ from 病 *bìng*, *các* ‘various’ from 各 *gè*, *hiểu* ‘to understand’ from 曉 *xiǎo*, etc.), thousands more Sino-Vietnamese words are bisyllabic-bimorphemic compounds in which one or both morphemes cannot be not used as full words in Vietnamese (e.g., *sản phẩm* ‘product’ from Chinese 產品 *chǎn pǐn*).

Yet another challenge facing the statistically minded lexicographer is that multiple periods of borrowing mean some Chinese etyma have been borrowed more than once, resulting in loanword doublets, as shown in Table 1. First, there is a layer of early Chinese loanwords, consisting of pre-Late Middle Chinese loanwords from the early 1st millennium CE (and possibly the end of the 2nd millennium BCE, though this is uncertain). Loanwords belonging to this early stratum are highly integrated in Vietnamese. They are commonly associated with Nôm characters (i.e., a Chinese-script-based orthography to represent Vietnamese vernacular, with early substantive development from the 1200s, but which was replaced by the Romanized Quốc Ngữ in the early 20th century) rather than Hán-Việt characters; they pattern phonologically with “native” vocabulary (as to be noted in subsequent sections); and they are generally perceived by native speakers as native Vietnamese words.

In addition, there is the so-called Sino-Vietnamese (*từ Hán Việt*) stratum, borrowed in the Late Middle Chinese period at the beginning of the 2nd millennium CE, after Vietnam’s administrative independence from China. The phonology of the syllables in this stratum, being more recent borrowings, differ systematically from those of the early Chinese loans. Examples of these differences can be seen in the ‘gh’ and ‘r’ onsets of Vietnamese *ghế* ‘chair’ and *rường* ‘kingpost’ of the early Chinese layer (Table 1). These are precisely the consonants lacking in Sino-Vietnamese words, but which are plentiful in the non-Sino-Vietnamese layer, whether native words or loanwords. The existence of these doublets further complicates the accurate calculation of loanword statistics, since the analyst must decide whether they should be judged as a single borrowing, or as two borrowings.

Table 1: Sino-Vietnamese and Early Chinese loanword doublets

Sino-Vietnamese	Chinese Characters	Early Chinese Loanwords	Nôm Characters
<i>giảo</i>	鉸 <i>jiǎo</i> ‘scissors’	<i>kéo</i>	鉏, 鋸
<i>tuế</i>	歲 <i>suì</i> ‘age/years old’	<i>Tuổi</i>	轆/轆
<i>hoàng</i>	黃 <i>huáng</i> ‘yellow’	<i>vàng</i>	鑽
<i>kỷ</i>	几 <i>jī</i> ‘chair/small table’	<i>ghế</i>	几, 梯, 椅, 榼, 許
<i>lương</i>	梁 <i>liáng</i> ‘kingpost’	<i>rường</i>	梁, 杖

In this paper, we focus strictly on well-studied Sino-Vietnamese (SV hereafter) borrowings stemming from the Late Middle Chinese period. While this limits the generality of our conclusions, especially with respect to more basic vocabulary, it allows us greater confidence that we are not mis-identifying native items as early loans or vice versa (but see also Section 2.1 below). Also, rather than studying loanwords, which are problematic as described above, we focus on LOANMORPHS, that is, morphs (free or bound) which are all monosyllables. Loanwords can also be identified, of course, and we will use

Chinese pinyin is provided after Chinese characters for reference (e.g., 曉 *xiǎo*). Technical terms or abbreviations of note are represented using small caps (e.g., O/E RATIO).

² The pinyin pronunciation is used only as a means of reference to check for Chinese characters. The original source of the readings of Chinese characters stems, of course, to the variety of Chinese in northern Vietnam in the period of Late Middle Chinese, about a millennium ago.

the term “loanwords” when suitable, but they are determined primarily by morphological rather than phonological features.

1.2 Motivating intuitions

Sino-Vietnamese vocabulary has a stylistic usage and flavor widely recognized as distinct from other parts of the Vietnamese lexicon:

[Sino-Vietnamese words have Vietnamese equivalents, and there is a synonymous relationship between them. The degree of synonymy may be complete but differs in nuances used. For example, Sino-Vietnamese words for *đàm thoại* “conversation”, *quốc gia* “country”, and *phụ nữ* “women” are often used in formal, serious contexts, while native Vietnamese words *nói chuyện* “talk”, *đất nước* “country”, and *đàn bà* “women” are often used in a folk-like way.] (Phạm Hùng Việt et al. 2018:297)

(Original text: Các từ Hán Việt có từ thuần Việt tương đương, giữa chúng có quan hệ đồng nghĩa. Mức độ đồng nghĩa có thể là cùng sở chỉ nhưng khác biệt về sắc thái rong sử dụng, ví dụ các từ Hán Việt *đàm thoại*, *quốc gia*, *phụ nữ* thường dùng trong ngữ cảnh chính thức, trang trọng, còn các từ thuần Việt tương ứng *nói chuyện*, *đất nước*, *đàn bà* thường dùng một cách dân dã.)

Correspondingly, there seems to be a fairly widespread intuition that SV loanwords (such discussion often does not distinguish bound morphemes, loanmorphs, and free morphemes) have identifiable characteristics that allow them to be identified even by native speakers who have not studied Sino-Vietnamese explicitly. The following quotations are representative:

Most [SV words] are recognizably “Chinese” to the average native speaker. They are generally elevated vocabulary with either literary or intellectual flavour, and may not have a “native” alternative in the language... (Phan 2010:6)

An example of this is the pair “khiếu” — “kêu,” to call, summon³. The character for khiếu is 叫. “Khiếu” is not used at all in ordinary Vietnamese speech (it may appear in a Sino-Vietnamese compound or two, but no examples come to mind). Vietnamese speakers, in general would have no difficulty in recognizing “khiếu” as a Sino-Vietnamese word. (Eric Henry, [Language Log, 13/11/2018](#))

One might dispute whether non-educated speakers would necessarily recognize these items as Chinese in origin. Knowledge of SV vocabulary is frequently associated with the amount of education of a Vietnamese speaker. However, it seems reasonable that even non-educated speakers would at least have some intuitions about SV items as being somehow distinct from the core the Vietnamese lexicon:

As to whether native speakers of Vietnamese would recognize, say, ‘khiếu’ as Sino-Vietnamese, & yet defend ‘kêu’ as truly Vietnamese, I think it would depend on the level of that person’s education. Obviously, some professor at VNU would see the distinction right away – would a young fisherman on the Mekong do likewise? I rather doubt it. Just as the Average American would say that ‘dancing’ is ‘normal talk’ but ‘terpsichore’ is snobbish ‘show off talk,’ without any idea of Greek derivation, our man-in-the-street in Qui Nhon would probably come up with something similar when confronted with such a fine distinction. (Steve O’Harrow, [Language Log, 13/11/2018](#))

These quotes highlight several features that have been noted to hold of SV vocabulary at the word level, such as frequency of usage in spoken and especially written Vietnamese, perceived formality, and semantic field (e.g., Nguyễn Tài Căn 1979; Alves 2001, 2007, etc.; Lê Đình Khấn 2002; Phạm Hùng Việt et al. 2018, inter alia). Other signals may be morphosyntactic in nature (e.g., the extremely common bisyllabic compounds with two SV morphs) or include the existence (or lack thereof) of doublets with related meanings, such as the example of *khiếu/kêu* given earlier (although this latter would be a signal presumably only to those with in-depth etymological knowledge). However, SV vocabulary has been hypothesized to have been introduced primarily via an early Middle Chinese-speaking community

³ An example of an ESV/LSV “doublet” that was actually borrowed twice, like the examples in Table 1.

(Annamese Chinese as per Phan 2013). Accompanying this was the rime dictionaries which supported consistent readings of Chinese characters among the literati.⁴

This presence of a second phonological system in a bilingual community suggests the possibility that there may be phonotactic⁵ regularities or “signatures” that give clues as to the Sinitic⁶ provenance at the syllable level, in much the same way as there are phonological differences characteristic of the Latinate stratum of English (Chomsky & Halle 1968) or the Sino-Japanese layer of Japanese (Ito & Mester 1995). This leads us to pose a narrower question: Are there specifically phonotactic criteria that are indicative of a syllable’s Sinitic origin?

While it is conceivable that SV items are simply too well-integrated phonologically to be reliably distinguished from “native” forms on the basis of phonotactics, we think this question is worth pursuing for at least four reasons. First, it is of interest to anyone interested in the principles underlying loanword phonology awareness (Kang 2011; de Jong & Cho 2012; Kang, Phạm & Storme 2015). Second, if we were to find phonotactic regularities that reliably signaled whether a syllable was from the SV layer, it would be of considerable value to language educators (Storkel 2001; Ellis 2002). Such regularities would also be of interest to historical linguists who seek ways to distinguish native and non-native vocabulary. Finally, this topic is related to a more general theoretical question within phonology of the extent to which speakers of a language are sensitive to phonotactic regularities, as evidenced by the large body of work on “wordlikeness” going back to the *Sound Pattern of English* (Chomsky & Halle 1968; Bailey & Hahn 2001; Myers & Tsay 2005; Kirby & Yu 2007; Albright 2009).

To foreshadow our findings, however, rather than finding any reliably phonotactic indicators that a syllable belongs to the SV layer, we find that there are instead many more phonotactic constraints on the SV layer of the Vietnamese lexicon. Thus, there is little evidence suggesting that SV phonology is identifiable largely due to the degree of incorporation into a typologically restructured Vietnamese syllable template.

2 Data and methods

2.1 Materials

Our study is based on two primary data sources. The first is a list of 8,090 syllables (7,588 unique characters) assembled by Chiang (2011), which he identified as Chinese character readings, and which are thus assumed to be of the Sino-Vietnamese/Late-Middle-Chinese stratum. The second is a Vietnamese lexicon containing around 74,000 words, which we built from two online sources (Hồ Ngọc Đức 2004; Luong 2017).

Before processing the lists further, we first had to convert the *Quốc ngữ* orthography to a phonological representation. To remain as agnostic as possible regarding modern Vietnamese dialectal variation, we employed a conservative spelling pronunciation as implemented in the rule-based phonetizer *vPhon* (Kirby 2008), as in Table 2. In this system, most of the orthographically distinct onsets are phonetized using a unique symbol, so that a contrast is preserved between, for example, *rau* /*rau*/, *dau* /*zaw*/, and *giâu* /*zaw*/, *xêng* /*sɛŋ*/ and *sêng* /*ʒɛŋ*/, or *châu* /*cəw*/ and *trâu* /*təw*/ (but not between the onsets of e.g., *nghiên* and *nguồn*, both of which are represented as /*ŋ*/). Maintaining the phonemic

⁴ See Shimizu (this volume) for discussion. He suggests evidence of the reference to rime dictionaries. However, we do not have answers as to how much and when the rime dictionaries played a role in the development of Sino-Vietnamese phonology.

⁵ PHONOTACTICS refers to language-specific constraints on which segments can occur in a particular sequence within a syllable. For example, English has strong constraints on what kinds of consonants can appear together in an onset: the sequences /*fst*/ or /*vzg*/, for example, cannot occur as syllable onsets, although such sequences are perfectly fine as onsets in Russian (встречат ‘to meet’, взгляд ‘gaze’). Similarly, in Cantonese, syllables cannot both start and end with a labial consonant, so perfectly acceptable English syllables like /*pap*/ or /*pup*/ do not occur (Yue-Hashimoto 1972). In contrast, these are permitted in NSV syllables, as noted in Section 3.6.

⁶ The term “Chinese” has a complex mixture of meanings, so in this paper, we often use “Sinitic” to refer broadly to varieties of Chinese or to the sub-branch of Sino-Tibetan, and thus the ancestral language, to which all modern varieties of Chinese belong.

distinctions as represented in the Vietnamese *Quốc ngữ* orthography is also beneficial in capturing generalizations about a somewhat earlier stage of Vietnamese phonology before the various mergers in modern Vietnamese dialects (e.g., the pronunciation of ‘ch’ and ‘tr’ as /c/ in northern Vietnamese, the pronunciation of ‘d’, ‘gi’, and ‘v’ as /j/ in southern Vietnamese, etc.). In addition to the 24 onsets, this system includes 8 codas /p t k m n ŋ w j/, 14 nuclei /a: a e e ə: ə ɔ o i i u iə iə uə/, and the optional (but phonotactically restricted) medial glide /w/.⁷ We assume a system of 6 tones, as distinguished in the orthography, but consider the historically relevant checked syllables (those with final /-p -t -k/) separately when appropriate.

Table 2: System used in the phonetization of onsets (Kirby 2008)

ɓ ‘b’	d ‘đ’				
p ‘p’	t ‘t’	c ‘ch’	t̚ ‘tr’	k ‘c’	ʔ ‘-’
	tʰ ‘th’				
f ‘ph’	s ‘x’	ʃ ‘s’		x ‘kh’	h ‘h’
v ‘v’	z ‘d’	ʒ ‘gi’		ɣ ‘g/gh’	
m ‘m’	n ‘n’	ɲ ‘nh’		ŋ ‘ng/ngh’	
w ‘o’	l ‘l’	r ‘r’			

After phonetizing the lists, we proceeded to filter them with the goal of having a core list of the unique syllable types found in Vietnamese. As can be seen in Table 3, many of the items in the Chiang list are homophonous. We filtered this list and found 1,939 unique syllable shapes. In what follows, we refer to this as the SINO-VIETNAMESE SYLLABLES list, or just the SV list for short, although this is slightly misleading, as we shall see in a moment.

Table 3: Excerpt from master list of SV loanmorphs (including homophones)

Character	Quốc ngữ	IPA	Pinyin
裨	banh	ba:ŋ ¹	bēng
滨	banh	ba:ŋ ¹	bēng
繃	banh	ba:ŋ ¹	bēng
叫	khiếu	xiəw ⁵	jiào
嘯	khiếu	xiəw ⁵	xiào
嗽	khiếu	xiəw ⁵	jiào
齣	khiếu	xiəw ⁵	xiào
竅	khiếu	xiəw ⁵	qiào
莓	môi	moj ¹	méi
莓	môi	moj ¹	méi
媒	môi	moj ¹	méi
煤	môi	moj ¹	méi
襍	môi	moj ¹	méi

We next removed entries from the phonetized full lexicon that were obvious spelling errors or Anglicisms, as well as forms which were successfully phonetized by *vPhon* but which violated clear phonotactic rules (e.g., forms containing both a final obstruent and a tone other than *sắc* or *nặng*) and, for simplicity, forms with marginal long vowels (e.g., orthographic ‘ôô’ and ‘oo’). This produced a list

⁷ That Vietnamese syllables may contain an optional glide is clear, but whether it is best phonologically regarded as a secondary articulation of the onset (e.g., Thompson 1965) or as part of the syllable rime (e.g., Đoàn Thiện Thuật 1977) remains debated (Yamaoka 2021 makes a compelling case for the latter interpretation). Here, we remain agnostic on this issue, and simply treat the medial as a distinct segment, with the aim of enumerating its co-occurrence with both segmental onsets as well as elements of the rime.

of 8,138 syllable shapes, including tones as a distinguishing feature, which we refer to as the ATTESTED list.

Finally, we created a third list by removing all items in the SV list from the ATTESTED list. We will call this the NON-SINO-VIETNAMESE SYLLABLES (NSV) list, because none of the items in this list have a known SV reading. It is important to be clear about what the NSV list does and does not contain. It should not be regarded as a complete list of “native” syllable shapes, because a very large portion of syllables in the SV list also consist of homophonous non-SV etyma. For example, the syllable *tranh* occurs in the SV list because it derives from 爭 *zhēng* and occurs in compounds such as *chiến tranh* ‘war’ (cf. 戰爭 *zhàn zhēng*) but also has a meaning ‘thatch-grass’ stemming to an Austroasiatic etymon (Proto-Austroasiatic *[p]laŋ/*[p]lain, Proto-Vietic *p-lɛŋ, Proto-Katuic *plaŋ, Proto-Khmuic *pla:ŋ, Proto-Bahnaric *blaŋ, Palaung /plāŋ/, Mang /plaŋ⁶/, etc.). The corollary of this is that the SV list cannot be regarded as containing “purely” SV syllable shapes; it also contains some number of shapes that also have non-Sinitic etyma. In effect, the SV list is really two lists: some proportion is “syllables with solely Sinitic etyma”, while the other proportion is “syllables with both Sinitic and non-Sinitic etyma, including Pre-SV Chinese loanwords”. Unfortunately, sorting out exactly how many SV syllables have homophonous NSV forms cannot be accomplished automatically. What we can say about the NSV list, on the other hand, is that it definitely does *not* contain any syllables with an associated Late Middle Chinese (Sino-Vietnamese) character reading; as we have constructed them, the SV and NSV lists are absolutely complementary (NSV = ATTESTED \ SV).

All of our materials, along with the scripts needed to generate them from the original sources, are available as part of the online supplementary materials (<http://doi.org/10.17605/OSF.IO/KR6C7>). We encourage the reader to peruse these materials alongside the text.

2.2 Methods

To answer our initial question regarding the possibility of identifying phonological indicators of SV syllables, we first applied an exploratory computational method, followed by a more detailed statistical examination. As the computational method used does not provide an interpretable phonotactic analysis, it was necessary to pursue a descriptive statistical approach, in which phonological segments, tones, and combinations of these sounds were quantified with a view towards the expected-versus-observed statistical results. It is the results of the latter that are then discussed in the historical linguistic context in Section 3.

2.2.1 Computational approaches to loanword identification

Our initial approach to exploring the statistical structure of the Sino-Vietnamese layer was to treat it as a sub-type of loanword identification problem with a single donor language (Miller et al. 2020), which can itself be thought of as a type of language identification task (Jauhiainen et al. 2019). Briefly, in this type of a computational task, a statistical classifier – an algorithm for assigning labels to observations, implemented as a software program – is trained on examples of texts from different languages. The classifier is then assessed on its ability to correctly identify the source language of some text not seen during training. In the case of loanword identification, the classifier is trained by being presented with lexical items drawn from a single language, each of which is labelled as being loan or native vocabulary. The classifier is then tested by having it label unseen forms from that same language as “native” or “loanword”. In our study, we label all forms in our ATTESTED list as either found in the SV list or not found in that list.

The accuracy of a classifier is typically assessed by the so-called *F*-MEASURE (3), the harmonic mean of the PRECISION (1) – here, the proportion of forms correctly labeled as loans out of all forms labelled as loans – and RECALL (2) – the proportion of correctly labelled loans out of all correctly labeled forms, loans and non-loans. All three of these quantities can take on values from 0 to 1. A classifier with high precision will have a high ratio of true positives to all positive labels: when it predicts a form is a loan, it will usually be right. However, precision can be made arbitrarily high by making the classifier extremely conservative (a classifier that correctly predicts a single form is a loan will have a precision of 1). A classifier with high recall does a good job at identifying all of the loans in the test set;

that is, it has a low rate of misclassifying loans as native forms. Again, recall can be made arbitrarily high by simply classifying every form as a loan – it will often be wrong, but it won't miss any loans. The *F*-MEASURE (the harmonic mean of precision and recall) is a way of assessing the overall performance of the classifier by taking into account both measures.

$$\text{PRECISION} = \frac{\text{Correctly labeled SV forms}}{\text{All forms labeled as SV}} \quad (1)$$

$$\text{RECALL} = \frac{\text{Correctly labeled SV forms}}{\text{Total number of correctly labeled forms}} \quad (2)$$

$$F1 = \frac{2(\text{PRECISION} \times \text{RECALL})}{\text{PRECISION} + \text{RECALL}} \quad (3)$$

We explored the effectiveness of two character-level language models—a trigram hidden Markov model (HMM) and a recurrent neural network (RNN)—at correctly identifying syllables in our ATTESTED list as being SV or non-SV in origin. Both HMMs and RNNs are commonly used for sequence modelling tasks such as string prediction to estimate the probabilities of sequences (here, phones). Those interested in the technical details are referred to the Appendix; the results, using implementations in the *pybor* package (Miller, Tresoldi & List 2020), are shown in Table 4. The neural network model performs somewhat better than the trigram HMM, but more relevant for present purposes is that, while precision is high for both models, both show relatively poor recall, which gives rise to rather modest *F1* scores (although these are comparable to the performance of these methods in other monolingual borrowing experiments: see Miller et al. 2020).

Table 4: *SV loanmorph borrowing detection results using pybor (Miller, Tresoldi & List 2020), showing mean and standard deviations from ten-fold cross-validation*

	<i>Precision</i>	<i>Recall</i>	<i>F1</i>
Trigram HMM	0.83 (0.035)	0.59 (0.037)	0.69 (0.035)
RNN	0.92 (0.014)	0.64 (0.016)	0.76 (0.011)

These results suggest that the classifiers are relatively conservative: when they do decide to label a form as belonging to the SV layer, they are usually correct (hence high precision), but there are many SV forms that are incorrectly labeled as belonging to the native layer (hence mediocre recall). In other words, it seems there are certain syllable shapes that the software is able to recognize as ‘clearly’ SV (although whether a native speaker would agree is unclear), but many which could belong to either layer. Therefore, there must exist at least some phonotactic constraints that the classifiers are using to correctly identify at least some items as belonging to the SV layer. Our next step was to try and identify what, exactly, those constraints are.

2.2.2 *Relative frequency and the observed/expected (O/E) ratio*

Given the suggestive results of the loanword identification experiment, we proceeded to examine both lists more carefully in an effort to determine what kinds of co-occurrence patterns the classifiers might be learning. One way of approaching this task is as a constraint induction problem (e.g., Hayes and Wilson 2008), but here we took a more exploratory approach, guided by a simple calculation: the ratio

of observed to expected occurrences of a segment or segment sequence observed in the SV list (the O/E RATIO).⁸

The O/E ratio is a simple way of calibrating our expectations about which list a particular segment or segment sequence might appear in. Recall that our ATTESTED list contains 8,138 syllables, while the SV list contains 1,939. This means that SV loanmorphs constitute *at most* around one-quarter (23.8%) of all attested Vietnamese syllable shapes (although in fact certainly less, given that the SV list necessarily contains some unknown percentage of items which are homophonous with native Vietnamese forms). Therefore, if a given sound (or sound sequence) is proportionally distributed throughout the lexicon, when it occurs, we should expect roughly 25% of its occurrences to be in the SV list. If the percentage that a sound (or sound sequence) is observed rather more than 25% of the time in the SV list, this means it is overrepresented relative to this baseline.

For a given segment or pair of segments, we may define its RELATIVE SV FREQUENCY $f(SV)$ as simply

$$f_{sv} = \frac{\text{Count in SV list}}{\text{Count in both lists}} \quad (4)$$

To calculate this frequency for different segments and segment sequences, we built some simple sortable tables to find the rates of occurrence and co-occurrence of different elements of the syllables in the two lists, from which we can easily determine the percentage of how many appeared in the SV list. For example, the onset /s/ (orthographic *s*) occurs 89 times in the SV list and 244 times in the NSV list; therefore, approximately 27% of syllables beginning with this onset occur in the SV list (=89/(89+244)), or roughly as often as we might expect. Meanwhile, the nucleus /iə/ occurs in 280 SV forms and 291 NSV forms, meaning that nearly 50% of the occurrences of this diphthong are found in the SV layer – rather more than we might expect. Conversely, the coda /m/ is found in 747 NSV forms but just 133 SV forms, meaning that just 15% of all occurrences of coda /m/ are found in an SV syllable. How these percentages can be interpreted is an issue we take up in Section 3.

Since the length of the ATTESTED lexicon (8,138) and the length of the SV list (1,939) are both constants, the O/E ratio is a simple transformation of the relative frequency:

$$O/E = \frac{\text{Count in SV list}}{\text{Count in both lists}} \times \frac{\text{Length of lexicon}}{\text{Length of SV list}} \quad (5)$$

The advantage of the O/E ratio is its interpretability: when $O/E \approx 1$, then the segment or segment sequence occurs in the SV list about as often as expected. Values of greater than 1 indicate overrepresentation, and less than 1 indicate underrepresentation. In the tables below, we report both the O/E ratio as well as the relative SV frequency used to derive it. Note that neither the O/E ratio nor the relative SV frequency transparently encode information about overall frequencies of the segments involved. For example, although the labialized onsets /h^w/ and /n^w/ both have similar O/E ratios (2.25-2.35), the former occurs in 81 forms but the latter in just 9. When the counts become very low, therefore, this statistical summary becomes less informative. Another good example is the sequence /wiə/, which has an SV ratio of 1, meaning it only occurs in the SV list – but as it only occurs in 3 forms, its absence from the NSV list could well be due to its overall rarity for other reasons. When studying the tables, both in the text as well as in the online supplementary materials, the reader is therefore advised to keep an eye on the raw counts as well as the summary statistics.

⁸ Pierrehumbert (2003) provides examples of the use of the O/E ratio in phonological studies. The supplementary materials also include a second calculation, the POINTWISE MUTUAL INFORMATION between segments; for an accessible introduction, see Goldsmith (2002).

3 Observations

3.1 *Vietnamese historical linguistics*

Before discussing our findings, it is necessary to first provide a historical linguistic context to understand the degree of phonological convergence of Sinitic and Vietic, leading to the current situation. We begin by clarifying some historical linguistic facts and assumptions, including the hypothesized timing of the interaction of language groups involved and some key phonological matters. Vietnamese belongs to the Viet-Muong sub-branch of the Vietic branch of the Austroasiatic language family. The dispersal of Austroasiatic languages in Mainland Southeast Asia is hypothesized to have begun in approximately 2000 BCE (Sidwell & Blench 2011). This was a time when archaeological data shows Neolithic agriculturalists spread from Southern China (Higham 2017:201). When Vietic became a distinct branch is unknown and beyond the scope of this paper. However, the beginning of the Bronze Age at the end of the Dong Dau culture or by the Go Mun culture in the Red River Delta are strong indicators of sociocultural change about 3,000 years ago and nearly a millennium before the Han Dynasty. During the Han Dynasty, the Sinitic branch of the Sino-Tibetan (or more recently, Trans-Himalayan) language family, was at the end of the stage of “Old Chinese”, a toneless language and one reconstructed with presyllables and complex initials. This was followed in subsequent centuries by the Early Middle Chinese period, when tones emerged and monosyllabicity was complete.

For the first several centuries of Sinitic-Vietic contact (i.e., long before Vietnamese became a distinct language within Vietic or even Viet-Muong) into the first millennium CE, the language contact was during a later stage in Vietic, but it ultimately contributed to the distinctions that made Viet-Muong languages typologically distinct (i.e., no presyllables, complex tone systems, limited vowel-length distinctions) from the archaic Vietic languages with an Austroasiatic-like typology (i.e., presyllables, limited or no tone systems, vowel-length distinction paradigms). The first millennium CE was also the period in which a hypothesized Annamese Chinese (Phan 2013) speech community was formed in northern Vietnam. The speciation of Viet-Muong is generally considered to a good extent due to the impact of language contact with Sinitic-speaking groups (e.g., speakers of the ancestral language(s) of modern varieties of Chinese), but only after several centuries of this contact, possibly around the turn of the millennium and the period of Late Middle Chinese. The early second millennium CE is the likely time that the Annamese speech community shifted to the already Sinicized Viet-Muong.

Correspondingly, the history of Chinese loanwords in the Vietnamese language—including its ancestral Viet-Muong and even earlier Vietic stages—extends back to the Han Dynasty. As described in Section 1, during these two millennia, multiple layers of Chinese loanwords have been identified. The early Chinese loanwords of the first millennium CE during Late Old Chinese to Early Middle Chinese largely follow the phonology of Vietic,⁹ while the Sino-Vietnamese layer of Late Middle Chinese is more directly connected to changes of Chinese languages. As the focus of the study is of Sino-Vietnamese proper, not the early loanwords, the latter will not be explicitly addressed, but rather assumed to be part of the Non-Sino-Vietnamese syllables at least for purposes of phonological tendencies.

In the subsequent sections, we present counts, relative SV frequencies, and O/E ratios for several aspects of the Vietnamese syllable: (a) onsets/initial consonants, (b) vowel nuclei, (c) tones, and (d) co-occurring segments in syllable structures (onset-medial-coda and nucleus-coda (i.e., rime)). In each subsection, we begin by presenting the key statistical findings and then provide historical linguistic context to interpret the quantities. For these historical linguistic references, we have referred to the following list of core publications. These publications and the information we can provide in this brief study are far from exhaustive as the goal of this paper is not to explain the entire history of Vietnamese phonology. The focused target is to answer the question of the identifiability of Sino-Vietnamese phonological elements, so concise reference to historical linguistic issues is necessary.

⁹ It is, of course, possible for Old Chinese loanwords to have introduced syllables with phonological combinations not previously seen in Vietic at that stage. Regardless, the Chinese words borrowed at that stage have phonotactic constraints matching those of native syllables, suggesting that they have a deep enough history to have become very fully incorporated into Vietnamese (and Viet-Muong) phonology.

- **Proto-Vietic:** Nguyễn Tài Căn 1995
- **Proto-Viet-Muong:** Nguyễn Văn Tài 2005
- **Middle Chinese:** Baxter 1992, Pulleyblank 1991, Baxter and Sagart 2014
- **Other relevant studies:** Haudricourt 1953, 1954 on tonogenesis; Ferlus 1992 (history of Vietnamese onsets with respect to both Vietic and Sinitic), 1997 (the history of Vietnamese vowels), 2014 (Proto-Vietic phonology), etc.; Alves 2001 (language contact issues), 2006 (Vietnamese language affiliation), 2009 (loanwords in Vietnamese), 2018 (historical phonology of tones in Chinese and Vietnamese); Phan 2012 (Viet-Muong language history and historical phonology), 2013 (language contact and historical phonology)

3.2 Onsets

Of the 24 onsets in the Vietnamese orthography, none occur more than 40% of the time in the SV list, meaning all Vietnamese onsets occur in NSV syllables a majority of the time. Of those at the top of the list in Table 5, the voiceless stops /t/, /t^h/, and /t̚/ have relative SV frequencies ranging from 36% to 39% (O/E ≈ 1.6),¹⁰ as does /h/. A few more onsets have frequencies of about one-third (/w/, /f/, /x/, and /k/), while the rest are either at the expected rate or below (O/E ≤ 1).

Table 5: Relative SV frequency, O/E ratios, and counts of onsets in SV and NSV syllables

Onsets	f_{sv}	O/E	No. of SV	No. of NSV
t ‘t’	39.86	1.69	167	252
t ^h ‘th’	39.12	1.66	142	220
h ‘h’	39.23	1.66	169	263
t̚ ‘tr’	36.36	1.54	112	196
w ‘o-’	35	1.48	21	39
f ‘ph’	34.15	1.45	84	162
x ‘kh’	32.59	1.38	103	213
k ‘c/q’	32.07	1.36	169	358
d ‘đ’	30.77	1.3	116	261
ʔ ‘Ø’	27.3	1.16	83	221
ʂ ‘s’	26.73	1.13	89	244
β ‘b’	24.1	1.02	94	296
ŋ ‘ng’	19.96	0.85	77	308
l ‘l’	20	0.85	94	377
n ‘n’	19.17	0.81	60	253
m ‘m’	19.01	0.8	65	277
z ‘gi’	18.68	0.79	71	309
ɲ ‘nh’	15.21	0.64	54	301
c ‘ch’	14.52	0.61	61	359
v ‘v’	14.29	0.6	39	234
s ‘x’	14.08	0.6	48	293
ʒ ‘d’	11.8	0.5	21	157
ɣ ‘g/gh’	0	0	0	221
p ‘p’	0	0	0	99
r ‘r’	0	0	0	348

At the opposite end of the spectrum, the phones /r/ and /ɣ/ (orthographic *gh*) never occur in SV loanmorphs. As shown in Table 1 in Section 1.1, those two onsets do occur in early Chinese loanwords borrowed before the Late Middle Chinese period, highlighting these early loanwords’ degree of integration into Vietnamese (and indeed Vietic or Viet-Muong) phonology; as noted below, both *r and *g are reconstructed at the Proto-Vietic level. Finally, /p/ occurs only in recent loanwords, primarily

¹⁰ These percentages correspond well to Phan's (2010:8-9) "Viet-Muong drag chain" of the merging of fricatives and affricates to coronal stops.

from western languages (e.g., *pin* ‘battery’ from French *pile*) and thus obviously is not seen in SV syllables. Overall, no onsets occur strictly in SV syllables, but some do occur strictly in NSV syllables.

Historical phonological information can help to account for some of these tendencies. The situation is complex in part due to the fact that the presyllables and complex onset clusters of Vietic, Viet-Muong and archaic Vietnamese have subsequently been completely lost in Vietnamese over the past several centuries. Nguyễn Văn Tài (2005) does not reconstruct Proto-Viet-Muong presyllables, only clusters (cf. Table 6), and onset clusters lingered in Vietnamese well into the 19th century (Vu 2019). However, Shimizu (2015) and Xun (2019) both find evidence of presyllabic material in early Vietnamese texts. Reconstructions of Old Chinese sesquisyllables (Baxter & Sagart 2014) similarly indicate the borrowing of Old Chinese words in Vietic with complex word-initial material. Thus, onsets in modern Vietnamese originate in a mixture of single segments, onset clusters, and presyllabic material (cf. Ferlus 1982; Shimizu 2015).

We here briefly consider the reconstructed systems of Proto-Vietic, Proto-Viet-Muong, and Middle Chinese onsets. Fine details or challenging questions of the reconstructions are beyond the scope of this study. Only general relevant observations need be made. As shown in Table 6 and Table 7, a core set of phones has been retained (e.g., *p/t/c/k, *m/n/ɲ, the medials *-l- and *-r-, etc.), but a major change from Proto-Vietic to Proto-Viet-Muong was the development of voiceless aspirates /p^h/, /t^h/, and /k^h/ (and loss of implosive stops which merged with nasal onsets matching place of articulation), seen in the grey highlighted row of Table 7.

Table 6: Proto-Vietic Initials in Main Syllables (Nguyễn Tài Căn 1995:242)

*p	*t	*c	*k	*ʔ
*b	*d	*ɟ	*g	
*ɓ	*d̥	(*ɟ̥)		
*m	*n	*ɲ	*ŋ	
*v	*r	*j		
	*l			
	*s	*ś		*h
	*-l-	*-r-		

Table 7: Proto-Viet-Muong onsets (Nguyễn Văn Tài 2005:118)

*p	*t	*c	*k	
*b	*d		*g	
*p ^h	*t ^h		*k ^h	
*m	*n	*ɲ	*ŋ	
	*s			*h
	*z			
	*l			
*pl	*tl		*kl	
*br	*dr		*gr	
	*ml			
	*hr			

Middle Chinese similarly had a class of aspirated onsets, as shown in Table 8. As Middle Chinese aspirated onsets are sources for Vietnamese /f/ ‘ph’, /t^h/ ‘th’, and /x/ ‘kh’, and they have relative SV frequencies of one third or more, we can consider this an instance of the impact of language contact with Sinitic. Nguyễn Tài Căn explicitly posits this for ‘ph’ (1995:96-98) and ‘kh’ (1995:98-99), while he claims ‘th’ stems to *ś (1995:85). But of course, strong majorities of syllables with such onsets are still NSV syllables, indicating that this impact on the Viet-Muong phonological system has been long

incorporated into its phonology. Similarly high degrees of phonological integration of possible Chinese phonological features are seen in many instances throughout the data.

Table 8: Middle Chinese Initials (Baxter 1992)

Lab	Dent	Retr	Dent Sib	Retr Sib	Pal	Vel	Glott
p	t	tr	ts	tsr	tsy	k	ʔ
ph	th	trh	tsh	tsrh	tsyh	kh	
b	d	dr	dz	dzr	dzy	g	
m	n	nr			ny	ng	
			s	sr	sy	x	
	l		z	zr	zy		h
					y		

Another broad historical change was the massive merging of a large class of sibilants (dental, palatal, and retroflex sounds, in grey cells in Table 8) to Vietnamese /t/, /tʰ/, and /t̚/. Nguyễn Tài Căn (also cf. Ferlus 1992) posits that ‘t’ stems to dental *ts, *dz, *s, and *z and palatalized labials *pj/bj (1995:80); ‘th’ comes from aspirated *th and *tsh and palatalized *ś, *ź, and *dź (1995:83)¹¹; and ‘tr’ is from retroflex *tr, *dr, and *tsr (1995:106). As noted, SV frequencies of these phonemes are above one-third, somewhat above the one-quarter average of SV loanmorphs overall. However, this is a broad merger that may have occurred in Annamese Chinese, Viet-Muong, or both simultaneously.

Another issue is the seeming introduction of a retroflex category, as neither Proto-Vietic nor Proto-Viet-Muong have been reconstructed with such sounds. Middle Chinese retroflex sounds are generally realized as retroflex /s/ ‘s’ and /t̚/ ‘tr’, but in many NSV syllables, the origins stem to previous onset clusters (e.g., *pl, *bl, *kl, etc.), all of which are native forms. Moreover, various other Vietic languages, including archaic languages, have retroflex initials which are not from Chinese loan material. Thus, while Middle Chinese certainly contributed loanmorphs that supported the retroflex category, the exact history of retroflex sounds in Vietic is not yet fully understood and not necessarily all due to language contact with Chinese.

To some extent, the statistically most common initials of SV origin are precisely those to have undergone significant mergers (e.g., sibilants merged with stops), thereby increasing their quantity and thus SV frequencies. The lowest frequencies of onsets in NSV syllables are above 60%: the solid statistical majority of onsets are in NSV syllables in all cases, which shows that the sounds have been well incorporated into Vietnamese phonology. This involves the phonology of both previously existing words and lexical innovations since the shift of Annamese Chinese to Vietnamese. For example, the change *s > /t/ is seen in both SV and NSV words (e.g., Vietnamese *tóc* ‘hair’ from Proto-Austroasiatic *suk). At best, the development of an aspirated series in Proto-Viet-Muong could be in part a result of language contact between Middle Chinese and Viet-Muong.

3.3 Vowel nuclei

As shown in Table 9, of the 14 vowels (11 monophthongs and 3 diphthongs /iə/, /iə̃/, and /uə̃/) of the Vietnamese system, just 3 can be regarded as heavily overrepresented in the SV layer (O/E > 1): nearly 50% of all occurrences of /iə̃/ are in SV syllables, followed by /a:/ at 44%, and /i/ at 39%. All others occur as often or less than expected. As expected, considering the time-depth of the borrowing, no vowels occur strictly in SV or NSV syllables. The vowels /uə̃/, /ə:/, /ɔ/, /ɛ/, and /a/ all have relative SV frequencies of less than 10% (O/E < 0.5), showing that these are heavily underrepresented. In the most extreme case, /uə̃/ is attested in just 9 SV syllables versus 279 NSV syllables.

¹¹ Ferlus (1992) also suggests *pʰj as a source of ‘th’.

Table 9: Relative SV frequencies, O/E ratios, and counts of vowel nuclei in SV and NSV syllables

Vowel Nuc.	f_{SV}	O/E	No. of SV	No. of NSV
iə ‘iê/ia’	49.04	2.08	280	291
a: ‘a’	44.42	1.88	505	632
i ‘u’	38.89	1.65	126	198
ə ‘â’	32.94	1.39	221	450
o ‘ô’	30.38	1.29	182	417
i ‘i’	28.12	1.19	176	450
u ‘u’	23.7	1	146	470
iə ‘uô/ua’	18.57	0.79	70	307
e ‘ê’	14.57	0.62	73	428
a ‘ă’	7.99	0.34	54	611
ɛ ‘e’	8.12	0.34	61	702
o ‘o’	3.28	0.14	22	623
ə ‘o’	3.41	0.14	14	413
uə ‘uô/ua’	3.12	0.13	9	279

As was the case in the system of onsets, some patterns of changes occurred in the history of Vietic that are suggestive of the impact of language contact with Sinitic. However, as the number of vowels in Viet-Muong far exceed those of Middle Chinese, there are no introduced nuclei. The core vowels of Vietic were retained, as shown in Tables 10 and 11. Instead, the primary change from the vowel systems of Proto-Vietic to Proto-Viet-Muong is the loss of most of the vowel-length distinctions (except two mid-vowels, retained in modern Vietnamese as ‘â’ versus ‘o’ and ‘ă’ versus ‘a’) and the development of diphthongs.

Table 10: Proto-Vietic vowels in main syllables (Nguyễn Tài Căn 1995:244)

*i	*ĩ		*ĩ	*u	*ũ
*e	*ẽ	*ə	*ẽ	*o	*õ
*ɛ	*ě	*a	*ă	*ɔ	*õ

Table 11: Proto-Viet-Muong vowels (Nguyễn Văn Tài 2005:118)

*i	*u ¹²	*u
*e	*æ, *ǣ	*o
*ɛ	*a, *ă	*ɔ
*iə	*uə	*uə

Middle Chinese had only 8 vowels with no length distinction or diphthongs, as in Table 12. All the vowels of Middle Chinese have also been reconstructed in Proto-Vietic and Proto-Viet-Muong, the latter seen in highlighted cells in Table 11. While a causal relationship is uncertain, it is notable that Viet-Muong largely lost its length distinction in intense language contact with a language without a vowel-length distinction. Of course, this affected the entire Viet-Muong phonological system and therefore does not mark any syllables as more likely to be SV syllables.

¹² Nguyễn Văn Tài reconstructs *u, while Nguyễn Tài Căn for Proto-Vietic and Baxter for Middle Chinese reconstruct *i. These are comparable such that different linguists use one or the other IPA symbol for Vietnamese ‘u’.

Table 12: Middle Chinese vowels (Baxter 1992)

*i	*i	*u
*e		*o
*ɛ		
*æ		*a

As for diphthongization, the development of a diphthong series is significant, but it cannot be considered the result of loanmorphs from (or language contact with) Chinese. Sets of diphthongs are common in the phonological systems of many Austroasiatic languages, and a similar three-diphthong pattern is seen as well in many Tai languages and even the Cham language. Thus, Viet-Muong diphthongs represent a language familial and regional typological tendency, not the influence of contact with Chinese, or one can even argue despite it. The relative SV frequencies for the three diphthongs are /iə/ 49%, /iə/ 18%, and /uə/ 3%. Were Viet-Muong diphthongization the result of contact with Chinese, we would expect to see more balanced ratios. Indeed, /uə/ is virtually a mark of a NSV syllable. We must assume that the high rate of /iə/ in SV syllables is due to a phonological tendency in Middle Chinese syllables at the time of borrowing. The diphthongization of Viet-Muong has affected both early Chinese loanwords, which follow native phonological patterns, and Late Middle Chinese loanmorphs. Also of significance is that the /iə/ diphthong has the highest relative SV frequency. The source of this is the sequence of medial *-j- and *e of Middle Chinese, which apparently occurred in a large number of syllables in that period. It seems that this Middle Chinese segmental sequence fit into an existing Viet-Muong diphthong, rather than introducing a palatal medial. This is discussed further in Section 3.6 on segmental combinations.

The changes from Vietic and Middle Chinese to modern Vietnamese vowels include a mixture of shared and distinct changes (cf. Nguyễn Tài Căn 1995). These all require additional sifting to determine the precise paths of change. In many cases, the modern Vietnamese vowel stems to the same vowel in Late Middle Chinese (e.g., *a > /a/, *e > /e/, *i > /i/, *u > /u/, *əC > /əC/). In other cases, phonological adaptations have occurred (e.g., *ju > /i/, *ja /iə/ and /iə/, *u > /ɔ/ and /o/). Some of the Proto-Vietic sources of vowels are comparable, but there is considerably more variety, a situation not yet well understood (as Ferlus 1992 has noted).

The most significant influence of language contact with Chinese appears to be the loss of most vowel length distinctions. The high SV frequency vowels largely fit into existing phonemes in the Vietic and Viet-Muong systems.

3.4 Codas

As seen in Table 13, no Vietnamese codas are particularly over-represented in the SV layer (O/E ratios ≤ 1.4). While /-k/ has a somewhat greater than expected relative SV frequency, 32.5%, this typologically common sound existed in both Proto-Vietic and Proto-Viet-Muong, so this slight asymmetry is not noteworthy.

Table 13: Relative SV frequencies, O/E ratios, and numbers of Vietnamese codas

Coda	f_{sv}	O/E	No. of SV	No. of NSV
-k ‘-c/ch’	32.26	1.37	170	353
-∅	27.49	1.16	430	1132
-w ‘-u’	27.09	1.15	198	532
-n ‘-n/nh’	26.12	1.11	338	956
-ŋ ‘-ng’	25.88	1.1	345	987
-t ‘-t’	21.38	0.91	127	467
-p ‘-p’	16.67	0.71	59	294
-m ‘-m’	15.11	0.64	133	747
-j ‘-i/y’	14.9	0.63	139	793

In available reconstructions, Proto-Vietic had 15 codas, Proto-Viet-Muong had 11 codas, and Middle Chinese had only 8 codas, as shown in Tables 14 to 16. The Proto-Vietic-Muong coda system more closely resembles the system of Late Middle Chinese than Proto-Vietic, but with some retentions (i.e., *-l, *-c, *-ŋ). All the Middle Chinese codas were also in both Vietic and Viet-Muong, the latter highlighted in Table 15.

What is significant is the codas that were lost by the Viet-Muong stage, including *h, *s, and *-ʔ. As will be discussed in Section 3.5 on tones, some of the Vietic codas not in Viet-Muong were rephonologized as tones: *-ʔ as Tone B (the *sắc* and *nặng* tones) and *-s/-h as Tone C (the *hỏi* and *ngã* tones). The tone system patterns with the Chinese A/B/C/D tone system and does appear to represent a degree of influence of language contact with Sinitic. The loss of coda segments represents a typological shift rather than borrowing of material. More discussion on the larger issue of tones is provided in Section 3.5.

Table 14: Proto-Vietic finals in main syllables (Nguyễn Tài Cẩn 1995:243)

*-p	*-t	*-c	*-k	*-ʔ
*-m	*-n	*-ŋ	*-ŋ	
*-w	*-r	*-j		
	*-l			
	*-s			*-h

Table 15: Proto-Viet-Muong codas (Nguyễn Văn Tài 2005:150)

*-p	*-t	*-c	*-k
*-m	*-n	*-ŋ	*-ŋ
*-w	*-l	*-j	

Table 16: Middle Chinese codas (Baxter 1992)

*-p	*-t		*-k
*-m	*-n		*-ŋ
*-w		*-j	

The Proto-Vietic and Middle Chinese origins of Vietnamese codas can be tracked relatively precisely, as in Table 17. There is considerable consistency in the developments from both Proto-Vietic and Late Middle Chinese codas, with the single exception of the merger of Proto-Vietic palatals with coronals. In this situation, Chinese had little potential for impact on Vietnamese codas. While the losses of some codas are paralleled in Middle Chinese, language contact did not introduce new syllable-final segments.

Table 17: Source codas from Proto-Vietic and Middle Chinese in Vietnamese

Proto-Vietic	Middle Chinese	Vietnamese
*-m	*-m	-m ‘-m’
*-p	*-p	-p ‘-p’
*-n, *-ŋ	*-n	-n ‘-n’
*-t, *-c	*-t	-t ‘-t’
*-ŋ	*-ŋ	-ŋ ‘-ng/-nh’
*-k	*-k	-k ‘-c/-ch’
*-w, *u/*o	*-w	-w ‘-u/o’
*i, *e, -Vr/l	*i	-j ‘i/y’

Thus, the impact of Sinitic-Vietic contact in the Vietnamese coda system is primarily evidenced in the form of phonotactic constraints against final fricatives and the glottal stop (and perhaps against palatal

codas), though this was also a factor in the development of tones. Another less significant change is the loss of palatal codas *-c and *-ɲ, which merged with alveolar sounds /t/ and /n/ respectively.¹³ In any case, the loss of segments does not increase the degree of identifiably Chinese features since they apply to all Vietnamese syllables broadly and overall phonological phonotactic constraints.

To conclude, the possible types of influence include (a) loss of palatal stop codas, which merged with alveolar consonants, (b) loss of final liquids *-r and *-l, which merged with /-j/ (and sometimes /-n/ in early Chinese loanmorphs), and (c) loss of final fricatives *-s and *-h and the glottal stop coda, which correspond to tone categories in modern Vietnamese. The remaining features were shared by both Vietic and Middle Chinese.

3.5 Tones

Most of the relative SV frequencies of Vietnamese tones are comparable to the overall rate of SV loanmorphs, close to one-quarter, as shown in Table 18. The two outliers (highlighted in grey) are in the level-tone category: the *ngang* tone has the highest rate of occurrence in the SV layer, while the *huyền* tone has the lowest rate. Indeed, its relative SV frequency of just 13% is unexpectedly low (O/E = 0.56), and the well-known historical pattern that accounts for this is explained below.

Table 18: Relative SV frequencies, O/E ratios, and counts of tones in SV and NSV syllables

Tone	f_{sv}	O/E	No. of SV	No. of NSV
ngang	28.97	1.23	462	1133
ngã	26.24	1.12	154	433
nặng	26.09	1.11	246	697
sắc (open)	24.64	1.05	307	939
nặng (-p, -t, -k)	24.59	1.02	166	509
sắc (-p, -t, -k)	23.9	0.99	190	605
hỏi (open)	23.16	0.98	239	793
huyền	13.19	0.56	175	1152

Beyond statistics of the tones themselves is the matter of onset-tone cooccurrences. Two relevant statistical patterns emerge from the data. First, SV syllables beginning with /ʔ c x s z w/ primarily belong to upper register tones (*ngang*, *hỏi*, *sắc*) and (almost) never lower-register tones (*huyền*, *ngã*, *nặng*; see supplementary materials). Second, SV syllables beginning with sonorants /l m n ɲ/ and voiced fricatives /v z/ typically occur with the *ngang*, *ngã*, and *nặng* tones; that is, they rarely or do not occur with *huyền*, *hỏi*, or *sắc*.

This is not a random distribution. Upper-register tones (*yin* 陰 tones in the Chinese tradition) are historically associated with syllables with voiceless onsets, while lower-register tones (*yang* 陽 in the Chinese tradition) are associated with voiced onsets. In some cases, the modern onsets have the same voicing as in the past, so the tone height is transparent (e.g., SV *đề*, from 提 *tí* ‘lift’, Middle Chinese *dej*, has a lower-register tone with the voiced /d/ onset as well as the Middle Chinese *d). Other onsets have changed voicing, but as they are reconstructed through the comparative method with the opposite voicing, the tone height is then explained as being the result of onset voicing in the past (SV *đế*, from 帝 *dì* ‘god’, Middle Chinese *tejH*, has an upper-register tone as per the voiceless *t of Middle Chinese). This is very consistent in Chinese historical phonology and is seen in many tonal languages in the region: voiceless onsets with upper-register tones but voiced onsets with lower-register tones.

However, a phenomenon noted in the literature (e.g., Haudricourt 1954:79; Nguyễn Tài Căn 1979:292) is that in Sino-Vietnamese syllables with onsets originally from sonorant initials (e.g., /v/ and /z/ are from Middle Chinese sonorants *v and *j respectively), which are voiced sounds by definition, have the upper-register *ngang* tone rather than the expected lower-register *huyền* tone. This phonological phenomenon specific to Annamese Chinese spoken in northern Vietnam at the end of Chinese administrative rule there has not yet been explained (but cf. Yik 2014:151–160). Regardless, it

¹³ Debate previously lingered regarding the status of orthographic ‘ch’ and ‘nh’, which are now generally agreed to be not palatal codas, but rather pre-palatalized velars, conditioned by high front vowels /i e ε/.

has resulted in the unequal distribution of the two “level” tones in Vietnamese: a considerably higher relative SV frequency for the *ngang* tone but considerably lower rate for the *huyền* tone.

Regarding the tone system itself, it may be tempting to simply identify the Vietnamese tone system as a kind of Chinese borrowing. However, the situation is more complex as the emergence of tones in Viet-Muong (as well as other Vietic languages outside of the Viet-Muong sub-branch) may have involved both borrowing and natural typological tendencies. It is unclear how much an incipient tone system was in place in Vietic similar to the register-phonation systems of archaic Vietic languages. Some of the register and phonation features of archaic Vietic languages are suggestive of a natural path towards incipient tone systems, including that in Vietnamese (cf. Alves 2001). Also, this pattern of tonal development occurred as well in Tai-Kadai and Hmong-Mien languages in a roughly similar period of time (Ratliff 2010:185–191), altogether suggesting a regional pattern of development rather than simple borrowing.

We can say the following about Vietnamese tones. Tones in Vietnamese are undoubtedly influenced by contact with and lexical borrowing from Chinese, but the original stimulus for tonogenesis is likely to have been more complex than just borrowing. The statistics borne out by the data show that relative frequencies with which Vietnamese tones occur in the SV layer are proportional to the ratio of SV syllables, and so all Vietnamese tones occur, as with most segments, mostly in NSV syllables. The exceptions of the *huyền* and *ngang* tones are explained by a recognized historical linguistic phenomenon. No tones stand out as somehow more Chinese-like.

3.6 Syllable templates and rimes

This section focuses on co-occurrence restrictions of segments in the Vietnamese syllable, including combinations of onset-medial-coda and of nucleus-coda (i.e., rimes). As noted above, the entire Vietnamese syllable template matches that of varieties of Chinese: CGVC+tone. In many cases, the combinations include the high relative SV frequency onsets and vowels, thus making many of such co-occurrences statistically more probable. For example, among the 10 rimes shown in Table 19 with the highest relative SV frequencies, many contain the vowels /iə/ and /a:/, both of which have the highest SV frequencies among Vietnamese vowels. While the diphthong /iə/ seems to be a good indicator of an SV syllable in some rimes (e.g., /iət/, /iəp/, /iən/, /iəm/, others are almost always NSV (/iək/, /iəŋ/, and /iə/). However, the rime /iw/ is almost exclusively SV, thereby marking this particular rime as more SV-like, though it occurs in only 46 syllables in the database.

Table 19: Relative SV frequencies, O/E ratios, and counts of rimes with top 10 SV O/E ratios.

Rime	<i>f_{sv}</i>	O/E	No. of SV	No. of SNV
iw	84.78	3.59	39	7
iət	82.35	3.49	42	9
iəp	79.31	3.36	23	6
ət	69.81	2.96	37	16
iəm	69.01	2.92	49	22
iən	67.52	2.86	106	51
iəw	66.28	2.81	57	29
a:n	58.05	2.46	101	73
ən	56.6	2.4	90	69
ik	54.35	2.3	25	21

Combinations of the onset, medial, and nucleus result in 459 groupings, so we can here consider only particularly robust tendencies. Undoubtedly, more careful inspection will result in additional insights. A particularly prominent co-occurrence restriction is that in SV, there is a complete prohibition on combinations of labials in both onsets and codas. Sequences such as *bVp, *mVp, *mVm, *wVp, *wVm, *vVp, etc. do not occur in any SV syllables (as noted for Cantonese by Yue-Hashimoto 1972 and Kirby & Yu 2007). They do, in contrast, occur in NSV syllables, thereby marking such forms as native syllables and highlighting a phonotactic distinction between Sinitic and Vietic.

Table 20 shows the top 25 combinations of onset-medial-coda, and again, many have onsets that are overrepresented in SV. In this set, the codas show no patterns. What stands out in Table 20 is that many syllables with medial /-w-/ are heavily overrepresented in SV (O/E > 2). However, the fact that there are very few observations for most of these trigram sequences means we are not licensed to draw any firm conclusions.

Table 20: Relative SV frequencies, O/E ratios, and counts of 25 onset-medial-coda combinations with the highest O/E ratios

Onset	Medial	Coda	f_{sv}	O/E	No. of SV	No. of NSV
x	w	k	100	4.23	4	1
ɖ	w	n	80	3.39	4	1
h		k	80	3.39	15	5
z	w	t	75	3.18	2	1
n	w	n	66.67	2.82	2	1
ʈ	w	n	66.67	2.82	4	2
w		n	66.67	2.82	8	4
t	w	n	66.67	2.82	13	7
ʈ		k	65	2.75	13	7
h	w	ŋ	65	2.75	11	6
ɕ	w	n	64.71	2.74	5	3
ʈ		p	62.5	2.65	5	3
tʰ		k	62.5	2.65	13	8
x	w	n	61.9	2.62	8	5
x	w	t	61.54	2.61	3	2
n	w		60	2.54	3	2
tʰ	w	t	60	2.54	3	2
h	w	n	60	2.54	13	9
h	w		59.09	2.5	10	7
tʰ	w	n	58.82	2.49	10	7
t	w	t	58.82	2.49	4	3
w		t	57.14	2.42	4	3
h	w	k	57.14	2.42	4	4
ŋ	w		50	2.12	4	4
tʰ	w	j	50	2.12	2	2

Overall, Chinese medials appear to have had two distinct impacts on the Vietnamese phonological system. Late Middle Chinese medials have contributed statistically to Vietnamese /-w-/ and the diphthong /iə/.

- **Middle Chinese medial *-w-:** The Vietnamese medial /-w-/ has been noted as rare in Vietic languages (Nguyễn Tài Cẩn 1995:221–223). This medial’s higher numerical occurrence in SV loanmorphs seems to support this as being introduced. Yet, numerous NSV syllables do have /-w-/, and in many cases, onset-medial combinations occur only in NSV syllables. Thus, this medial may have been introduced into Viet-Muong, but it has been completely incorporated, likely for centuries, enough time for many new words to have been created in Vietnamese in subsequent centuries.
- **Middle Chinese medial *-j-:** As noted, the Vietnamese diphthong /iə/ stems largely to the Middle Chinese sequence of medial *-j- plus the vowel *e. The shift from Middle Chinese *je to Vietnamese /iə/ thus appears to reflect a shift in sonorancy in which the medial shifted to the vowel nucleus in the process of phonological adaption. The large number of Chinese syllables stem to some two dozen rime categories in the Chinese rime-dictionary tradition (仙 tiên, 元 nguyên, 先 tiên, 嘯 khiêu, 宵 tiêu, 小 tiểu, 屑 tiết, 帖 thiếp, 月 nguyệt, 業 nghiệp, 獮 tiên, 獮 tiên, 琰 diêm, 笑 tiêu, 篠 tiêu, 線 tuyền, 葉 diệp, 咍 diệp, 蕭 tiêu, 薛 tiết, 豔 diêm, 銑 tiên, 願

nguyên, 鹽 diêm, diễm). Thus, there has been a lexically rich source for this particular phonological string.

Some other co-occurrence restrictions of rimes include the following:

- Among NSV syllables, the rimes /a e j ə ə: ə:k ə:ŋ ə:w ə j i j i ə j i p u ə p/ are all unattested, or occur just once, in addition to the known constraint on rounded vowels + /w/ sequences (i.e., *ow *ɔw *u w *u ə w)
- SV rimes with /ɛ/ or short /a/ are almost all closed with a velar (/k/ or /ŋ/). Conversely, SV rimes with short /ə/ are never closed by velars.
- SV rimes with /e/ are almost all open; a few end in /-ŋ/ (*bệnh, kệnh, lệnh, mệnh, nghênh*), and there are three singletons, *kết, khuếch*, and *mên*.

These highlight phonotactic constraints in Chinese and Vietic and could be productive areas in future studies. However, there are no attested rimes which are solely in SV syllables, thereby highlighting the highly incorporated nature of SV loanmorphs in the Vietnamese phonological system.

3.7 Historical linguistic context and implications

While up to one-quarter of Vietnamese syllable shapes may have SV origins, an unknown percentage of those have corresponding homophonous forms of NSV status. The question of what percentage of Vietnamese syllables have only SV origins is as yet unanswered and possibly unanswerable due to the complex nature of identifying etymological origins of words as well as the loss of words over time. However, of the segments, tones, and combinations of speech sounds, none have relative SV frequencies of 100%. It appears that all available phonological material of Vietnamese occurs in NSV syllables, and the vast majority of co-occurring phonological segments and tones are part of the NSV layer of Vietnamese syllables. The reverse is not true of SV phonological material.

The broader context in which the borrowing occurred is as follows. At the time of contact with Old Chinese and Early Middle Chinese, Vietic had larger inventories of onsets, vowels, and codas. We can speculate, but not prove, that this increased the facility to incorporate segments relatively easily. By the time of the development of Viet-Muong as distinct from other sub-branches of Vietic, it appears some amount of typological convergence with Chinese had already occurred. Rather than introduce specific segments or combinations of segments, the impact of Chinese on Viet-Muong phonology tended towards typological changes in Viet-Muong syllable structure:

- A Chinese-like tone system
- All syllables with CGVC shape, specifically the -w- medial
- A class of aspirated onsets
- No *p onsets
- The loss of codas: (a) fricatives *-s and *-h and the glottal stop preceding tonogenesis, (b) liquids *-r and *-l, and (c) *-c and *-ɲ due to merging with *-k and *-ŋ
- Pressure to lose presyllabic material and onset clusters (though presyllabic material lasted into the 2nd millennium and clusters lasted until the 1800s)

Overall, we can track possible areas of influence on the Vietnamese phonological system. However, it is much more difficult to identify phonological segments or combinations that might be perceived as more “Chinese-like” due to the long time and deep degree of phonological integration into the Vietnamese phonological system.

4 Conclusion

To summarize, while we posed the question initially as “what are the features, if any, that signal to native speakers that a syllable is an SV loanmorph?”, what we find is that in fact, there are very few phonotactic indicators that a syllable belongs to the SV layer, but there are a number of strong

phonotactic indicators that a syllable could *not* belong to this layer. In other words, the SV layer is much more phonotactically constrained than the NSV layer. Some NSV indicators are absolute (e.g., the presence of orthographic ‘r’, ‘g/gh’) or extremely dominant (e.g., ‘e’, ‘o’, etc.); many other are in the majority. But while some SV features show statistically higher frequency, none are absolute, due to the tight integration of the SV loanmorphs into the modern Vietnamese lexicon and phonological system over many centuries.

There are implications of the data and observations in this study for a number of related areas of inquiry. For studies of loanword phonology awareness and theoretical phonology/psycholinguistics, there is a modest range of tendencies to test native-speaker awareness of SV loan material through phonotactic constraints. Some of these tendencies have been presented here, and the online supplemental resources could allow those interested in this topic to further explore and identify areas for psycholinguistic testing with native-speaker subjects. Still, as indicated, the deep typological convergence of the two languages as well as the deep time-depth makes it challenging to sort out discreet phonological elements. As for Vietnamese language education and literacy development, the findings are unfortunately of very limited usage. We speculate that the issue of Sino-Vietnamese vocabulary in education is better considered through standard psycho-educational approaches. However, for the field of historical linguistics, the results confirm previous observations, while the tools have substantial potential to explore historical linguistic paths and do so more thoroughly. Overall, we hope that the ideas presented here, together with online supplementary materials, will stimulate new directions of enquiry in Sino-Vietnamese linguistics studies.

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Appendix: Language models

In an n -gram hidden Markov model (HMM), the probability of a string is proportional to the conditional probabilities of the component n -grams:

$$P(x_i|x_1^{i-1}) \approx P(x_i|x_{i-n+1}^{i-1}) \quad (6)$$

In the case of a trigram model, $n = 3$, so probability of seeing, e.g., a k in the coda is conditioned on the probability of seeing a k given the preceding nucleus and onset.¹⁴

In a recurrent neural network (RNN), the next character in a sequence is predicting using the current character and the previous hidden state. At each time step t , the network retrieves an embedding for the current input x_t and combines it with the hidden layer from the previous step to compute a new hidden layer h_t :

$$h_t = g(Uh_{t-1} + Wx_t) \quad (7)$$

where W is the weight matrix for the current time step, U the weight matrix for the previous time step, and g is an appropriate nonlinear activation function. This hidden layer h_t is then used to produce an output y_t which is passed through a softmax layer to generate a probability distribution over the entire vocabulary. The probability of a sequence $x_1, x_2 \dots x_N$ is then just the product of the probabilities of each character in the sequence:

$$P(x_1, x_2 \dots x_N) = \prod_{t=1}^N y_t \quad (8)$$

The incorporation of the recurrent connection as part of the hidden layer allows RNNs to avoid the problem of limited context inherent in n -gram HMMs, because the hidden state embodies (some type of) information about the preceding characters in the sequence. Although RNNs cannot capture arbitrarily long-distance dependencies, this is unlikely to make a difference for the relatively short distances involved in modeling phonotactics.

For further technical details, see Miller et al. (2020). Jurafsky and Martin (2020) provide a good introduction to language modeling, HMMs, and neural networks from a linguistic perspective.

¹⁴ Here, we included tone in the language models by treating it as a segment that was ordered after the coda. There is no particular reason to order it in this way, as opposed to after the nucleus or the onset; however, the probabilities of strings in languages like Vietnamese is not significantly affected by this choice (Kirby 2021).

WHALES AND OTHER MAMMALS: A NATURALIST'S TAKE ON SYNTACTIC VARIATION (WITH PARTICULAR REFERENCE TO VIETNAMESE & IRISH)

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Abstract

In this paper, I offer four foundational principles of phrase-structure, intended as heuristics to help describe the underlying syntax of natural languages, and for explaining observed restrictions on word-order variation cross-linguistically. Whilst the core theoretical intuitions are not new—for the most part, they derive from those of Chomsky (1981)—there is some originality in their articulation, more significantly, in the kinds of data used to justify them: in contrast to the implicit Anglocentricity of mainstream generative analysis, the present theory is grounded in observations from three less familiar varieties—Irish, Vata (Kru), and Vietnamese, the latter being considered archetypal.

Keywords: Vietnamese, Irish, syntactic constraints, non-verbal predication, grammatical variation, UG.

ISO 639-3 codes: Vietnamese (vie), Irish (gle), Vata (Dida-Lakota (dic)), German (ger)

“It’s not what you look at that matters, it’s what you see.”
– Henry David Thoreau

1 Preamble

When it comes to understanding linguistic diversity, it may be preferable to adopt the perspective of the 19th century naturalist (zoologist, entomologist, botanist than that of the more contemporary geneticist, or molecular biologist. Given the Naturalist’s turn, *pace* Chomsky, Lewis or Davidson, there can be no Theory of Language with a capital *L*, any more than there is a Theory of Animal, or Insect, or Plant. This does not imply that one does not look beneath the surface, or that all surface detail or behavior is relevant to understanding or categorizing an organism, only that universal properties are not revealed by abstraction to a purely internal computational system, but rather through close observation and dissection of surface form, on the one hand; alternatively, through a study of the growth, development and dynamic behavior of different language varieties in their natural environment.

Adopting such a perspective, this paper explores the following thought experiment: how might a theory of UG¹ appear without English, if instead we were to begin our investigation with Vata (Kru)², or Modern Irish, or Vietnamese? If we disregard English data (as the *object* language)—alternatively, if we try to discern UG through different lenses (*objectif*)—what putatively universal properties would we want our theory to derive; conversely, which grammatical propositions, currently considered axiomatic, might turn out to be artefactual, given a different starting point?³

Let us begin with a piece of etymology, with the nouns *object* and *objective*. Both words find their source in the medieval Latin verb *ob + jacere*, meaning to throw something in the way of [one’s view]. In Germanic and Romance varieties, the nominal form is ambiguous, referring either to the thing at

¹ I recognize that UG, as articulated here, is itself an outdated concept: one purpose of this paper is to bring it back into circulation.

² The name Vata is that used by Koopman (1984): more recent, descriptively oriented sources, such as *Ethnologue*, treat this variety as a sub-variety of the Dida-Lakota dialect cluster (dic).

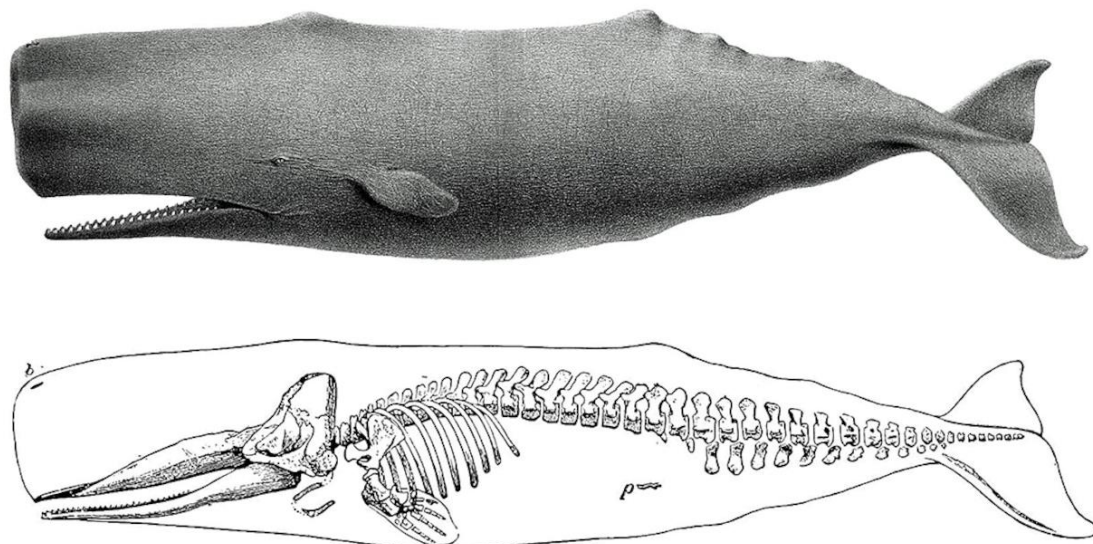
³ ‘TP’, ‘Case’ and the ‘EPP’ are likely candidates; similarly, uninterpretable features are also probably dispensable.

which one directs one's sights, or to the means that afford the observation, *viz.*, the lens; in English, the former meaning is the more prominent, in French and German, the latter dominates. But whichever interpretation one adopts, some views are more lucid—hence more informative to the researcher—than others.

Object

If, as a Naturalist, you wish to better understand the skeletal structure of mammals, it is certainly easier to consider an under-nourished white-tailed deer than to inspect a sperm whale: in its living form, the external bumps on the whale's skin offer few clues to its internal architecture; even after dissection, the whale skeleton—with its vestigial limbs and disproportionate tail to upper spine ratio—provides but a poor guide to what to expect from its terrestrial cousins. As we shall see directly, with respect to phrase structure internal to (and immediately above) the predicate phrase, studying English is like studying the hind legs of a whale; by contrast, Vietnamese, Vata and Irish are much more deer-like—*Tier*-like, perhaps, archetypal, in this regard.

Fig. 1. Sperm Whale as Archetype? (Creative Commons License)



SPERM WHALE WITH A VESTIGIAL PELVIS (LABELED "P"). VIA WIKIPEDIA.

Objective (*Objectif*)

Conversely, we might take UG to be the object of study, and different language varieties the various lenses used to obtain a clearer view of this abstraction. A recent paper by Caves *et al.* (2018)—‘*Visual Acuity and the Evolution of Signals*’—provides a useful frame of reference. The authors consider the consequences of variation in cross-species visual acuity, both for the species themselves and for our interpretations of their appearance and signalling behavior.

It turns out that most of the species surveyed in the Caves *et al.* (2018) would be classified as legally blind if they were human. This observation has significant ecological consequences when considering interactions among conspecifics with low acuity vision. Caves *et al.* take as their chief example the map butterfly (*Araschnia levana*): they demonstrate that even very close-up (~10cm range) this insect has only the fuzziest idea of what her mate looks like, when compared to the view of the Eurasian jay (a key predator), at two metres’ distance.

We can further improve the analogy: rather than taking language *varieties*, we can consider different *versions of generative theory* as the types of lenses through which to examine UG. Where Chomsky and others use powerful microscopy, this paper advocates a more human-scale, macroscopic approach.

Moral

The upshot is that some languages, and some theories, afford a clearer view. Anglocentricity is the attitude that English is the archetypal mammal when it comes to the clausal skeleton—alternatively, that current Minimalism is the hawk’s eye—when English could be the sperm whale, 21st century generativism, butterfly vision. Either way you look at it, UG is in the eye of the beholder. On a nature ramble or on safari, it’s best to take a pair of binoculars, not a microscope.

2 Four Principles of UG (*LGB redux*)

So how does UG appear, if we take a fresh look, through different eyes? Listed below I offer four deductive principles as plausible candidates for a contemporary theory of Principles & Parameters. The proposals presented below are a distillation of traditional *Lectures on Government & Binding* ingredients (Chomsky 1981), infused with insights from more recent advances, notably Cartography (Cinque 1999, 2002, Cinque & Rizzi (2008), Shlonsky (2015), Saito (2015), Antisymmetry (Kayne 1994, 2010, 2020), and ‘First Phase Syntax’ (Ramchand 2008; see also Travis 2010).⁴

As I hope to clarify in this paper, this is intended as more than a cosmetic re-branding of *LGB*: whilst many of the core features of the ‘d-structure’ components of *LGB*—X’-theory and Theta Theory—are recapitulated, the present theory derives these features quite differently. In certain respects, it is much more restrictive than *LGB*, imposing more fine-grained distinctions on the underlying position of both lexical and functional items (the underlying position of DP- vs. PP-complements, for example, or of non-Agentive thematic subjects). Yet in other ways—for instance, with regard to the inventory of functional categories found in a particular language, or to the position of phrasal heads within the X’-schema, or to the very notion of binary branching—what is proposed here is considerably less restrictive, allowing for greater parametric variation.

- **Exhaustive Endocentricity** (EE) requires that *every* category should project a phrase; conversely, that every phrasal constituent should be headed by a single element (morpheme). This means that minor categories, including determiners, auxiliaries, and subordinating conjunctions (complementizers), as well as adjunct modifiers, should all project their own constituent phrases;
- **Thematic Integrity and Uniformity** (TIU): Thematic *Integrity* requires that all thematic arguments (‘subjects’ and ‘objects’ alike), are initially projected inside the maximal projection of the predicate with which they are interpreted; Thematic *Uniformity* postulates that arguments⁵ bearing an identical thematic relation to a predicate across constructions are initially generated in the same structural position underlyingly;
- **Unique Argument Hypothesis** (*I-Arg*): every lexical or grammatical predicate is associated with at most one thematic argument. Bare arguments are initially projected as specifiers of their licensing head;
- **Supervenience of Functional Categories** (*SuperV*): Propositional functions aside (*T*, *Neg*), functional categories supervene on lexical categories (roots). In any grammatical clausal derivation, each lexical category *L* has at least one supervenient functional category *f* associated

⁴ As was the case for *LGB/Principles & Parameters Theory*, these principles are intended as declarative constraints within a representational theory. It is not especially difficult to express these in procedural/derivational terms; however, it is unclear—particularly given the epistemological stance adopted here—that this would be desirable, any more than one needs a theory of embryology to study animal physiology).

⁵ Excluding optional arguments appearing in an adjunct phrase, for example, the *by*-phrase argument in passives and derived nominal constructions (e.g., *the destruction of the city*). See section 2.3 below.

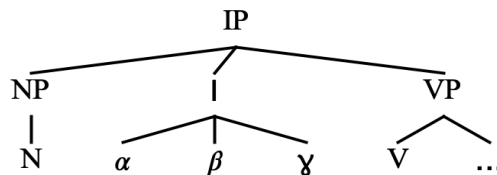
with it: differences in the feature-specification of a given functional category f imply differences in the specification of the subjacent lexical term L .

Whether considered separately, or in interaction with one another, these four principles have clear empirical implications for clausal analysis, as well as for cross-linguistic (parametric) comparisons. In almost every instance, they imply a mismatch between underlying and surface word-order, resolved by (functionally interpreted) movement. Let us now briefly examine the first three principles in turn.⁶

2.1 Exhaustive Endocentricity: Splitting functional structure

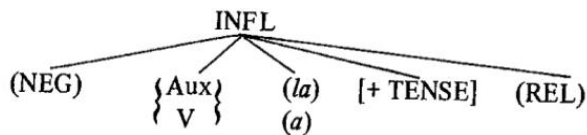
EE entails a complete fractionation of the composite heads in the clausal domain, traditionally labelled ‘I’ or ‘C’: see Chomsky (1981): if *EE* holds, then grammatical morphemes expressing Tense, (grammatical) Aspect, Mood, or Polarity all must be projected to the syntax independently of each other, as well of any lexical host. *EE* thus excludes analyses such as those in (1) in favor of the layered structure given in (2).

(1) a.



b.

(34) a. Vata

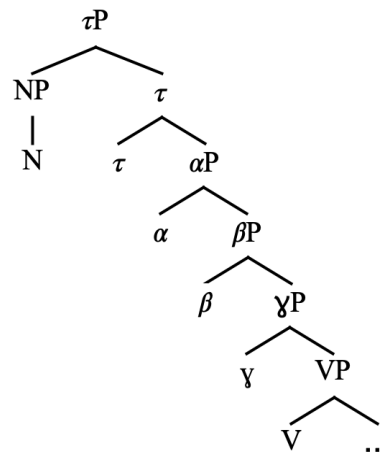


A case in point is Koopman’s (1984:[39]) analysis of the INFL node in Vata (Kru), reproduced in (1b).⁷

⁶ Space constraints prevent discussion of the fourth principle, *SuperV*. See Duffield & Phan (in prep.), for justification and elaboration.

⁷ I return to this language directly. Something to keep in mind for later, when we consider Modern Irish—is that in Koopman’s diagram (1b = [34]) the feature [+Tense] refers exclusively to the position of *future* tense morphemes: the past/non-past distinction is not expressed in Vata, at least not segmentally.

(2)



The consequences of *EE* for the analysis of more inflectional languages, in which TAM morphemes are attached or fused to a verbal stem, will be clear: previous analyses of such varieties—from Pollock (1989) and Ouhalla (1991) onwards—have all pursued different aspects of this fractionation strategy. However, *EE* also has significant implications for more isolating languages, with respect to ambiguous or multifunctional functional categories. Specifically in the case of Vietnamese, *EE* entails a derivational analysis of the anterior morpheme *đã* in (3)—ambiguous in affirmative contexts between an aspectual (perfect) and a temporal (preterit) interpretation, but unambiguously preterit in negative contexts; see Trinh (2005), Phan & Duffield (2019a). *EE* also constrains the analysis of elements that simultaneously express more than one grammatical meaning, such as *chưa* (NEG+PERF) in (4) (Phan & Duffield 2019b), or those whose interpretation changes depending on their position—e.g., clause-medial vs. -final *không* in (5), see Phan & Starke (2021), and ‘multifunctional *được* (‘can’) in (6) (Duffield 1999, 2001).

- (3) a. Anh.áy **đã** đến.
 PRN DA come
 ‘He has come/came.’
- b. Anh.áy **đã** không đến.
 PRN DA NEG come
 ‘He didn’t come.’ [exclusive past time interpretation]
 NOT ‘He hasn’t come.’
- (4) a. Anh.áy **chưa** đến.
 PRN NEG.PERF come
 ‘He hasn’t come yet.’ [exclusive negative perfect interpretation]
- b. Anh-áy đã **chưa** đến.
 3SG.M DA NEG.PERF come
 ‘He hadn’t come yet.’ [exclusive past perfect interpretation]
- (5) a. Anh-áy **không** đến.
 3SG.M NEG come
 ‘He doesn’t come/didn’t come.’

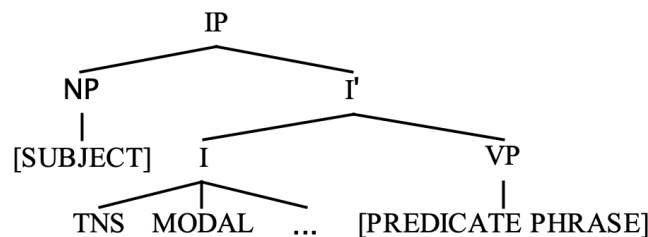
- b. Anh.áy (có) đến **không?**
 3SG.M ASR come NEG
 ‘Is he coming?’
- (6) a. Ông Quang **được** mua cái nhà.
 PRN Q. can buy CLF house
 ‘Quang is allowed to buy a house.’
- b. Ông Quang mua **được** cái nhà.
 PRN Quang buy can CLF house
 ‘Quang has bought (was able to buy) a house.’
- c. Ông Quang mua cái nhà **được**.
 PRN Q. buy CLF house can
 ‘Quang is able to buy a house/Quang may possibly buy a house.’

More generally, *EE* excludes the possibility that different kinds of grammatical category are base-generated in the same syntactic position: where semantically distinct functional categories appear in complementary distribution—apparently ‘in competition for’ the same syntactic slot, *EE* entails that at least one of these, quite possibly all of them, have been raised from some other underlying position(s).

Whereas this idea is well accepted in mainstream generativist analysis when it comes to alternations between finite verbs and auxiliaries in languages like French, or where the alternation involves elements in the ‘C-domain’—for instance, ‘Verb-Second’ alternations in Continental Germanic—it has some more interesting consequences for what used to be termed the ‘INFL’ node, and which is nowadays usually labeled T (for Tense).

Far from being a natural locus of well-defined features, ‘INFL’ is the laundry basket or, perhaps—following our zoological metaphor—the large intestine of the clause: almost nothing that is found there actually belongs, but instead originates some more ordered place, and is on its way to somewhere else—PF, or Spellout, as preferred.

(7)



(8)

(15) **Aux** → Tense (Modal)(Perfect)(Progressive)

EE thus excludes a decades-old assumption, diagrammed in (7)—and (8), from Chomsky (1965:43)—that would generate English modal auxiliaries under the same node as tense specifications [\pm PAST]. *EE* implies that English modal⁸ auxiliaries—being inherently *irrealis*, and therefore untensed—are

⁸ This discussion relates to *deontic* modals, which appear immediately pre-verbally in Vietnamese, and to the right of morphemes expressing clausal negation and grammatical aspect (perfect, progressive). Other modal types are projected in different positions - *cf.* the examples in (6) above. Crucially, however, none of these appear in τ underlyingly.

initially projected lower in clausal phrase-structure—arguably, in the position in which they are found in Vietnamese, in the examples in (9). It also suggests that tense (and expletive *do*) are generated in some lower position(s); cf. Duffield (2013).⁹

- (9) a. Cô.áy đã không **được** đi ra ngoài một mình.
 PRN ANT NEG CAN go out one self
 ‘She couldn’t go out by herself.’
- b. Tôi sẽ **nên** làm gì nếu bị sa thải? [FUT? < MODAL < V]
 1SG FUT MOD do what if PASS fire
 ‘What should I do if I get fired?’
- c. Lẽ ra lúc này họ đã **nên** đi rồi. [ASP<MODAL<V]
 right out when DEM PRN ANT MOD go already
 ‘He (should) have left already.’
- d. Mình đang **nên** làm một thứ gì đó. [PROG < MODAL < V]
 self DUR MOD do one thing what DEM
 ‘I should have been doing something.’

Which in turn raises the possibility that tense may not be projected in all languages: in other words, one could have a universal base without tense, though with τ (*tau*), the clausal head, as schematized in (2) above.¹⁰ This idea is certainly attractive to many Vietnamese scholars; see, e.g., Bui (2019), Nguyễn H. T. (2019). If instead of the merged categories found in English ‘INFL’ generative theory had started out with the T-A-M distributions so clearly articulated in Vietnamese, it is reasonable to think it would have run a very different course.

It is not only the separation of Tense from modal auxiliaries that Vietnamese reveals (where English conflates). Vietnamese also provides evidence of a separation between Tense and Finiteness; or rather, a splitting of finiteness itself into Tense and Assertion (‘Assertion validity’). In Duffield (2007, 2017), it is argued that Vietnamese *có*—located to the right of clausal negation and aspect—is the realization of ‘assertion validity’, abbreviated as *Asr*. This splitting of *T* and *Asr* is the structural implementation of a conceptual proposal originally due to Klein (1998, 2006).

In English, the two readings can be distinguished contextually, with auxiliaries in their emphatic form: compare (10b) and (10c) below. Morpho-syntactically, however, Tense and *Asr* are morphologically inextricable in English: it is this contingent fact that leads to the (possibly false) conclusion that Tense is obligatorily projected universally.

- (10) a. The book *was* on the table.
- b. “The book is on the table.”
 — “No, the book *was* on the table.” [TNS reading]
- c. “The book was not on the table.”
 — “No, that’s wrong, the book *was* on the table.” [ASR reading]

⁹ Koopman (2020) argues on independent grounds that modal auxiliaries in English raise from a lower position.

¹⁰ The identity of τ may be subject to variation (within a constrained set of options); alternatively, τ may be a purely formal construct, projected to satisfy *EE* in structures where A-movement is required, for interpretive reasons. See Duffield & Phan (*in prep.*), for further discussion.

In Vietnamese, on the other hand, *Asr* is independently expressed by *có*, as illustrated by the examples in (11). Moreover, as we shall see later, this particle also serves as an existential copula and—probably non-coincidentally—as a main verb of possession; cf. Harves & Kayne (2012).

- (11) a. Hôm qua anh.ấy đã không có đến nhà chị.
 yesterday PRN NEG ASR go-to house PRN
 ‘He didn’t go to your house yesterday.’
- b. Chị đang có yêu một người¹¹
 PRN PROG ASR love one man
 ‘She is in love with someone.’
- c. (Anh) đừng/chớ có nói to!
 PRN NEG.IMP ASR talk loud
 ‘Don’t speak loudly!’

2.2 TIU: The Projection of Predicate-Argument Structure

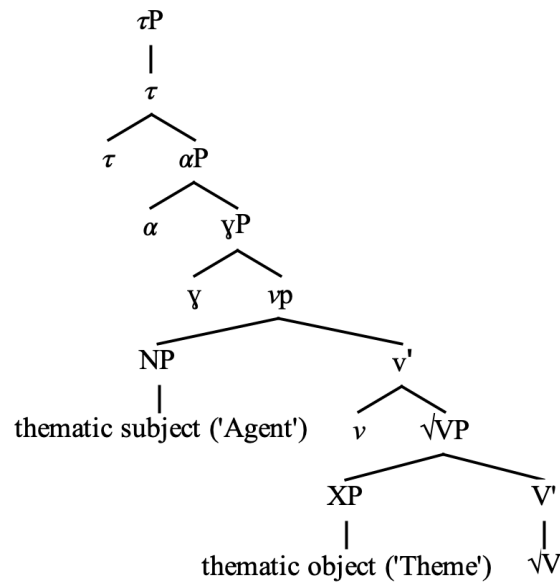
2.2.1 Thematic Integrity

The next principle, **Thematic Integrity and Uniformity**, comprises two sub-principles, which together recapitulate the Theta Criterion and the Projection Principle from LGB, in more restrictive, Cartographic, terms.

The first of these sub-principles, *Thematic Integrity* (TI), encompasses two earlier hypotheses concerning thematic subjects and direct objects, respectively, namely, the **VP-internal Subject Hypothesis** (VP-ISH: Koopman & Sportiche (1991), Woolford (1991), Burton & Grimshaw (1992)), and the **Verb-Object Constraint** (Baker 2001, 2009). See (12) below, which also incorporates the *I-Arg* constraint. With respect to clausal *subjects*, *TI* entails that canonical S AUX V O word-order observed in regular declarative clauses in Vietnamese and English is the result of subject raising, and that the position of thematic subjects in passive **bị/được**-clauses, such as those in (13)—alternatively, of the indefinite subjects of existential clauses in (14)—is closer to the underlying position of these arguments.

¹¹ Some Vietnamese speakers do not accept the sequence *đang có*, especially with eventive predicates. For all speakers, however, this is preferable to the reversed order (**có đang*).

(12)



- (13) a. Nam bị (Nga) đánh. [Simpson & Ho (2008)]
 Nam PASS(-) Nga hit
 ‘Nam was hit (by Nga).’
- b. Nam bị *(Nga) bảo cảnh sát đến bắt. [Simpson & Ho (2008)]
 Nam PASS(-) Nga call police come arrest
 ‘Nga called the police to come and arrest Nam.’
- c. Anh.ấy được [(nhiều người) khen.
 PRN DEM PASS+ many people praise
 ‘He was praised (by many people).’
- (14) a. Sẽ không có một mẫu iPhone SE mới nào vào năm nay?
 FUT NEG ASR 1 CLF iphone SE new WH come year this
 ‘There won’t be a new iPhone SE this year, will there?’
- b. Có thể sẽ không có ‘viên đạn bạc’ vắc xin diệt COVID-19.
 perhaps FUT NEG ASR bullet magic vaccine against Covid-19
 ‘There may not be a magic bullet vaccine against Covid-19.’
- c. Sẽ có người đợi bạn ở sân bay.
 FUT ASR person wait friend be-LOC airport
 ‘There will be someone waiting for you at the airport.’

TI raises new empirical questions concerning the ‘clausal subject position’ in SVO languages, to the left of TAM and Polarity elements. Notice that the Movement Conjecture rules out any explanation that invokes purely formal features, such as Case or EPP features, to drive subject raising. Yet even without this condition on movement, it seems doubtful that Case theory would have received any serious consideration as an explanatory factor, if Vergnaud—who made the original proposal in a letter to Chomsky in (1976)—had been a native-speaker of Vietnamese, rather than French.

Further examination of Vietnamese passive constructions reveals that, although the clausal subject position must be filled by some (affected) argument other than the Agent—as evidenced by the contrast between (15a) vs. (15b)—this movement cannot be driven by Case considerations. This is clearly demonstrated by the grammatical acceptability of the examples in (16), in which both the thematic subject (*nhiều người*) and Theme object (*báo cáo*) are properly licensed in lower positions, apparently *in situ*; cf. Simpson & Ho (2008), Huhyn (2013). Indeed, the examples in (16) cast doubt on the idea that the surface subject in Vietnamese or Chinese (Huang 1999) passives originates as a direct object in any context: more plausibly, the surface subject (*anh ấy*) in (16) should be analyzed as an argument introduced by the passive auxiliary **bị/được**.

Note that similar distributions are observed in English *have*-passives, illustrated in (17), which receive less attention than their more common counterparts with BE:¹²

- (15) a. Dùng bằng giả sẽ bị xử ra sao?
 use diploma fake FUT PASS judge how?
 ‘How will the use of fake diplomas be judged?’
- b. *Sẽ bị xử ra dùng bằng giả sao?
 FUT PASS judge use diploma fake how?
 ‘How will the use of fake diplomas be judged?’
- c. Anh.ấy bị [(nhiều người) chê.]
 PRN PASS- many people criticize
 ‘He was criticized (by many people).’
- (16) a. Anh.ấy đã bị [_{TP} (nhiều người) chê báo cáo (của anh.ấy)].
 PRN DEM ANT PASS many people criticize report belong^{PRN}
 ‘His report was criticised by many people.’
Lit. *He was many people criticized his report.
- b. Anh.ấy được [_{TP} (nhiều người) khen báo cáo (của anh.ấy)].
 PRN PASS- many people praise report belong^{PRN}
 ‘His report was praised by many people.’
- (17) a. Richard had [the police raid(ing) his apartment, in search of illegal material].
 b. Alice had [five people come(ing) to her door, looking for her sister].
 c. Mary had [everyone in the office tell(ing) her what a great job she’d done].

As for thematic *objects*, *TI* forces a movement analysis of every construction in which a lexical predicate is separated from its s-selected object by some functional category: either movement of the verb, or of the object, or both. Within the generative literature, the most familiar examples of verb- and/or object-raising are cited from European languages such as French (e.g., Pollock 1989) or Swedish (Holmberg 1999); in such examples, the position of clausal negation (NEG) serves as diagnostic of constituent movement. However, instances of obligatory verb-object separation are also observed in at least some constructions in Vietnamese, notably, in sentences containing universally quantified objects, as in (18) below. It is particularly significant that the canonical SVO order is not grammatically acceptable here; *(18c), see Duffield (2007) for discussion.

¹² Though see Chomsky (1965: 21-22). That the object does not raise for Case reasons would follow from *Burzio’s Generalization*, since the subject theta-role is evidently not suppressed (Baker, Johnson & Roberts 1989): however, in the absence of any principled explanation as why passive morphemes in Vietnamese do not lead to subject demotion, this is simply a restatement of the facts. A better explanation is that Case—or whatever Case really is—does not apply in this language.

- (18) a. **Từ nào** [**cô.áy** **cũng** **nhớ** **từ nào**] [O_{QP}SV order]
 word WH PRN also remember
 ‘She remembers every word.’
- b. **Cô.áy** **từ nào** [**cũng** **nhớ** **từ nào**] [SO_{QP}V order]
 PRN word WH also remember
 ‘She remembers every word.’
- c. ***Cô.áy** [**cũng** **nhớ** **từ nào**] [*SVO_{QP} order]
 PRN also remember word WH
 ‘She remembers every word.’

Even where both the verb and the direct object remain within the verb-phrase, *TI* entails a more complex derivation, if the two elements are separated by a functional category. This can be appreciated through a reconsideration of data from Vata, a Kru variety with restricted verb-raising, originally presented in Koopman (1984). Scholars of my generation will be familiar with the core alternation exemplified in (19) through (21): the examples show that in finite clauses the verb appears verb-medially in the absence of certain auxiliaries, but strictly clause-finally—sentential complements aside—in the presence of those same (typically aspectual or negative) morphemes.¹³

The negated sentences in (21) offer a nice minimal contrast: Koopman observes that movement is obligatory where NEG is an auxiliary (NEG-P) (21a), but obligatory when NEG is a particle (NEG-A) (21b):¹⁴

- (19) a. n| **lē** **bĩ** sa|ká. [SVO↯]
 I eat now rice
 ‘I am eating rice right now.’
- b. n| **là** sa|ká. [SVO↯]
 I eat-^{PERF} rice
 ‘I ate rice. [*sic*].’
- (20) a. wa| **lā** **mÓ** **dlá.** [SIOV]
 they ^{PERF-A} him kill
 ‘They have killed him.’
- b. n| **ká** na| **gòli** **mÍ** **pùtu** **sà.** [SIOV]
 I ^{FUT-A} my mounds in grass remove
 ‘I will clear the weeds from my mounds.’
- c. yO|-O| **gū-gū** **nā** **Kòfí** **nÍ** **mÓ** **yé** **yÉ`** [SIOV]
 child-DET think that Kofi NEG-A him PART see
 ‘The child is thinking that Kofi did not see him.’

¹³ From Koopman (1984): ‘the order is Subject Verb Complement (SVO) in Vata and Gbadi, [*sic*] if the aspect of the clause is imperfective ... *in both main and embedded clauses alike* [emphasis in original]...In some tenses or moods, however, in which the clause contains an auxiliary...the main verb follows its complements.’

¹⁴ Given the other alternations in the paradigm, as well as the behavior of floating tones in this language, the description (PARTICLE vs. AUXILIARY) is less circular than it might appear here. That said, there is certainly more to review and verify when it comes to Koopman’s glosses of functional categories.

- (21) a. O| na ĩ sa|ká. [negative subjunctive: SVOV̄]
 she NEG-P eat rice
 ‘She should not eat rice.’
- b. O| Ó tĩ sa|ká ĩ... [negative conditional: SIOV]
 S/he NEG-P NEG-A rice eat
 ‘If she had not eaten rice...’

Of particular interest—though largely ignored in most general presentations of Vata—is the positioning of the verbal particles in so-called ‘particle-verb’ constructions; these are illustrated in the verbal examples in (22), as well as in the nominalizations in (23)—also by the first *yé* in example (20c) above:

- (22) a. O| pÉ ma|ma| mlÉ [S-V-ADV-PART-V̄]
 s/he shout much PART
 ‘S/he shouts a lot.’
- b. à nI| ma|ma| mlÉ pÉ. [S-I-ADV-PART-V]
 we NEG-A much PART shout
 ‘We did not shout a lot.’
- c. O| b)lá sa|ká kO| [S-V-OBJ-PART-V̄]
 s/he take rice PART
 ‘She is taking rice.’
- d. à lā sa|ká kO| b)lá. [S-I-OBJ-PART-V]
 we PERF-A rice PART take
 ‘We have taken the rice.’
- (23) a. [mlÉ -pÉ]-ĩ [PART-V] NOM
 PART -talk- NOM
 ‘the shouting’
- b. [sa|ká -kO| b)lá]-ĩ [[OBJ PART-V] NOM]
 rice PART take- NOM
 ‘the taking of rice’

Crucially, this lexical particle always occurs strictly left-adjacent to the verb in non-verb-raising contexts, even though—as Koopman discusses, and as shown by the *di-transitive* paradigm in (24)—all other constituents can be freely scrambled out of the thematic verb-phrase:¹⁵

- (24) a. (n| ká) yÓ-Ó slé-e| mlí s|áká nyE|.
 I FUT-A child-DEF house-DEF in rice give
 ‘(I will) give rice to the child in the house.’

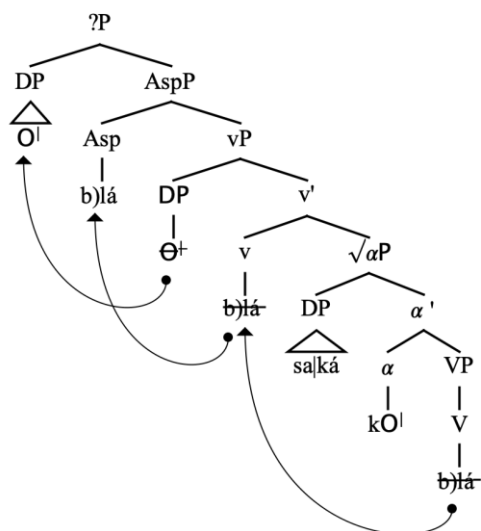
¹⁵ It is understandable, given that it is her native language, that Koopman tends to interpret Vata data through a Dutch lens, rather than an English one: particle verb constructions in Vata are assimilated to those found in Continental West Germanic (*esp.* Dutch and German). Arguably, however, more insight would be gained by reversing the perspective: i.e., viewing Dutch through the lens of Vata.

- b. ... slé-e| mlÍ yÓ-Ó s|áká nyE|
 ... house-DEF in child-DEF rice give
- c. ... slé-e| mlÍ s|áká yÓ-Ó nyE|
 ... house-DEF in rice child-DEF give
- d. ... s|áká slé-e| mlÍ yÓ-Ó nyE|
 ... rice house-DEF in child-DEF give
- e. ... yÓ-Ó s|áká slé-e| mlÍ nyE|
 ... child-DEF rice house-DEF in give
- f. ... s|áká yÓ-Ó slé-e| mlÍ nyE|
 ... rice child-DEF house-DEF in give

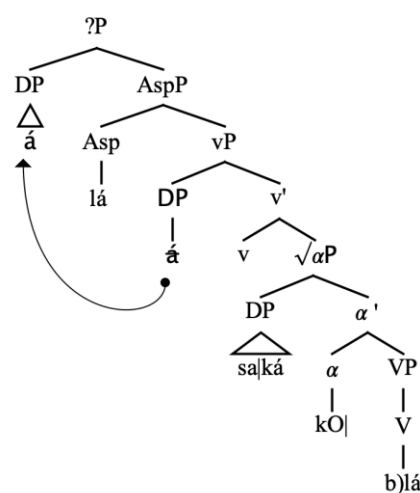
TI, taken in conjunction with *EE* and *I-Arg*, suggests an analysis of the Vata V-PART-O (19c) ~ O-PART-V (19d) alternation, as diagrammed in (25a), (25b), respectively:¹⁶

(25) Vata V-PART-O vs. O-PART-V order (limited V-movement: V-Asp raising)

a.



b.



There are several immediate conclusions to be drawn from the Vata facts. Most obvious is the fact that verb-raising seems not to depend on the particular features of either the ‘goal’ or the ‘probe’, since the same verb is involved in both alternants, and the same functional features—typically aspectual

¹⁶ Other analyses are compatible with these three principles. In the original presentation of this work, I proposed that the direct object originates in the {Spec,√VP} and moves to the left of the particle in Vata, as it does in the corresponding sentences in Vietnamese. However, the present analysis seems preferable, given that these particles are retained in nominalizations, as also in English particle verbs (*take-up*, *uptake*, *send-off*, etc); this suggests that the object is really an argument of the particle, rather than the root verb. If this is the case, then *TI* and *I-Arg* requires something like the analysis given here.

features—are being projected. Rather, as with V_2 movement to C in Germanic, movement depends primarily on there being an available slot.¹⁷

A further conclusion, which follows from our four principles, is that the verb must be able to skip over the particle head on its way to the higher landing site, as diagrammed in (25a) above. This suggests that the Head Movement Constraint/HMC (Travis 1984)—Head Minimality (Rizzi 1990)—is an artefact of languages with exclusively morphologically-selecting functional heads.

The Vata facts find an interesting parallel in Vietnamese, in contexts where the verb is separated from its object by aspectual (telic) particles, including *ra*, (post-verbal) *được*, and *xong*. These are illustrated in (26) and (27) below; see also (6b) above. Given previous work—including especially Phan (2013)—these particles are taken to be expressions of an ‘Inner Aspect’ node; see Travis (1991, 2013).

- (26) a. Chú bò tìm (**ra**) bạn. [vP V-**IASP**-OBJ-**V**]
 CLF cow search (go out) friend
 ‘The cow looked for (and found) his friend.’
- b. Cô.áý kiếm (**được**) việc. [vP V-**IASP**-OBJ-**V**]
 PRN seek can work
 ‘She was looking for/(and got) a job.’
- c. Anh.áý ăn lóít lòng (**xong**). [vP V-OBJ-**IASP**-**OBJ**-**V**]
 PRN eat breakfast finish
 ‘He ate his breakfast/(up).’

Notice, in particular, the definiteness effect in the alternation in (27), where raised object noun-phrases are necessarily interpreted as definite, even in the absence of any determiner or classifier element; cf. Simpson, Soh & Nomoto (2011).

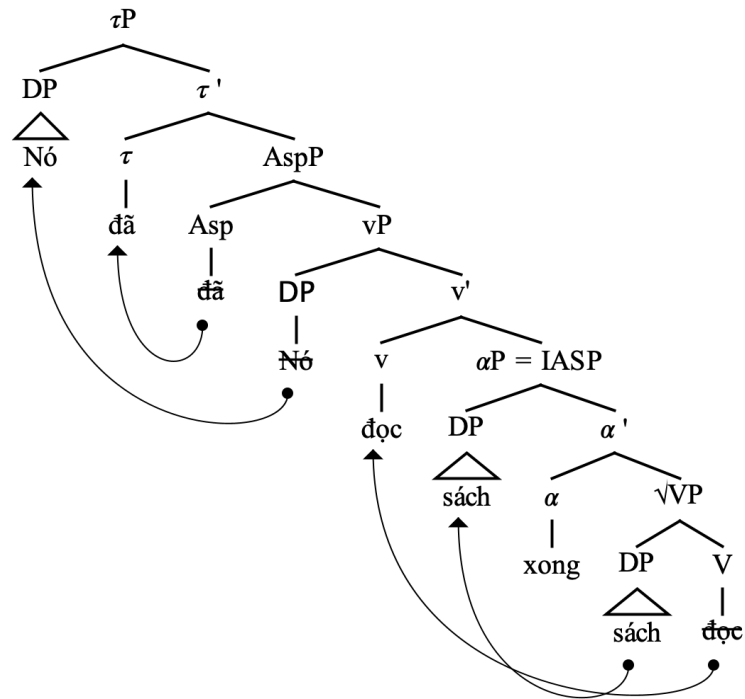
- (27) a. Nó đã đọc xong sách rồi. [vP V-**IASP**-OBJ-**V**]
 PRN ANT read PTC book already
 ‘He has finished reading (the) books.’
- b. Nó đã đọc sách xong rồi. [vP V-OBJDEF-**IASP**-**OBJ**-**V**]
 PRN ANT read book PTC already
 ‘He has finished reading the books.’

By applying to Vietnamese the same phrase-structural analysis proposed in (25) for Vata VPs—*modulo* verb-raising to v —we can describe the alternation in (27) in a way that is consistent with *TI*. This is diagrammed in (28):¹⁸

¹⁷ Compare Roberts’ (1993) distinction between morphologically selecting *vs.* non-selecting functional categories (X^{-1} *vs.* X^0), where only the former type drives verb-raising.

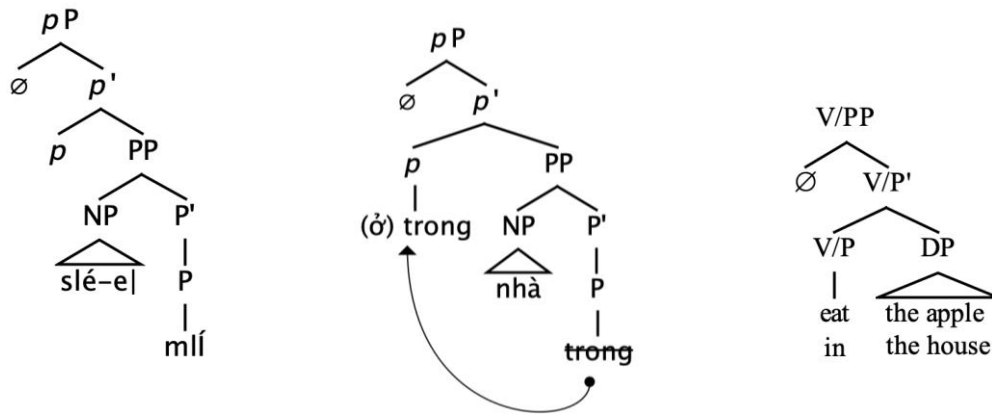
¹⁸ In Phan & Duffield (2021), it is argued that certain contrasts between Vietnamese and Mandarin Chinese can be captured through parameterization of verb- and object-raising over the vP structure given in (26).

(28) *Inner Aspect: Definiteness effects, Verb-Raising in Vietnamese*



A final point to observe concerning Vata is the NP-P order in adpositional phrases (e.g., *slé-e/ mlí* ‘in the house’). As discussed in 2.3 below, this is the expected base-order (O-P), even in so-called ‘head-initial’ languages: given *EE*, *I-Arg*, and *Supervenience*, prepositional word-order entails movement to a supervenient functional category, as diagrammed in (29ab):

(29)



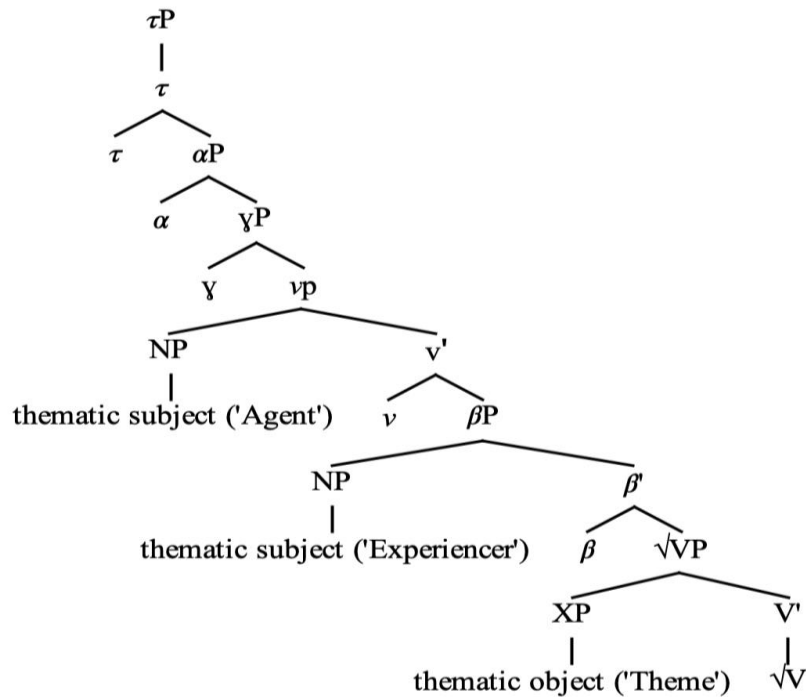
Alternative analyses of prepositional phrases, compatible with 1-Arg and Supervenience: (a) in Vata; (b) in Vietnamese, vs. (c) the standard analysis.

2.2.2 Thematic Uniformity

The second part of the TIU principle, **Thematic Uniformity (TU)**, is concerned with the underlying positions of arguments that are interpreted as expressing particular kinds of thematic relations to their predicate. Whilst it might be seen as a simple restatement of Baker's **Uniformity of Theta-Assignment Hypothesis** (Baker 1988, 1997), TU actually pursues a stronger hypothesis, more in line with the earlier **Universal Alignment Hypothesis** (Perlmutter & Postal (1984:97), see also Rosen (1984)). In the case of the UTAH, the implicational relationship between thematic structure and syntactic position was unidirectional (identical thematic relationship \supset identical underlying position), and applied only to individual predicates, on a case-by-case basis: see Baker (1997), for discussion. By contrast, TU proposes that different thematic relations {Agent, Experiencer, Theme, Goal, *etc.*} imply distinct structural positions, irrespective of the predicate head.

Perhaps the most investigated thread of TU is the **Unaccusative Hypothesis**. Originally due to Perlmutter (1978), this hypothesis distinguishes between two kinds of 'intransitive' argument: (i), the subjects of (volitional) activity predicates such as *sing*, *dance*, *play* — so-called **unergatives**; (ii) subjects of predicates describing involuntary, uncontrolled actions, such as *fall*, *blush*, *appear* — the **unaccusatives**; see also Burzio (1986), Levin & Rappoport (1995). Most previous work on other language varieties has provided evidence of a two-way distinction only, in which unaccusatives are subsumed under a more general class of 'affected objects' (Themes). However, as outlined in Duffield (2011, 2014), also Phan & Duffield (2021), Vietnamese causative constructions—'simple *làm*' causatives—provide striking distributional evidence of a *three-way* split, diagrammed in (30). This tree should be compared with that in (12) above. The following examples show that whereas strongly unergative *Agent*-subjects are completely excluded from this construction (31), non-agentive DP_2 arguments preferentially appear *pre-verbally* (32), with true Themes preferring a *post-verbal* position (33), in accordance with Thematic Uniformity.

(30) A Tripartite Division in Unaccusative Alignment



- (31) a. *Tôi làm a con gái giúp anh.áy. *[DP1 làm DP2 V DP3]
 I make CLF CLF girl help PRN
 ‘I make the girl help him.’
- b. *Tôi làm đưa con gái nhảy/hát/ngủ. *[DP1 làm DP2 V]
 I make CLF CLF girl dance/sing/sleep
 ‘I make the girl dance/sing/sleep.’
- (32) a. Tôi làm thang-be ngã/khóc/biến-mất. [DP1 làm DP2 V]
 I make boy fall/cry/disappear
 ‘I made the boy fall (I tripped the boy.)/cry/disappear.’
- b. ??Tôi làm ngã/khóc/biến-mất thang-be. ??[DP1 làm V DP2]
 I make fall/cry/disappear boy
- (33) a. ?Tôi làm cái que gãy ~ tờ giấy rách. ?[DP1 làm DP2 V]
 I make CLF stick break ~ CLF paper tear
 ‘I broke the stick/tore the paper.’
- b. Tôi làm gãy cái que ~ rách tờ giấy. [DP1 làm V DP2]
 I make break CLF stick ~tear CLF paper

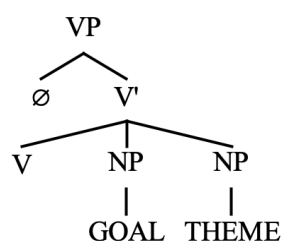
Here once more it is very likely that a different theory of *d*-structure would have emerged had *LGB* been based on Vietnamese, rather than on English or Italian, or other ‘Standard Average European’ facts; see Burzio (1986); cf. Sorace (2000).

2.3 *I-Arg*: Consequences for the Head Parameter

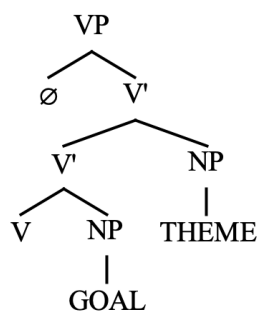
The third principle, *I-Arg*, is the most radical of the four structural proposals. It is certainly the one that owes least to *LGB*: in Chomsky (1981), the number of arguments directly associated with a given predicate in the syntax was entirely determined by the *s-selection* properties of that predicate (Projection Principle). In the interim, however, various proposals have been made to handle special problems raised by di-transitive predicates—including those found in double-object (DO) and applicative constructions—in which an asymmetric relationship obtains between different kinds of object, such that the indirect object in DO constructions not only intervenes between the verb and the direct object, but also *c-commands* the object position.¹⁹ This excludes any analysis involving a ternary branching structure (34a) or where the Goal object is lower than the Theme, underlyingly, as in (34b):

(34)

a.



b.



A separate line of research, developing seminal work by Hale & Keyser (1993), and Kratzer (1996), has concluded that the thematic subjects of canonical transitive verbs are not in fact arguments of a lexical predicate, but are instead arguments of ‘little-*v*’, a quasi-functional category, supervenient on the core VP. *I-Arg* generalizes over both of these research strands.

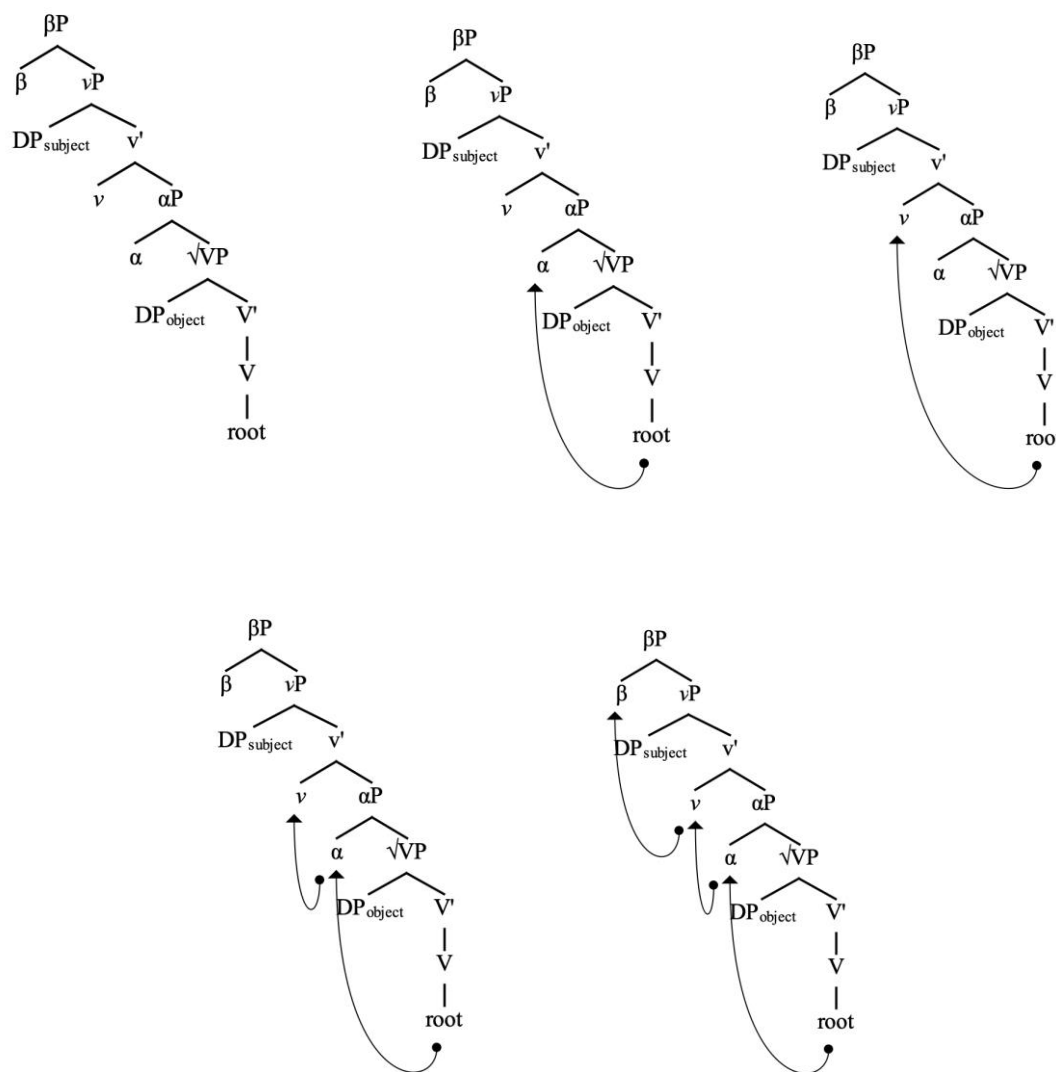
As with the other principles introduced in this paper, *I-Arg* involves a theoretical claim about content—*viz.*, that transitivity is always compositional—as well as a set of empirical arguments about underlying structure. It is these latter claims that I focus on here.

Consider first the notion of **headedness**. In GB, notably in Travis (1984), headedness was defined in terms of the precedence relationship holding between a lexical predicate (verb or adposition) and its thematic complement; in classical X'-Theory, ‘sister’ and ‘complement’ become almost synonymous terms. However, in the theory proposed here, there is no such equivalence: non-nominal arguments (CPs, PPs) aside, nominal arguments are always specifiers. Consequently, all languages are underlyingly OV, independently of branching direction. Issues of head-directionality only arise once lexical predicates are combined with supervenient functional projections, and movement has or has not taken place. *Cf.* Kayne (2020).²⁰

¹⁹ On double objects, see especially Kayne (1984), Larson (1988), Baker (1997) for a review; on applicatives, see Polinsky (2005).

²⁰ A corollary of this is that verb-argument adjacency effects will only be found in right-branching languages. That is, there should be no OV adjacency requirements in left-branching configurations. I am not aware of any counterexamples to this claim.

(35) *Deriving the Head Parameter, without sisterhood*



Hence, of the two languages we have considered thus far—Vata and Vietnamese—the former is no more ‘head-final’ than the latter, underlyingly. Rather, they are distinguished only by the scope of predicate-raising internal to *vP*, in (25a) vs. (28), and/or internal to *pP*, in (29a) vs. (29b), respectively.

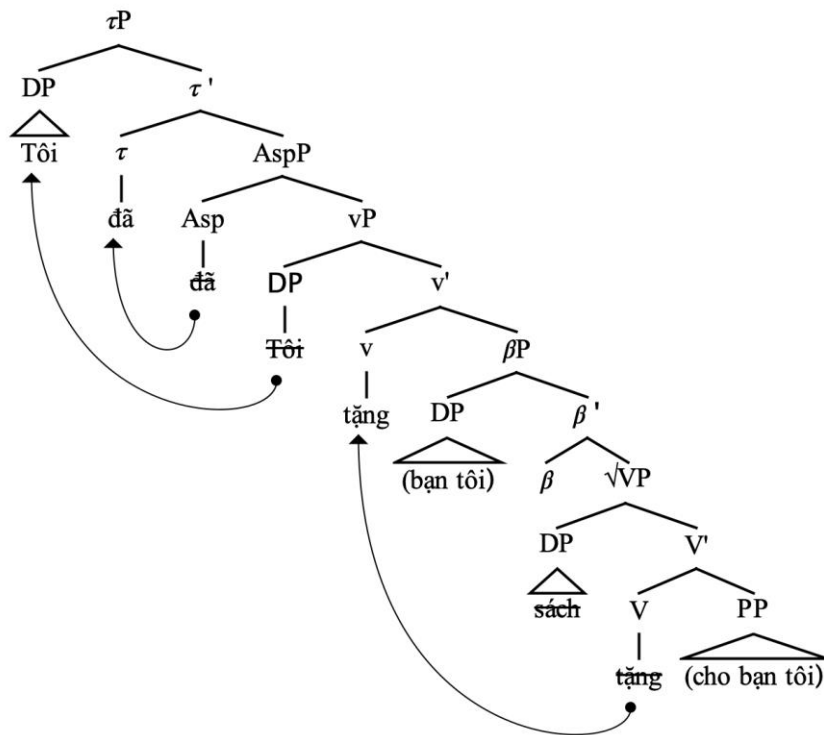
This does not mean that there is no distinction to be drawn between ‘head-initial’ languages such as Vietnamese and ‘head-final’ varieties such as Japanese or Korean. But this is a question of branching direction, not head-complement order; see Dryer (1992); Hawkins (1990, 1995). *Contra* Travis (1984) and subsequent work, *I-Arg* entails that head-directionality cannot be determined by direction of theta-assignment, since thematic complements (DP-complements, at least) are never sisters to any head.

The *I-Arg* principle, in conjunction with *TI*, also explains the distribution of s-selected non-nominal complements relative to DP-arguments: whereas *I-Arg* requires DP-arguments to precede the root predicate underlyingly, *TI* entails that non-nominal complements should appear to the right, as sisters of the selecting head. The Vietnamese double object examples in (36) instantiate this contrast—though here, English would serve as well. Example (36a, b) are diagrammed in (37) below:

- (36) a. Tôi đã tặng bạn tôi sách. [modified from Ngô 1998:166]
 I ANT present friend I book
 ‘I have given my friend a book.’

- b. Tôi đã tặng sách cho bạn tôi.
 I ANT present book give friend I.
 ‘I have given a book to my friend.’
- c. *Tôi đã tặng cho bạn tôi sách.
 I ANT present give friend I book
 ‘I have given a book to my friend.’

(37)

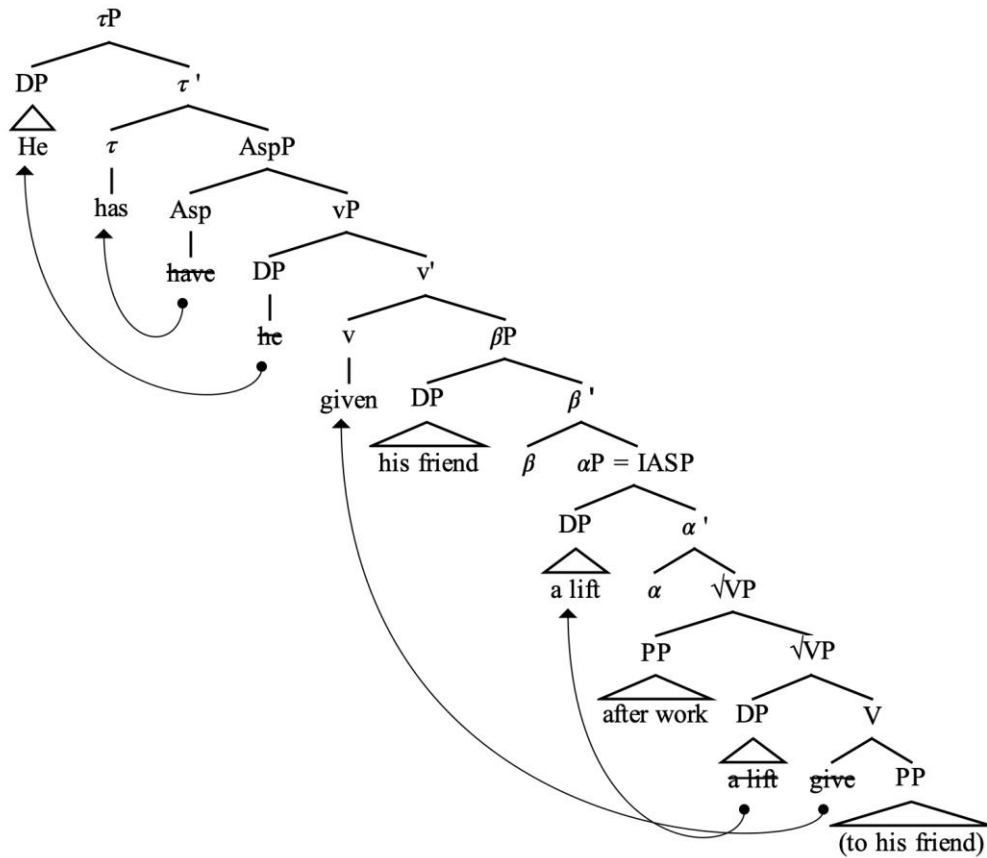


The layered-VP approach diagrammed in (37) is hardly original: it informs most contemporary generative analyses of double object constructions; see Baker (1997), *cf.* also Beck & Johnson (2004). Yet, as it stands, this analysis fails to capture a relevant descriptive contrast between double object and prepositional objects with respect to adjacency effects, namely, that both objects must be string-adjacent in the former construction, but not in the latter.

- (38) a. He has given his friend (*after work) a lift (on several occasions).
 b. He has given a lift (after work) to his friend (on several occasions).

Attempts to solve this problem have usually resorted to an additional step of object-raising—typically motivated by Case Theory—such that adjuncts adjoined to the left of the root \sqrt{VP} appear to the right of the Theme object, as in (39).

(39)



Whilst such a strategy may be effective in this particular instance, it does not account for adjacency effects more generally, not just in the case of object nominals—most obviously those in (40)—but also with respect to head-*subject* adjacency: across a variety of languages, including English (41), and German (42)—and Irish, which is the last object of our inquiry—subject arguments are subject to strict adjacency with a supervenient functional head (*C*).²¹

- (40) a. These people have done (*never) an honest day’s work in their lives.
- b. They bought (*yesterday) books.
- c. She took (*every time) him for a fool.

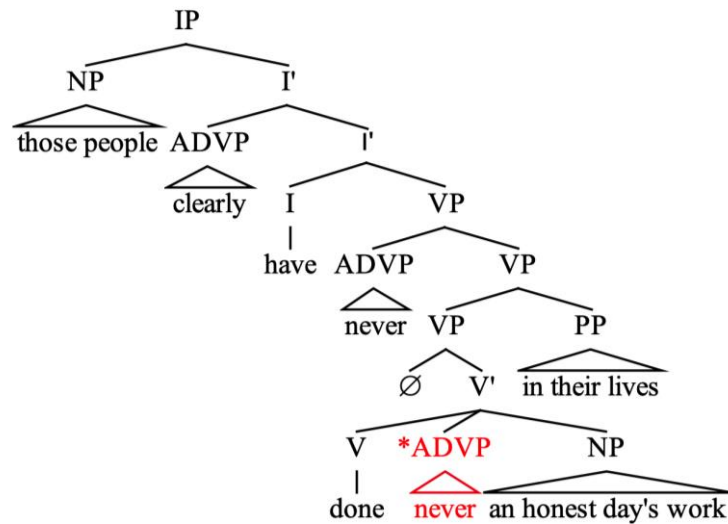
- (41) a. She had in mind **for John** suddenly to leap out of the car...
- b. *She had in mind **for suddenly John** to leap out of the car...
- c. She had in mind that *suddenly* John would leap out of the car...

²¹ On the analysis developed here, the English contrast between (41b) and (41c) implies that *that* and *for* occupy distinct projections within the C-domain, with *for* in a lower position; cf. Haegeman (2012). This splitting of the C-domain, which is independently required by *EE*, also serves to explain the distribution of *for* in ‘*for-to*’ dialects; Duffield (1989, 2021b), Henry (1995).

- (42) a. **Daß** **sie** gestern den Fritz geküsst hat.
 COMP PRN yesterday the.ACC Fritz kissed has
 ‘That she kissed Fritz yesterday.’
- b. ***Daß** *gestern* **sie** ausgeschlafen hat.
 COMP yesterday PRN slept-in has
 ‘That yesterday she slept in.’
- c. ***Daß** *den Fritz* **sie** geküsst hat.
 COMP the Fritz PRN kissed has
 ‘That she kissed Fritz yesterday.’

Ironically, the original X'-template did a better job at explaining *V-XP-O restrictions in (40) than its successors—e.g., the *in situ* analysis of (39a) in (43); nevertheless, it still failed to capture the adjacency facts in (41) and (42).

- (43) *Those people clearly have never done (*never) an honest day's work* (English, LGB analysis)

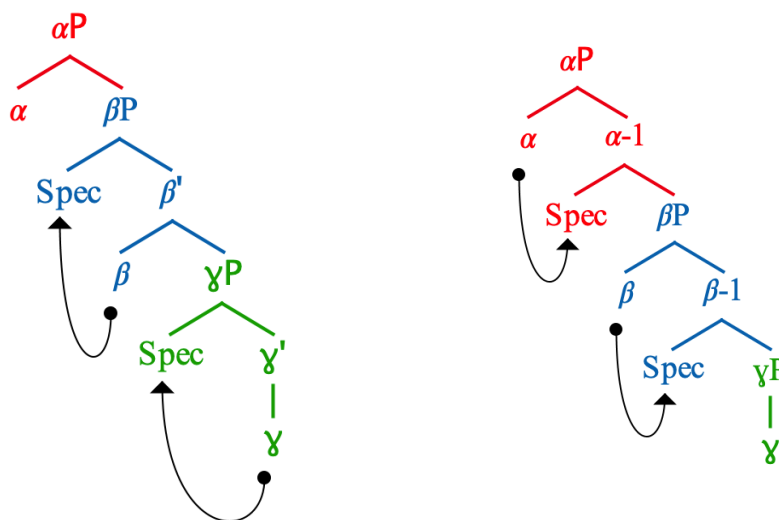


The problem posed by such examples is simply stated: other than through stipulation, there is no way to enforce strict linear adjacency if the licensing head and the thematic subject are members of distinct maximal projections, which is invariably the case under standard verb- and subject-raising analyses. But what if we're looking at this the wrong way? What if strict adjacency is indeed diagnostic of *belonging to the same maximal projection*—only this time, the relevant phrasal projection is *functional*, rather than lexical (as it was in *LGB*)? This brings us to the final section of this particular nature ramble.

3 X'-Inversion: ‘Heads, Shoulders, Knees and Toes’

Viewed from a zoological perspective, there is something grotesque about a metaphor in which heads protrude from the center of a body: as everyone knows from the children's nursery rhyme, not to mention common experience, heads should be on top. Yet that malformity is what classical X'-Theory gives us: a weird design prompted by the canonical S I V O order of English—or Vata or Vietnamese, for that matter—in which functional categories intervene between the clausal subject {Spec, βP} and the rest of the proposition, as schematized in (44a):

(44) *X'*-redux: (a-L) the Standard View ; (b-R) Head-Spec Inversion
 (arrows indicate Agreement/Government relations)



Had UG been based on a language—or even a sentence like the present one (!)—in which the subject is canonically subjacent to Tense in finite clauses, our structural metaphor would likely be more anatomically correct: in (44b), heads dominate. In other words, German would have served as a better model, or even Old English.²² In this final section, I will consider how Modern Irish, a VSO language, can be mapped on to the universal base developed here, and what this tells us about phrase-structure parameterization.

3.1 Irish verbal subjects

As is well known, Modern Irish displays VSO word order in tensed clauses lacking an auxiliary, alternating with AUX-SVO [tensed] and S-AUX-V [untensed]²³ orders in other contexts where the verb itself is unconjugated. In contrast to Germanic ‘Verb-Second’ (V₂) structures, which are restricted to root clauses, V_{FIN}SO order in Irish is equally available in main clause and subordinate contexts: complementizers (illocutionary operators), Tense and Polarity morphemes all appear to the left of the finite verb, often fused together. The general pattern is illustrated by the examples in (45):

- (45) a.i. Labhraíonn Mícheál Gaeilge le Cáit go minic.
 speak.HAB.PRES Mícheál Irish with Cáit often
 ‘Mícheál often speaks Irish with Cáit.’
- a.ii. ...an labhraíonn Mícheál Gaeilge le Cáit go minic.
 Q speak.HAB.PRES Mícheál Irish with Cáit often
 ‘...whether Mícheál often speaks Irish with Cáit.’
- b.i. Tá Séamus ag léamh an nuachtáin.
 be.PRES Séamus PROG read-VN the newspaper.GEN
 ‘Séamus is reading the newspaper.’
- b.ii. ... [toisc go bhfuil Séamus ag léamh an nuachtáin].
 ...cause COMP be.PRES Séamus PROG read.VN the newspaper.GEN

²² See Duffield (2021b), for an analysis of earlier stages of English under an inverted specifiers approach.

²³ The position of the thematic object varies according to construction and/or variety (SOIV~SIVO)

‘...because Séamus is reading the newspaper.’

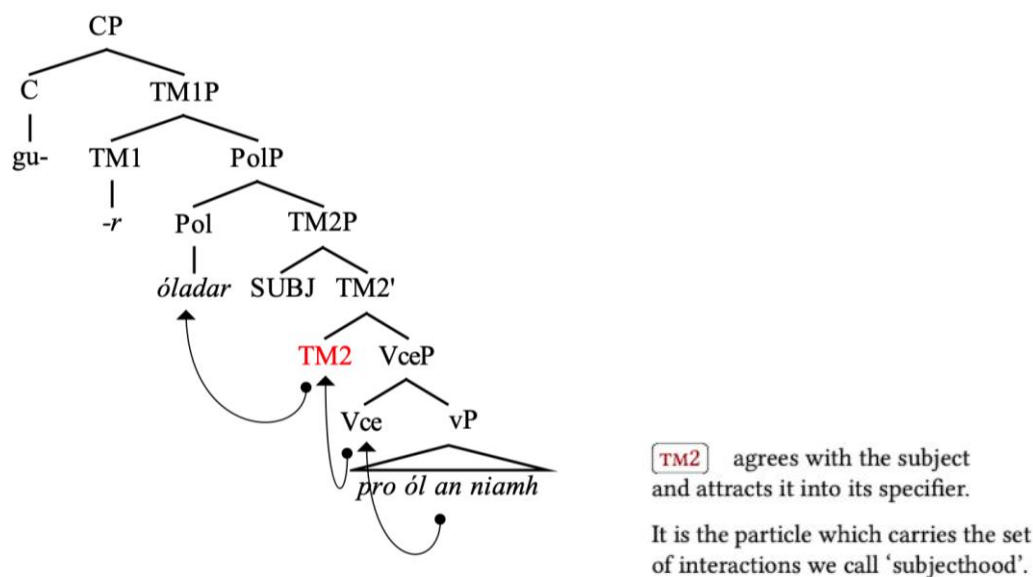
- c.i Ghuigh sé [é a theacht slán].
 prayed he.NOM him.ACC PTC come.VN safe
 ‘He prayed that he would come through safely.’
- c.ii Is mór an suaimhneas don gheata [iad a bheith pósta].
 is great the ease to-the gate them.ACC PTC be.VN married
 ‘T’is an aise to the gate, they to be married.’ [P.L. Henry 1957]

Irish, then, is a variety for which there is rather clear evidence that Tense is projected, and where finite verb-raising takes place, *but* where both the raised verb and the externalized subject remain to the right of T. Since 1995, it has been accepted within generative approaches that thematic subjects move from their base-position in Irish finite clauses — i.e., from {Spec, vP}, given *TI* and *I-Arg*. This is suggested by their placement relative to adverbials such as *ariamh* (‘ever’) in (46a, b); cf. McCloskey (1995). It has also been assumed that T is supervenient on this derived subject position, as shown by the position of the enclitic past Tense morpheme *-r*, which appears pre-verbally and attaches to C-elements (as well as to Negation).

- (46) a. Níó-r shaothraigh Eoghan ariamh [~~Eoghan shaothraigh~~ pingin]
 NEG-PAST earn-ASP Eoghan ever penny
 ‘Eoghan never earned a penny.’
- b. *Níó-r shaothraigh [ariamh [Eoghan ~~shaothraigh~~ pingin.]]
 NEG-PAST earn-ASP ever Eoghan earn penny
 ‘Eoghan never earned a penny.’
- c. Creideann na póilíní...
 believe.PRES the police ...
 ...[gu=r óladar *pro* an nimh sa tseomra seo.
 ...COMP=PAST drink.3PL the poison in.the room DEM
 ‘The police believe that they drank the poison in this room.’

In the most recent treatment of Irish VSO order—that of McCloskey (2021)—the finite verb is taken to move to Pol, with the thematic subject raising to the specifier of a lower functional projection which McCloskey labels ‘TM2P’—a secondary tense node. It is this lower projection which ‘carries the set of interactions we call ‘subjecthood’’. Example (46c) is then analyzed as in (47) below.

(47) *Finite Verb-Raising in Irish (re-drawn from McCloskey 2021)*



This head of TM2 need not be morphologically realized, but where it is, it expresses future: following Ó Siadhail (1989:128), a conditional form such as *dfásfadh* (‘would grow’) in (48a) is segmented as in (48b) ([McCloskey’s (18) and (19)]:²⁴

- (48) a. *Dfásfadh* féar dheas anseo, dá dtógfaimis an carracín.
 grow.COND grass nice here, if pick.COND.1PL the carrageen
 ‘Good grass would grow here, if we were to pick the carrageen.’
- b. d - fás - f - adh
 PAST grow FUT HAB
 ‘would grow’

There are some interesting parallels here with the Vata data presented previously: in both languages, future (tense) is projected independently of [±PAST]; in Irish, [+PAST] appears higher than the raised verb (triggering initial consonant mutation), whereas *Asp* is realized as a suffix; in Vata [±PAST] doesn’t appear at all, while the verb merges with aspectual feature in the same position where McCloskey posits a ‘secondary Tense’ node. Meantime in Vietnamese, the only overt morpheme found in past time contexts (*đã*) bears an aspectual, rather than an inherently temporal meaning, and seems to occupy an identical structural position underlyingly.

For McCloskey, the Irish data offer prima facie evidence that movement to the pre-tense specifier position in other languages is not driven by Case, since nominative case-marked pronouns are exclusively associated with this lower specifier position: Harley & Carnie (1997) reach a similar conclusion. Instead, it is claimed that raising beyond T—in English, for example—must be driven by EPP features: the possibility of VSO order—conversely, the impossibility of SVO word-order in Irish finite clauses—follows directly from the assumption that the EPP does not apply in this language, something for which there is good evidence (notably, from the absence of pre-verbal expletives in initial position, as well as from the ‘subjectless’ characteristics of certain passive and unaccusative constructions: see, for example, Stenson (1989), McCloskey (1996); cf. Harley (1995, 1997)).

²⁴ The fact that *-f-* occurs in both future and conditional contexts raise the possibility that what is called future tense is (in reality!) a kind of *irrealis* mood. Compare English *will*, also Bui’s (2019) treatment of the Vietnamese ‘future’ tense marker *sẽ*.

Whilst agreeing with McCloskey and Harley & Carnie that subject-raising beyond T in SVO languages is not Case-motivated (see the discussion of the Vietnamese passive facts in 2.2.1 above), the absence of expletive pronouns in Vietnamese existential constructions—in (14) above, (repeated here for convenience)—casts doubt on the idea that subject raising is driven by EPP features, either: neither Vietnamese—nor Vata, come to that²⁵—has expletives of any kind.

- (14) a. **Sẽ không có** một mẫu iPhone SE mới nào vào năm nay?
 FUT NEG ASR 1 CLF iphone SE new WH come year this
 ‘There won’t be a new iPhone SE this year, will there?’
- b. Có thể **sẽ không có** ‘viên đạn bạc’ vắc xin diệt COVID-19.
 perhaps FUT NEG ASR bullet magic vaccine against Covid-19
 ‘There may not be a magic bullet vaccine against Covid-19.’
- c. **Sẽ có** người đợi bạn ở sân bay.
 FUT ASR person wait friend be-LOC airport
 ‘There will be someone waiting for you at the airport.’

The natural conclusion from (14) must be that Vietnamese, like Irish, lacks a pre-verbal EPP requirement. Yet, in contrast to Irish, Vietnamese is obviously not a predicate-initial language: in regular verbal constructions—including those involving *lexical có* in (49)—the subject must precede all functional categories in the ‘I-domain’. This means that in regular SVO clauses something other than Case or EPP must be driving subject externalization.²⁶

- (49) a. Mai tôi **sẽ không có** thì giờ đâu!
 tomorrow I FUT NEG have time at.all
 ‘Tomorrow I won’t have any time at all.’
- b. *Mai **sẽ không** tôi **có** thì giờ đâu!
 Tomorrow FUT NEG I have time at.all
 ‘*Tomorrow won’t I have any time at all.’
- c. *Mai **sẽ không có** tôi thì.giờ đâu!
 tomorrow FUT NEG have I time at.all
 ‘Tomorrow I won’t have any time at all.’

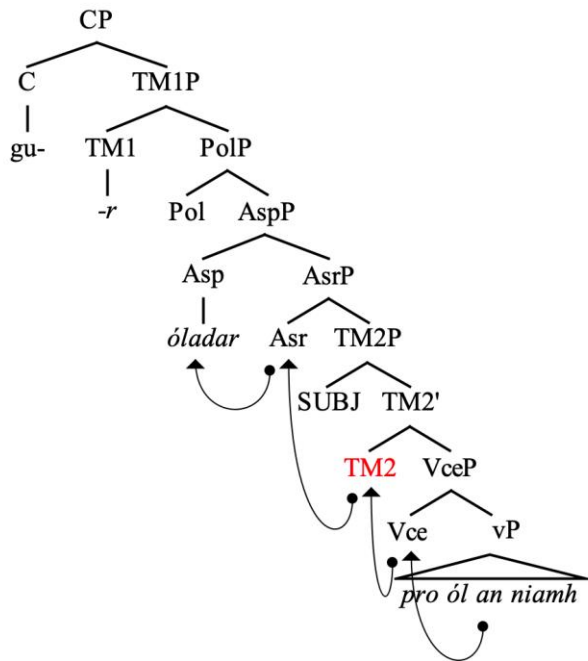
In fact, direct comparison with Vata and Vietnamese suggests that McCloskey may have missed a step in the derivation, or perhaps overstepped the mark—depending on how you look at it. If we apply the same template that we have developed thus far, then finite verb-movement in Irish would be to *Asp via Asr*, as shown in (50) below; on this analysis, the surface order of conditional (-f-) and aspectual suffixes (-adh) in (48) would be explained as a Mirror Principle effect; see Baker (1985), cf. Harley (2011).²⁷

²⁵ See Koopman (1984: 39): ‘We have been unable, for example, to find any small clauses or Exceptional Case Marking verbs. Furthermore, raising verbs like *seem* and existential constructions of the type *there arrived last night three men from London* are nonexistent.’

²⁶ A possibility explored in Duffield & Phan (forthcoming) is that definiteness plays a significant role. This is suggested by the fact that just as in English, unraised subjects of existential clauses must be weak indefinites (in the sense of Milsark 1977 and others).

²⁷ Supporting (language-internal) evidence for this alternative analysis comes from negated sentences such as the one in (46a) above. Duffield (1991, 1995) presents arguments for Neg->T and Neg->C raising in finite clauses in Irish, as well as ‘short verb-movement’ [to AgrS, as it was then]. This analysis is further supported by the distribution of the negation marker *gan* in infinitival clauses in Irish.

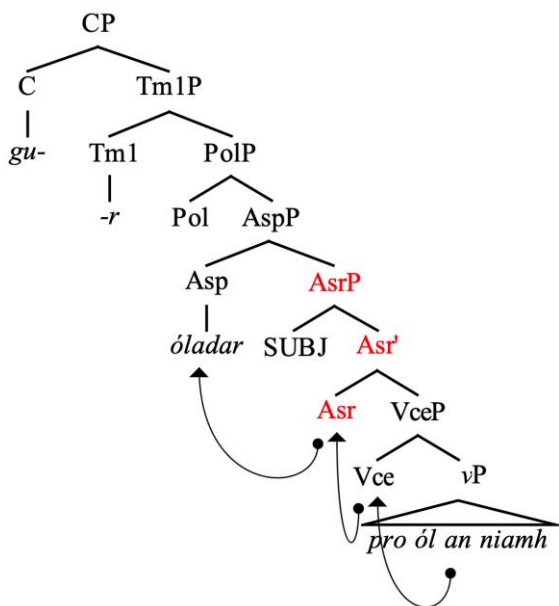
(50) *Finite Verb-Raising in Irish (Second Pass)*



TM2 agrees with the subject and attracts it into its specifier. It is the particle which carries the set of interactions we call 'subjecthood'.

In (50), I have left McCloskey's TM2 projection in place, even though one could derive the Irish VSO facts by raising the subject to {Spec, AsrP}. This is diagrammed in (51) below: identifying ASR with TM2 allows us to delete the latter projection from the clausal spine.

(51) *Finite verb-raising in Irish (Third Pass, {Spec, AsrP} analysis)*



ASR agrees with the subject and attracts it into its specifier. It is the particle which carries the set of interactions we call 'subjecthood'.

The cartography adopted in (51) thus allows for a convergent and uniform account of verb and argument distributions across a heterogeneous set of languages and constructions, explaining a wide range of asymmetries. However, what remains to be accounted for is the tight association in Irish between verb-

raising and nominative case assignment, where, once again—compare (41), (42) above—we observe a requirement for strict adjacency between the raised verb and the nominative subject.

Irrespective of the following arguments, notice that if McCloskey’s analysis is correct—whether in its original (47), or revised form (51)—it definitively breaks the connection between nominative case licensing and [\pm PAST] tense, something that has been a central tenet of generative theories of case/Case ever since *LGB*. Consequently, it further weakens the idea that Tense must be projected in every language, regardless of its morphological expression: if neither the subject, nor the finite verb, need raise as high as T in Irish—something that is very likely true of Vata as well—it becomes hard to defend the idea that Tense is what Case needs.

On the other hand, there obviously *is* some close association between *finite verbs* and nominative case in Irish. This is shown by the fact that subjects of non-finite clauses, e.g., those in (45c) above, appear with default *accusative* case (see Chung & McCloskey 1987); see also the copular clauses below. Hence, we need to ask what other properties distinguish finite from non-finite verb-forms? Given the cartography articulated in section 2.1 above, and the tree in (51), there are two likely candidates: Asp(ect) and As(ertion).

If *Asr* is the head that licenses nominative case, then the tree in (51) needs no further revision: the subject DP is in the correct position to be licensed. Of course, V_{FIN} -subject adjacency must still be stipulated. On the other hand, if *Asp* is the licensing head in Irish—as it seems to be Vata, and may be in Vietnamese—then the position of the subject in {Spec, *Asr*} *is* a problem, since it is not high enough in the structure for NOM to be assigned to it. (This is the same argument that was just applied to disqualify Tense as a Case licenser.)

This question may seem excessively arcane to some. Yet there is empirical evidence in Irish that appears to decide the matter, ruling in favour of *Asp*, rather than Assertion, as the functional category responsible for nominative case. The relevant data come constructions involving *non-verbal* predicates, which were the central focus of McCloskey’s (2021) presentation. While space constraints preclude elaboration of McCloskey’s analysis, it is nevertheless possible to present the core contrasts; see also Duffield (2021b, forthcoming.)

3.2 Irish Copular Constructions

In previous analyses of Irish copula constructions, primary attention has been paid to the distinction between *identificational* vs. *definitional* copular constructions—illustrated in (52) and (53), respectively; see especially Carnie (1997).²⁸ McCloskey (2021), however, directs attention to nominal and adjectival predicates taking clausal complements, such as those in (54) {*ait* ‘strange’, *féidir* ‘possible’, *mian* ‘desire’}; these also license ellipsis of these same complements under identity with a discourse-salient antecedent (54b:B), (54c:B).

- (52) a. Is é Seán an múinteoir.
 COP.PRES him Seán the teacher
 ‘Seán is the teacher.’
- b. Is iad na daoine sin na múinteoirí.
 COP.PRES them.ACC DET people DEM DET teacher.PL
 ‘They are the teachers.’

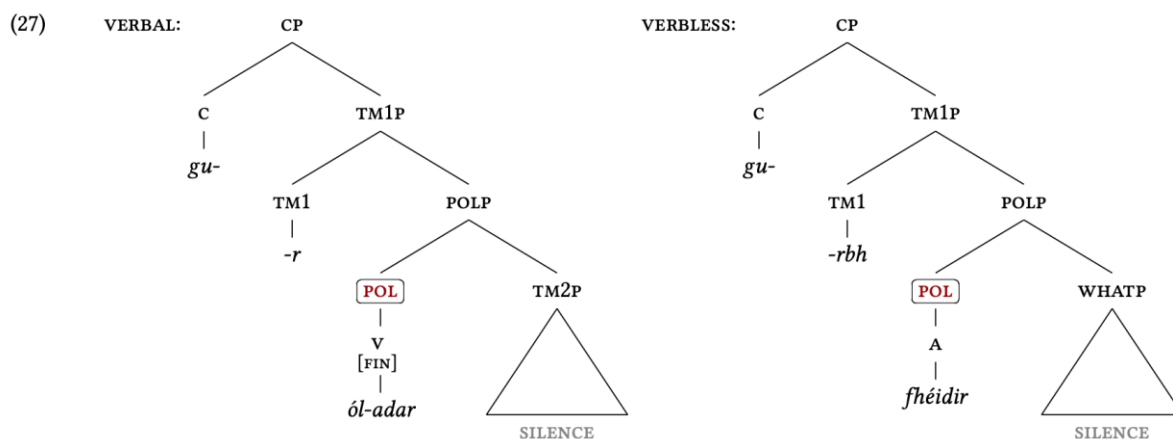
²⁸ Compare *Wikipedia*: ‘The Irish copula is not a verb but a particle, used to express a definition or identification. It may be complemented by a noun, a pronoun, an adjective, or a topicalized phrase. Because it is not a verb, it does not inflect for person or number, and pronouns appear in the disjunctive form.’

- (53) a. Is múinteoir (é) Seán.
 COP.PRES teacher him.ACC Seán.
 ‘John is/will be a teacher.’
- b. Ba mhúinteoir í.
 COP.PAST teacher her.ACC
 ‘She was/would be a teacher.’
- (54) a. Dúirt sé gu- -rbh...
 say.PAST he COMP COP.PAST
 ...ait leis sibh a bheith as baile.
 strange with.him you PTC be.INFIN out home
 ‘He said that he found it strange that you would be away from home.’
- b. A: Ar bh’ fhéidir go raibh sé beo?
 Q-PAST COP possible COMP be.PAST he alive
 ‘Was it possible that he was alive?’
- B: Is cinnte gu- -rbh’ fhéidir [~~go raibh sé beo.~~]
 COP.PRES sure COMP COP.PAST possible
 ‘It certainly was.’
- c. A: An Ø mian leat [mé a phósadh]?
 Q desire with.you me VCE marry.VN
 ‘Do you want to marry me?’
- B: Is mian [HOM-tú a-phósadh]
 COP.PRES desire
 ‘I do.’

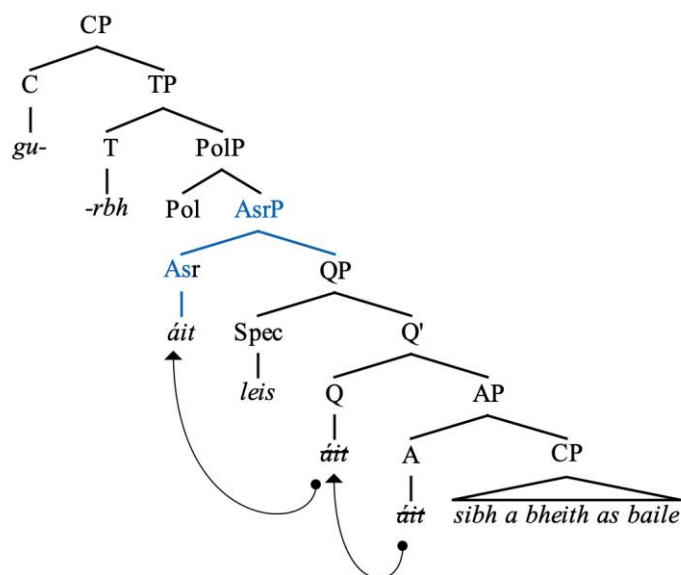
A distinguishing feature of the verbless constructions in (53) and (54) is the position of the bare predicate relative to all other thematic material (above the elision site): the pre-predicative slots of verbless constructions in Irish exactly parallel those found in verbal clauses, except for the presence of Aspect (McCloskey’s TM2), namely: (C)-(Neg)-T-Pred . Notice that in all of these constructions, associated subject arguments receive either (default) *accusative* case (in 52 and 53), or prepositional *dative* case in (54)—assuming that *leis* and *leat* are subjects; see directly below. Crucially, nominative case is excluded.

Whereas most researchers have treated these verbless clauses differently from those containing verbs, McCloskey (2021) assumes full parallelism of functional structure in the upper clausal spine: see (55) below (his [27]). By hypothesis, verbal and copular clauses are distinguished only by the lexical and associated functional projections *below* the landing site of predicate-raising (McCloskey’s ‘Pol’, our assertion ‘Asr’ projection). Compare now McCloskey’s treatment in (55 [27]) with the revised alternative in (56).

(55)



(56)



On McCloskey’s analysis, consistent with traditional descriptions, the copular particle *is/ba* is treated a pure exponent of Tense (Past/Non-Past), directly inserted under T;²⁹ unlike thematic verbs, *is/ba* does not express aspectual distinctions. T-Pred-XP order in finite clauses is then derived by raising the non-verbal predicate out of a lower projection QP, whose head Q — approximately, the non-verbal counterpart of little *v*—expresses a Kimian state, see Maienborn (2008), for details.

If this is correct, then Irish—just like Vietnamese—splits tense from assertion validity. The chief difference between the two languages is that *Asr* must be lexicalized through predicate-raising in Irish, whereas in Vietnamese the predicate typically remains low: *Asr* is filled by an independently projected particle, namely, *có*: compare the examples in (11) above. Notice that this is the same alternation as was observed in Vata, only one step lower down: that is to say, ‘filled’-Asp vs. V-->Asp.

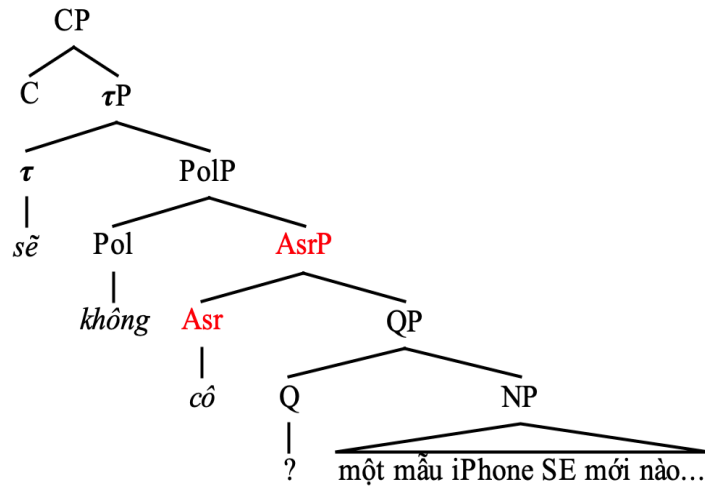
Translating McCloskey’s analysis back to Vietnamese yields an analysis of *existential* constructions, such as those in (14), using the same cartography; furthermore, we can also derive

²⁹ Carnie (1997) is a notable exception: indeed, Carnie’s analysis anticipates McCloskey’s in several important ways.

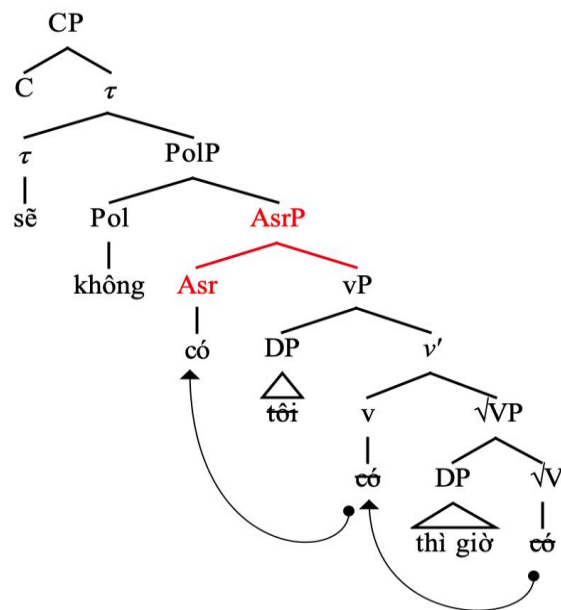
constructions involving *lexical có* (HAVE), such as those in (49)—modulo the effects of subject raising. These two analyses are presented side-by-side, in (57) below.

(57) Existential vs. Lexical *có* in Vietnamese.³⁰

a.



b.



The implications of this analysis take us beyond our current concerns. What *is* pertinent, however, is a contrast between the copular constructions in (54)-(56), and a semantically equivalent alternative. For, besides the pure tense particle *is/ba*, Irish also has the ‘regular’ copular verb *bí*: as well as appearing as verbal auxiliary (in progressive contexts, for example), this ‘verbal copula’ is compatible with many of the same predicates as those associated with *is/ba*, including *fíor* (58a,b) and *fuath* (58c,d).

³⁰ The analysis in (57b) explains why lexical *có*, alone of other verbal predicates, cannot co-occur with emphatic *có*: **Tôi có thì giờ!* (‘I do have time!’). The more *ad hoc* alternative is a haplology constraint.

- (58) a. Tá *(sé) fíor [gu- -r amhránaí breá é]?
 be.PRES it true COMP PAST singer fine him
 ‘It is true that he’s a fine singer.’
- b. Is (*sé) fíor [gu- -r amhránaí breá é]?
 COP.PRES it true COMP PAST singer fine him
 ‘It is true that he’s a fine singer.’
- c. Tá fuath agam dó.
 be.PRES hatred at-me to.him
 ‘I hate him.’
- d. Is fuath liom é.
 COP.PRES hatred with-me him
 ‘I hate him.’

There are three significant differences between the two copula types. First, *bí* licenses—and *requires*—expletive subjects in rightward extraposition contexts: compare the contrast between verbal-*(tá)* (58a) and particle-*(is)* in (58b), with respect to the subject pronoun *sé*. Contrary to common assumptions, then, it seems that Irish does not lack expletives entirely.

Second, unlike *is/ba*, *bí* shares all the conjugational possibilities of thematic verbs, including the expression of distinct aspectual (eventive *vs.* habitual) forms. These are illustrated in bold in the story extracts in (59):³¹

- (59) a. **Tá** tamallfada anois a **bhí** fear ina chómhnaighe ...
 be.PRES time long now PTC be.PAST man in.his living
 ...i mbaile mór Chorcaighe...
 ...in town big Cork...
 ‘It is a long time now since a certain man was living in the city of Cork...’
- b. Fear saidhbhir agus ceannaidhe fairrge do **b’eadh** é.
 man wealthy and merchant sea PAST be.IMP him.ACC
 ‘...He was a wealthy man and a sea merchant.’
- c. Do **bhíodh** luingeas ag teacht thar lear chuige.
 PAST be-HAB ships PROG come from abroad to.him
 ‘...Ships used to come to him from abroad.’
- d. Do **bhí** aon inghean amháin aige gu-r **b’é**...
 PAST be one daughter alone to.him C-PAST be=it...
 ...an ainm a **bhí** uirthi Máire Bhán.
 ...the name PTC be on.her Mary White
 ‘...He had an only daughter whose name was Mary White.’

³¹ From the story [Inghean an cheannaidhe \(description d'un parler de Kerry\)](#).

Finally—as might be predicted if Aspect is responsible for ‘the set of interactions we call subjecthood’—this copular verb assigns *nominative* case to the subject of the predicate phrase, as illustrated by the examples in (60):

- (60) a. ...agus do bhíodh sé ana-cheanamhail ar Mháire Bhán.
 ...and PAST be.HAB he.NOM very-fond on Mary White
 ‘And he was very fond of Mary White.’
- b. A: Mar sin ...
 A: then...
 ...ní raibh tú ag iarraidh jobannaí a chur i mbaol?
 ...NEG be.PAST you.NOM.PROG try.VN jobs PTC put.VN in risk
 ‘So you weren’t trying to put jobs at risk?’
- B: i ní raibh MÉ.
 NEG be.PAST I
 ‘Oh, I was NOT, I was NOT.’ (radio interview)
- B. ii. O, bhí MÉ
 be.PAST I
 ‘Oh, I WAS, I WAS.’³²

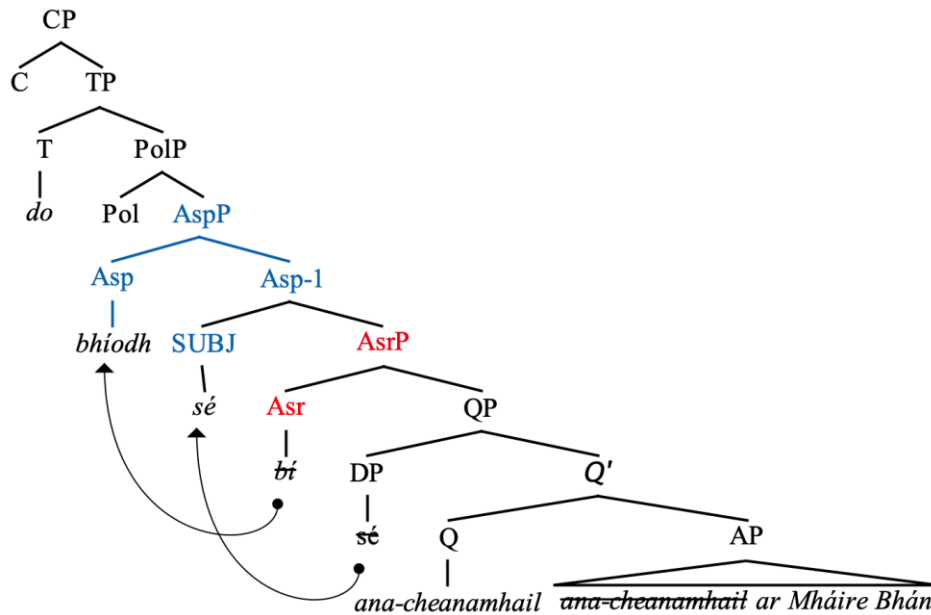
Taken together, the direct association between aspectual morphology and subject properties (Nom Case, Expletives) suggest unequivocally that *Asp*, rather than *Asr*, is the node responsible for subject licensing. Yet, as noted above, the subject remains subjacent to the *Asp* projection in clauses containing a verbal copula, as well as in regular verbal clauses (without an auxiliary).

The solution to this puzzle is as simple as it is radical. To explain the association between the aspect marked verb form and the lower subject—as well as the adjacency constraint, we only have to view the same stretch of phrase-structure from a different perspective: one in which—at least for functional categories—‘heads are on top’. Opposite to the standard order of lexical projections, in which specifiers asymmetrically *c*-command their heads, as in (44a), specifiers of functional projections can be viewed as *subjacent* to heads, tucked in (!) beneath (44b); cf. Richards (2001).

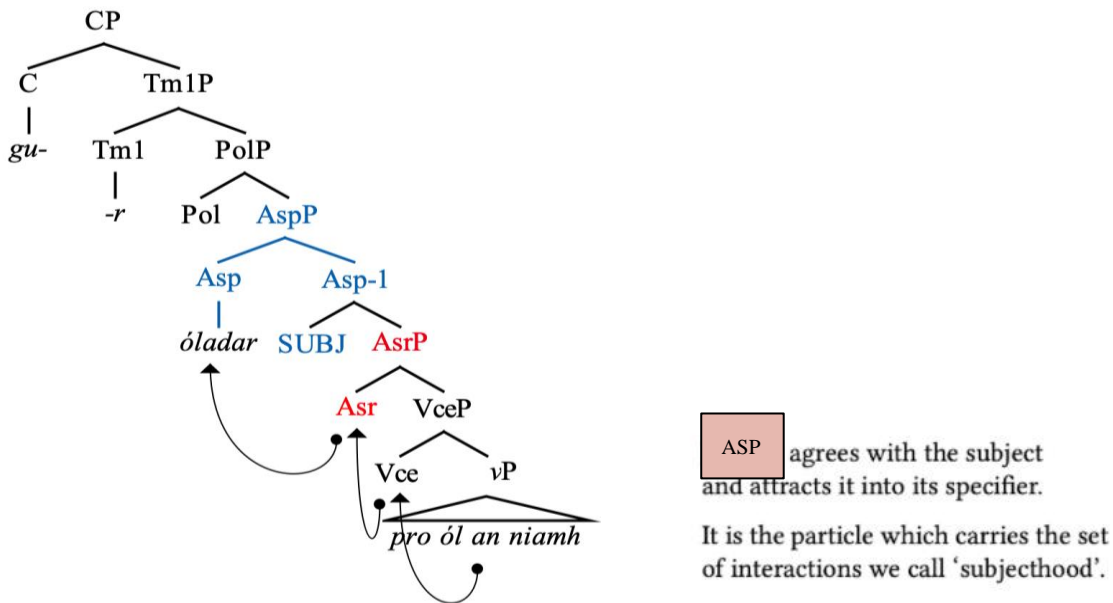
This move has the happy consequence of reconciling those people who claimed that Case was assigned under government with those claiming that Case was uniformly a specifier-head relationship: inverting the X’-skeleton allows both to be correct simultaneously. Given this change of perspective, verbal copular constructions in Irish such as (60a) would be analyzed as in (61a), while the analysis of verbal clauses given in (51) would receive the analysis in (61b):

³² Notice that in emphatic responsive constructions, the subject pronoun survives ellipsis and receives focal stress. This survival of the pronoun contrasts with regular V-stranding VP-ellipsis in Irish, in which only the verb survives see, McCloskey (2012), for exposition. This can be shown to fall out from the analysis presented here, involving *AsrP*; see Duffield (in prep.)

(61) a. Copular constructions in Irish (verbal variety)



b. Finite verb-raising in Irish (Fourth Pass, {Spec, Asp-1} analysis)



An immediate implication of this is that all specifier positions to the left of T/ τ —and all the abstract features associated with these specifier positions—must belong to C-domain projections. In English then, for example, the clausal subject position must be a subjacent projection of C: {Spec, C₋₁}, rather than {Spec, T'}. As well as accounting for the Comp-Subject adjacency facts in (41) and (42) above, this makes sense of the observation that expletives in languages like Icelandic and German are only found in the initial position of main clauses; cf. Roberts & Rousseau (2001, 2003), Svenonius (2002), from whom these examples are taken):

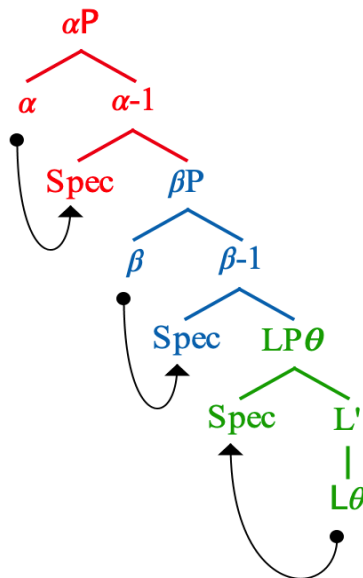
- (62) a. *(það) voru mýs í baðkerinu í gær. [Icelandic]
 (there) were mice in bathtub.the yesterday
 'There were mice in the bathtub yesterday.'

- b. *(Es) waren Habichte in der Luft. [German]
 (there) were hawks in the air.
 ‘There were hawks in the air.’
- c. Í gær voru (*það) mýs í baðkerinu. [Icelandic]
 yesterday were (there) mice in bathtub.the
 ‘Yesterday there were mice in the bathtub.’
- d. In der Luft waren (*es) Habichte. [German]
 In the air were (there) hawks
 ‘There were hawks in the air.’

Moreover, if it turns out that T is responsible neither for Case licensing, nor for EPP features, it is reasonable to wonder why it is regarded, exclusively, as the only obligatory head of the cluster of properties formerly known as ‘INFL’ (Chomsky 1981); ‘C’ before that (Chomsky 1957). Insisting that all languages project TP at the top of their skeleton might turn out to be akin to the insistence of a stag that all male mammals have antlers. It all depends on where you’re coming from.

A final point. It should be clear that—in those languages where it applies—this simple inversion has consequences for analyses of the highest specifier position, and of all head positions in the left periphery: it means that there must be a hidden head in every clause that drives movement to this highest Spec. As well as suggesting a revised treatment of Topic constructions in Vietnamese, this re-analysis has potentially significant implications for Accusative and Oblique Case-licensing, since at the point where thematic and functional projections meet, the two specifier positions will be string-adjacent, as shown in (63):

(63) “The twain shall meet”: LP~fp boundary effects

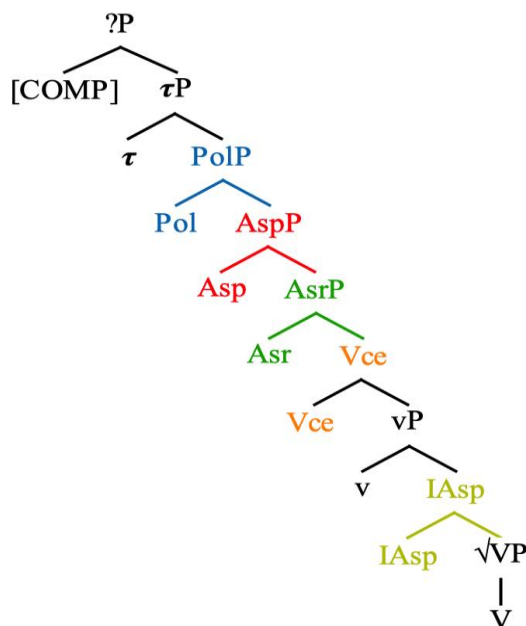


Given time constraints, the discussion of Accusative/Oblique case must be postponed: see Duffield & Phan, (*in prep.*)

4 Interim Conclusion

This discussion nearly completes our investigation of the lower spine puzzle:³³ It provides confirmation of the putatively universal template in (64) below, which is consistent not only with all the data from Vata, Vietnamese, Irish and German, but also with the under-differentiated fuzziness that is English. This template does not need to be (declaratively) represented; instead, the order of functional projections can be shown to emerge directly from the interaction of our four principles, especially EE, *I-Arg* and Supervenience. Moreover, although these principles could have an innate source, this is not a necessary conclusion: externalist interpretations are also possible.

(64)



Even if this presentation raises more questions than it answers, it seems reasonable to claim that progress has been made. The point to stress here is that whatever understanding of UG has been achieved, could not have been reached by inspecting English facts only, however fine-grained the description, nor could it have been discovered by using the standard Minimalist lens, which abstracts too far from surface forms. I contend that it is at least interesting to see what one can find with just a pair of binoculars and an embrace of surface diversity.

Many questions remain, of course. What *does* drive movement beyond T? Is it more than one thing? Is functional inversion a parameter?³⁴ How does definiteness fit into this theory of phrase-structure? (How is COMP fractionated)? Why in all three languages—as well as in English does *future* not behave as a Tense feature, but as a modal category? How does the Vietnamese copula/complementizer (*là*) fit into the template? How does functional inversion help us to understand Accusative Case assignment (or whatever drives Object raising in languages where it takes place)? These and numerous other questions must remain unanswered, for another day, for a better lens.

³³ A crucial missing piece involves modal categories, especially deontic modals, including pre-verbal *phải/nên/được*: these should by rights surface high, but have been shown to be generated low in the structure, below *Asr*: see Duffield (2013).

³⁴ This is suggested by other facts observed in Vata, which show strict subject-ASP adjacency effects.

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References

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SURPRISE-DENIAL/DISAPPROVAL *WHAT*-QUESTIONS IN VIETNAMESE: A COMPARATIVE PERSPECTIVE

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Abstract

This paper investigates a particular type of non-canonical *what*-questions in Vietnamese called surprise-denial/disapproval questions. We first propose a finer-grained distinction among subtypes of these special interrogatives, then compare them against other kinds of non-standard questions to shed light on their overall distributional and interpretative properties. We further demonstrate that they exhibit features not attested in languages with apparent similar configurations (Mandarin and Taiwan Southern Min in particular), and argue for the existence of a Particle Phrase in their Left Periphery. This study thus has far-reaching implications for the syntax of illocutionary force.

Keywords: non-canonical question, surprise-denial/disapproval question, comparative syntax, cartography, Vietnamese

ISO 639-3 codes: vie

1 Introduction

Non-canonical questions, or special questions, have an interrogative clause type but are not used to seek information, unlike standard constituent questions (henceforth, StQs). This paper aims to elucidate the syntactic and illocutionary characteristics of surprise-denial/disapproval *what*-questions (henceforth, SDQ), a lesser-known type of non-canonical interrogatives. We set out by comparing SDQs against other types of special interrogatives, with special focus on rhetorical questions (RhQs). Generally, RhQs have an affirmative/assertive force and do not expect an answer (Sadock 1971, 1974; Han 1998, 2002; Nguyễn 1997), see (1).

- (1) *Ti mà thích gì?*¹
Ti PRT like what
#‘What does Ti like?’
‘Ti likes nothing.’

SDQs have a denying or disapproving force typically accompanied by a surprise flavor. Denying force signals the speaker’s dismissal of a proposition as being not true or inappropriate, while disapproving force communicates a disapproval towards an act not considered ideal. They are close to the force produced by Searle’s (1976) *expressive* speech acts which express the speaker’s feelings about themselves or the world.

While RhQ is a familiar topic of research, SDQ and other special questions of comparable nature have only received attention recently. Relevant literature covers, *inter alia*, the Italian dialect Pagotto (Obenauer 2004, 2006), Mandarin (Pan 2014 *et seq*; Yang & Tsai 2019; Tsai 2021) and Taiwan Southern Min (TSM) (Lau & Tsai 2020). As shown in (2), this type of special interrogative appears in two forms in Vietnamese. (2a) features a clause-medial *gì* ‘what’. It allows two instantiations of the main verb *khóc* ‘cry’ and generally two possible readings. The sequence following *gì* is optional. In

¹ The abbreviations used in this paper are glossed as follows: 1/2/3: first/second/third person; ACC: accusative case; CL: classifier; CONJ: conjunctive; COP: copula; DAT: dative case; FUT: future marker; NEG: negation; NOM: nominative case; PERF: perfective marker; POSS: possessive marker; PRES: present marker; PRT: particle; SG: singular; SFP: sentence-final particle; TOP: topic marker.

(2b) *gì* surfaces clause-initially. Here only one instantiation of the verb is permitted and denial is the sole interpretation. We refer to the former as A-SDQ and the latter B-SDQ.

- (2a) *Mày khóc gì mà khóc?! [A-SDQ]*
 2SG cry what PRT cry
 ‘What are you crying for?!’ (≈ ‘You shouldn’t cry!’) [disapproval]
 ‘It’s not the case you’re crying!’ [denial]
- (2b) *Gì mà mày khóc?! [B-SDQ]*
 what PRT 2SG cry
 ‘It’s not the case you’re crying!’ [denial]

We argue, following Obenauer 2004, that SDQs activate higher layers of the Left Periphery. Specifically, they involve a null operator in C which binds into the *in-situ what*-element that is *vP*-internal. This operator is merged as the Force^o head of Rizzi’s (2004) C system, as schematized in (3). This functional head also enters an *Agree* relation with the head *mà* of a Particle Phrase (PrtP) which either indicates or modifies its illocutionary force.

- (3) **Force** Top* Int Top* Focus Mod* Top* Fin IP (Rizzi 2004:242)

A-SDQs are further scrutinized to shed light on their rather peculiar syntactic configuration. We will show that the structure of A-SDQs is more than meets the eyes. To wit, it involves both head-raising and remnant movement, the latter not to be found in languages like Mandarin, which exhibit an apparently similar configuration.

This paper is structured as follows. Section 2 familiarizes the readers with two subtypes of SDQs through a compare-and-contrast discussion with two other kinds of non-canonical questions: rhetorical questions and surprise-disapproval question-exclamatives. Section 3 provides a syntactic analysis of SDQs, with special concentration on the syntactic make-up of A-SDQs. Included in this section are in-depth scrutinies of three aspects of SDQs, namely the interpretations of *gì* ‘what’, the nature of the particle *mà*, and the movement (or the lack thereof) of verbal phrases and heads. Section 4 concludes the paper.

2 Spotting SDQs

Unlike StQs, non-canonical questions are not used to request the information needed to fill the speaker’s information gap. Despite this similarity in function, SDQs are distinct from RhQs, probably the best-known kind of special interrogatives, in at least three aspects: illocutionary force, intonational contour, and distributional-interpretative restrictions.

First, RhQs have an assertive force and are dominantly used to assert the opposite polar value of what appears to be queried. In *wh*-RhQs (as opposed to *yes/no* RhQs), the *wh*-phrase typically denotes the empty set (Han 2002), as in (4). However, under certain contexts they can as well denote a singleton set, as in (5).

- (4) *What has John ever done for Sam?* (Han 2002:202)
 (≈ John has done nothing for Sam.)
- (5) *Who fed you and gave you a proper education?* (A mother to her son) (Han 2002:218, fn. 6)
 (≈ I [the mother] fed you and gave you a proper education.)

SDQs, on the other hand, have either a disapproving or a denying force which typically go along with the speaker’s unexpectedness and annoyance. SDQs are highly hearer-oriented. (2a) expresses either the speaker’s strong disapproval towards what the other interlocutor is doing or his disagreement with the other interlocutor’s previous statement. Only the latter reading is available for (2b).

Intonational contour often provides a cue for an illocutionary force. An RhQ must have a contour of an assertion, i.e., it is marked with a normal falling intonation, just like a declarative sentence expressing an assertion (Han 2002:215). On the contrary, SDQs typically have the rising-falling intonation of an exclamation as they are construed as a kind of exclamatives (cf. Tsai 2020 and Yang 2021 for Mandarin). The prosodic disparity between these two subtypes of non-standard questions is transparent when we compare f0 trajectories of the two otherwise identical sentences in (6) as rendered by one male informant. We use Praat (Boersma & Weenink 2021) to extract the waveform, spectrogram, and f0 contour of each utterance.² The rising-falling contour as seen in Figure 2 (in contrast to the general falling contour in Figure 1) is often associated with the speaker’s attitudes of disapproval, surprise, puzzlement, irritation, etc. (Vanrell 2013:144).

- (6a) *Em lo gì?* [RhQ]
 2SG worry what
 ‘There’s nothing for you to worry about.’
- (6b) *Em lo gì?!* [SDQ]
 2SG worry what
 ‘What are you worrying for?!’

Figure 1: The waveform, spectrogram, and f0 contour of the RhQ (6a) as rendered by a male speaker

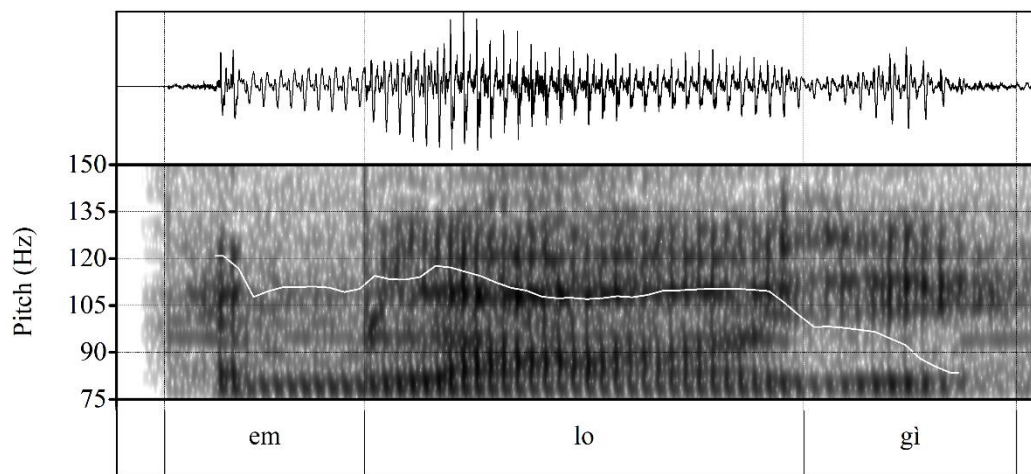
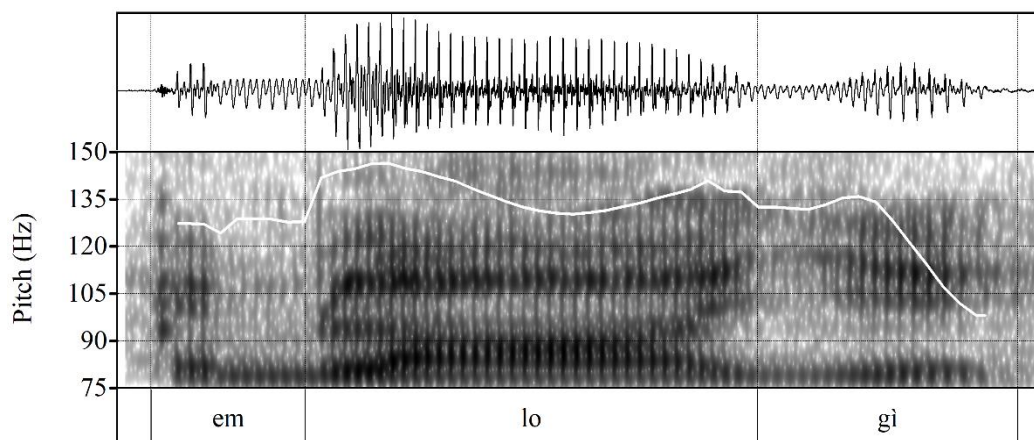


Figure 2: The waveform, spectrogram, and f0 contour of the SDQ (6b) as rendered by a male speaker



² We would like keep the prosodic discussion to the minimum throughout this paper. Any full-fledged account of prosodic manifestations of Vietnamese SDQs must await future research.

Third, compared to RhQs, SDQs are relatively restrictive in both interpretative and syntactic terms. SDQs only allow adverbial construals of the *wh*-element, but forbid its argumental use. In (7a), only a *what-for* reading is available. In the RhQ (7b), *gì* might be construed either as an argument or as an adjunct (i.e., as in a *why*-like *what*-question), although the former seems to be the default construal, and the latter might not be available in certain contexts.

(7) A: *Em lo là sẽ thi không tốt.*
 1SG worry that FUT test NEG good
 ‘I’m worrying that I won’t have a good test result.’

a. B: *Lo gì mà lo?! Tập trung ôn bài đi kia!*
 worry what PRT worry focus review lesson SFP SFP
 ‘You shouldn’t worry (about it)! Stay focused on reviewing your lessons!’ [*what-for*]
 (≈ ‘What are you worrying for?! (There’s no reason to be worried.)’)
 #‘There’s nothing to worry about. Stay focused on reviewing your lessons!’ [*argumental]

b. B: *Lo gì? Em học giỏi mà.*
 worry what 2SG study good SFP
 ‘There’s nothing to worry about. You are an excellent student.’ [argumental]
 ‘There’s no reason to be worried. You are an excellent student.’ [*what-for*]

Recall that some RhQs have *wh*-words that do not denote an empty set (Han 2002). The RhQ (8a) has two possible assertive construals depending on whether it denotes an empty set (‘I’m eating nothing’) or a singleton set (‘I’m eating the instant ramen, which is the only obvious option given the context’). SDQs do not allow the singleton set option: under no circumstances may (8b) mean that there is one particular reason for eating instant ramen that is obvious in the conversational context.

(8a) *Ở đây chỉ có mì gói. Em nghĩ anh ăn gì?* [RhQ]
 at here only have noodle pack 2SG think 1SG eat what
 ‘There’s only instant ramen here. What do you think I’m eating?’
 (≈ ‘I’m eating nothing.’, or
 ≈ ‘I’m eating instant ramen.’)

(8b) *Ở đây chỉ có mì gói. Ăn gì mà ăn?!* [SDQ]
 at here only have noodle pack eat what PRT eat
 ‘There’s only instant ramen here. What are you eating it for?!’
 (≈ ‘There’s no reason for you to eat the instant ramen!’
 ≠ ‘There’s one obvious reason for you to eat the instant ramen!’)

Again, due to its strict *what-for* interpretation constraint, (8b) forbids the complement reading of *gì*, i.e., it cannot mean ‘there’s nothing to eat’. By contrast, while the RhQ in (8a) readily accepts *gì* as the complement of the verb *ăn* ‘eat’, an adverbial (i.e., *what-for*) reading is relatively hard to construe.

Note that a *what-for* interpretation is only available in SDQs with a disapproving force (SDisQs thereafter). In SDQs where a denial force is operative (SDenQs thereafter), the *wh*-phrase, while also used non-argumentally, has an emphatic, maximal wide-scope negation reading along the lines of ‘it’s not the case that...’, as shown in the second reading of (2a). Here *gì* does not denote a set, whether an empty or a singleton one, but instead manifests an external negation. That is, the two sentences in (2) mean neither ‘there’s no/one particular reason for you to cry’ nor ‘there’s no/one particular thing about which you’re crying’. External negation is understood as a negation of a statement, i.e., the statement about the falsehood of the original statement (Geach 1972:76). Its domain is isomorphic to that of the Fregeans’ sentence negation operator (Carston 1998), i.e., it takes scope over the entire sentence.

Note further that *gì* in A-SDQs can be only be selected by the generic classifier *cái*. By contrast, StQs and RhQs might admit classifiers other than *cái* as long as their semantics is compatible with what is queried. This s-selection restriction is attributable to the strict non-argumental use of *gì* in SDQs. See 3.1 for more discussion on the syntax of the *wh*-phrase in SDQs.

A Vietnamese surprise-denial/disapproving force is only legitimate if an SDQ is prompted immediately upon the speaker’s acquisition of the act to be disapproved of, or of a propositional content to be denied. That is, an SDQ must be reactive against some unexpected here-and-now information. Hence, if an acquired act occurs in a different time frame from that of the utterance, an SDQ meant to react to it is ungrammatical. In this aspect, it behaves similarly to Cantonese but differs from Mandarin, as the contrast in (9) shows.

- (9a) **Hỏi sáng mà y khóc gì mà khóc?!* [Vietnamese]
 time morning 2SG cry what PRT cry
 Int: ‘What did you cry for this morning?!’ (≈ ‘You shouldn’t have cried this morning!’)
- (9b) **Nei zou soeng haam mei aa haam?!* [Cantonese]³
 2SG morning cry what PRT cry
 Int: ‘What did you cry for this morning?!’ (≈ ‘You shouldn’t have cried this morning!’)
- (9c) *Ni zaoshang ku shenme ku?!* [Mandarin]
 2SG morning cry what cry
 ‘What did you cry for this morning?!’ (≈ ‘You shouldn’t have cried this morning!’)

Furthermore, it seems that Vietnamese SDQs are quite bare as they are incompatible with all sorts of adverbials, even if they are indexical to the here-and-now of the utterance, as exemplified in (10). This property is also shared with Cantonese.

- (10a) **Bữa nay/bây giờ mà y khóc gì mà khóc?!*
 today now 2SG cry what PRT cry
 Int: ‘What are you crying for today/now?!’ (≈ ‘You shouldn’t be crying today/now!’)
- (10b) **Ở đây mà y khóc gì mà khóc?!*
 at here 2SG cry what PRT cry
 Int: ‘What are you crying for here?!’ (≈ ‘You shouldn’t be crying here!’)

Interestingly, these adverbials are fine with a *gì*-question in (11), regardless of whether it has a genuine information-seeking or a rhetorical reading. This shows that SDQs are subject to different constraints compared to RhQs and to StQs, albeit their apparent similarities, especially if the sequence *mà* + V of the SDQ is elided, which is always an option.

- (11a) *Bữa nay/bây giờ mà y khóc gì?*
 today now 2SG cry what
 ‘What are you crying about today/now?’ [StQ]
 ‘There’s nothing to cry about today/now.’ [RhQ]
- (11b) *Ở đây mà y khóc gì?*
 at here 2SG cry what
 ‘What are you crying about here?’ [StQ]
 ‘There’s nothing to cry about here.’ [RhQ]

³ We thank Hoi Hin Timothy Lee for the Cantonese data.

Note that some speakers might find (9a) and (10) quite acceptable. We speculate that this divergence in judgment comes from the apparent similarity between SDQs and a configuration featuring the so-called surprise-disapproval question-exclamative (hereinafter SDQE) *à la* Giorgi & Dal Farra 2019. SDQEs are also non-canonical questions as they do not solicit information but express surprise-disapproval and require an explanation for an unexpected and/or annoying behavior, as shown in (12).

(12a) I see Gianni wearing his best trousers kneeling in the dirt in the garden. I think that he will ruin his trousers. I am annoyed and utter:
Ma cosa fai?!
 but what (you) do-PRES-2SG
 ‘But what are you doing?!’ (Giorgi & Dal Farra 2019:337, minor changes in glossing)

(12b) Gianni should study math, but I see that he is reading comics. I am annoyed and utter:
Ma cosa leggi?!
 but what (you) read-PRES-2SG
 ‘But what are you reading?!’ (ibid., minor changes in glossing)

When a sentence like (10a) is judged as acceptable, it is not construed as a genuine SDQ, but at best an SDQE followed by a conjunctive *mà* ‘so/such that’ (not a particle *mà*) plus a verb of the identical form to the matrix verb, as in (13).

(13) *Bữa nay/bây giờ mà khóc gì mà khóc?!*
 today now 2SG cry what CONJ cry
 ‘What is the reason x such that today/now you are crying because of x?!’
 (≈ ‘It doesn’t make sense, I want you to explain why you’re crying today/now!’)

The syntax of SDQs, as well as the distinction between the particle *mà* and the conjunctive *mà*, will be discussed in the next section. For now, it is sufficient to say while both (10a) and (13) are similar in their surprise-disapproval tone as the speaker’s expectation is not met in the real situation, (10a) is more aggressive and anticipates no explanation or answer. That (13), but not (10a), is further compatible with sentence-final particles *thế* and *vậy* is straightforward since these particles presuppose a question and signal the expectation for an answer (Phan 2021). In short, that SDQEs generally demand an explanation effectively set them apart from SDQs which are plain rejections.

3 The syntax of SDQs

This section provides an extensive discussion on the morpho-syntactic properties of Vietnamese SDQs from a comparative perspective. It is suggested that SDQs are mono-clausal, verb-raising constructions that also feature a discourse/modal particle and a non-argumental *what*-phrase.

3.1 *Gì* and its adverbial nature

In section 2 we claimed that *gì* in SDisQs necessarily has a *why*-like interpretation, while in SDenQs it has a negation reading of a maximally wide scope. In both cases, this *what*-element is not used argumentally. This is in sharp contrast to RhQs which by default prefer the argumental interpretation of *gì* if it is available. In this subsection we discuss how these *why*-like and wide-scope negation readings of *gì* can be accounted for syntactically, starting first with the former.

Pan (2014) proposes that the Mandarin *shenme* ‘what’ in the SDQ (14) heads an SDQP to yield the surprise-disapproval reading associated with this alleged specialized projection. To derive the right surface order, the main verb then moves from inside of VP to join the SD° head and forms a complex head with it (but see Yang’s (2021) argument against this treatment for Mandarin).

- (14) *Ni pao-shenme?!*
 you run-what
 ‘Why do you run?!’ (Pan 2014:351)

Such a base-generation analysis does not receive support from Vietnamese given what is spelt out as *gì* in (15) is a phrase, not a head. First, *gì* is optionally selected by the classifier *cái*. Second, *gì* can modify a range of expletives (e.g., *quái* ‘devil’, *khỉ khô* ‘dried monkey’) to derive *what-the-hell* forms (in the sense of Pesetsky 1987)⁴ which convey a sense of impatience and/or annoyance. As noted by Giorgi & Dal Farra (2019), the inclusion of expletives is only eligible in special contexts, i.e., they do not surface in plain requests for information. A similar phenomenon is observed in SDQs of other languages like Mandarin (16a) and TSM (16b).

- (15) *Mày khóc (cái) (quái) gì mà khóc?!*
 2SG cry CL devil what PRT cry
 ‘What the hell are you crying for?!’

- (16a) *Ku shenme gui a?!*
 cry what devil PRT
 ‘Why (the hell) are you crying?’ (≈ ‘You shouldn’t cry!’)

- (16b) *Khao sann siauu?!*
 cry what sperm
 ‘Why (the hell) are you crying?’ (≈ ‘Don’t cry!’) (Yang 2021:66)

To ensure a *what-for* reading, we propose, following Lau & Tsai (2020) and Tsai (2021), that *gì* in A-SDisQs is selected by an implicit light verb FOR of the inner *vP* à la Tsai (2021). After FOR raises to attach to the outer light verb DO (or the voice head to the same effect), the main verb raises to attach to FOR, see (17) and its schematization in (18). In other words, a sentence like (2a) features an applicative construction in disguise (cf. Tsai 2018 and citations therein).

- (17) *ni ku-FOR shenme <ku>?!*
 you cry-LV what cry
 ‘What are you crying for?!’ (Tsai 2021:199)

- (18)
-
- (Tsai 2021:208)

Due to its nominal nature, the *what*-element *gì* stays *in situ* and is licensed by a null operator in C via unselective binding (cf. Tsai 1994, 1999; Phan 2021). This operator is merged as the Force^o head which

⁴ We take the so-called *wh-the-hell* forms to be non-D-linked *wh*-phrases which involve some logophoric attitude (of surprise, impatience, annoyance, etc.) and hence are presumably associated with the Attitudinal Phrase (Pesetsky 1987; Wiltschko 1997; Huang & Ochi 2009).

allows *gì* to denote a surprise-disapproving illocutionary force. Such a force is comparable to the “whining” force argued for in Lau & Tsai 2020 for TSM.

- (19) *I sī leh khàu án-tsuánn?!*
 he SI LEH cry how
 ‘What the heck is he crying for?’ (Lau & Tsai 2020:257)

Given its non-argumental nature, the *what*-element in A-SDenQs is also introduced by an implicit applicative head. This head is however different from FOR in being semantically underspecified. The *wh*-phrase is bound by a null operator in ForceP of the denial force to derive its interpretation as an external negation (cf. Pan’s (2015) negative *wh*-questions). This negation has a maximally wide scope over a quotational or metarepresentational material whose proposition is denied (Horn 1989; Carston 1998, a.o.), and helps convey a disagreement to a previously stated or implied assertion.

Since the *what*-element *gì* can receive two distinct readings, a sentence like (20) essentially has two potential interpretations.⁵ When *sao*, another *what*-element in Vietnamese (Phan 2021), replaces *gì*, both readings are still available, as in (21a). However, only the denial reading survives if the non-*what* *đâu* ‘where’ is merged in lieu of *gì*, see (21b).

- (20) *Mày khóc gì mà khóc?!*
 2SG cry what PRT cry
 ‘You should not cry.’ [disapproval]
 ‘It’s not the case that you’re crying.’ [denial]

- (21a) *Mày khóc sao mà khóc?!*
 2SG cry what PRT cry
 ‘You should not cry.’ [disapproval]
 ‘It’s not the case that you’re crying.’ [denial]

- (21b) *Mày khóc đâu mà khóc?!*
 2SG cry where PRT cry
 #‘You shouldn’t cry.’ [*disapproval]
 ‘It’s not the case that you’re crying.’ [denial]

That *sao* patterns with *gì* in allowing a disapproval reading while *đâu* forbids it further supports our analysis. Concretely, *sao* is similar to *gì* in its compatibility with FOR to trigger a *what-for* reading, which then allows a ‘deploring’ construal to emerge via binding with the Force^o head. As *đâu* ‘where’ cannot be s-selected by FOR, this construal is absent. By contrast, all three *wh*-words can be introduced by an underspecified applicative head. This head enables the *wh*-words to enter into a binding relation with ForceP to derive a denial reading.

While a clause-medial *what*-element must be introduced by an applicative head in vP, a clause-initial *what* as in (2b), repeated here as (22), is base-generated in CP. We suggest it is generated as a higher adverb in Spec,ForceP and uniformly exhibits a denial construal. This is reminiscent of Tsai’s (2008) denial *zenme* ‘how’ and Phan’s (2021) denial *sao* which are both merged directly to ForceP to alter the illocutionary force of the clause, as shown in (23).

- (22) *Gì mà Tí khóc?!*
 what PRT Ti cry
 ‘It’s not the case that Ti’s crying!’

5 Note that when the main verb is stative, only the denial interpretation is allowed in all contexts.

Mày giỏi gì mà giỏi?!
 2SG good what PRT good
 #‘You shouldn’t be excellent.’ [*disapproval]
 ‘It’s not the case that you’re excellent.’ [denial]

- (23) *Sao mà Tí khóc?!*
 what PRT Ti cry
 ‘It’s not the case that Ti’s crying!’

Phan (2021) suggests this adverb use manifests a highly grammaticalized stage of the *wh*-word *sao*. The same can be stated about the clause-initial *gì*. Notice that expletives like *quái* ‘devil’ are not permitted in B-SDQs, as exemplified in (24). This ban of *the-hell* forms indicates that the *what*-element in B-SDQs might have been further grammaticalized as it can no longer modify other elements.

- (24) **Quái gì mà Tí khóc?!*⁶
 devil what PRT Ti cry
 Int: ‘The hell Ti’s crying!’ (≈ ‘It’s not the case that Ti’s crying!’)

Interestingly, this contrast is comparable with the distinction between two types of sentence-peripheral adjunct *shenme* ‘what’ in Mandarin as argued for in Yang 2021, see (25a) and (25b). The L(ow)-WHAT retains a *why*-like interpretation, while the clause-initial H(igh)-WHAT is a highly grammaticalized adverb whose original interrogativity is lost.

- (25a) (*Ni*) *ku/pao shenme?!* [L-WHAT]
 you cry/run what
 ‘Why (the hell) are you crying/running?’ (≈ ‘Don’t cry/run!’) (Yang 2021:62)
- (25b) *Shenme ta ku/pao le?! Luanshuo!* [H-WHAT]
 what he cry/run PERF nonsense
 ‘It is not right (for you) to say, “he cried/ran away”! Nonsense!’ (ibid.)

3.2 *Mà* as the head of a Particle Phrase

The SDQs discussed above share not only a non-argumental *what*-word but also an instantiation of *mà*. The syntactic properties of this particle are crucial to answering two questions to be addressed in the next subsections: 1) are SDQs mono-clausal or bi-clausal?; 2) what is the nature of movement as exhibited in these questions?

Mà is commonly viewed as a conjunctive meaning ‘but’ or ‘so/such that’ (cf. Do-Hurinville & Dao 2019). We however propose that *mà* in SDQs functions in a fashion similar to “discourse particles” (or “modal particles”) in the German linguistic tradition. Note that “discourse particle” here is not to be confused with “discourse marker” as “sequentially dependent elements which bracket units of talk” (Schiffrin 1987:31). That is, they are not linguistic units connecting parts of the discourse to one another or to the extra-linguistic context (Schourup 1999), also known as discourse-level connectives, e.g., *therefore*, *and*, and *but*. Instead, they form a heterogeneous group and generally function to “express the speaker’s mental attitude toward or belief about what he or she is saying, i.e., they usually add the speaker’s subjective point of view to the basic meaning conveyed by the utterance” (Coniglio 2007:3).

In the following, we will make a case for why *mà* in SDQs should be treated as a particle that heads a functional projection in the Left Periphery. For this goal, we draw a parallel between *mà* and discourse/modal particles cross-linguistically, with a focus on the German *denn* and its cognate in Old English (OE). Particle *mà* shares with discourse/modal particles at least the following properties: 1) it

⁶ If *gì* is selected by the verbal *vì* ‘for’, as shown in the following sentence, the addition of modifiers to *gì* is fine again. However, this is either an RhQ or an SDQE. *Mà* here should introduce a clause. See 3.2 for the distinction between particle *mà* and conjunctive *mà*.

Nó vì (quái) gì mà khóc?!
 3SG for devil what CONJ cry
 ‘What’s the (damn) reason/purpose x such that he cried for x?!’

does not alter the truth values of an utterance but introduces the speaker’s attitude or belief with respect to the propositional content; 2) it can only occur in a clause-medial position; 3) it has homophones in other lexical categories; 4) it is restricted to certain clause types and sentential moods; 5) it is typically unstressed and occurs in a fixed position in the clause.⁷

Concerning the first property, we adopt a syntactic force-based approach to discourse/modal particles (Abraham 1991; Zimmermann 2008; Bayer & Obenauer 2011) and assume that *mà* contributes its meaning to the semantics of an illocutionary force operator in CP. For Bayer & Obenauer (2011), this illocution modifying or reinforcing function is achieved via a long-distance *Agree* along the lines of Chomsky 2000, 2001 and Pesetsky & Torrego 2007. Nevertheless, the semantic contribution of particles is often hard to define as their meaning is generally dependent on the context and the featured illocutionary force. Take (26), a German *why*-like *what*-SDQ that employs *denn*.

- (26) *Was lachst du denn so dumm?!*
 what laugh you DENN so stupidly
 ‘Why do you laugh so stupidly?!’ (≈ ‘You should not laugh so stupidly!’)
 (Bayer & Obenauer 2011:468)

As noted by Bayer & Obenauer (2011), while *denn* could be absent in principle, its employment is highly favored and seems to support the SDQ reading. In addition, when the particle is left out, the preferred reading is that of information-seeking. Van Kemenade & Links (2020) claim that questions with *denn* are usually rhetorical, and clauses that feature these particles are not pragmatically neutral. The same effect is observed with *mà*: the addition of *mà* in (27b) necessarily filters out the ordinary information-seeking reading prominent for (27a), and results in a rhetorical interpretation.

- (27a) *Tí thích gì?* [StQ]
 Ti like what
 ‘What does Ti like?’

- (27b) *Tí mà thích gì?* [RhQ]
 Ti PRT like what
 #‘What does Ti like?’
 ‘Ti likes nothing.’

Not only is the particle *mà* naturally featured in various types of non-canonical interrogatives, but we also find it in conditional sentences like (28).

- (28) *Nếu Ti mà đậu, mình sẽ ăn mừng.*
 If Ti PRT pass self FUT celebrate
 ‘If Ti passed (the exam), we would celebrate.’

Adopting Iatridou’s (2000) terminology, *mà* is taken to turn a ‘future neutral vivid (FNV)’ conditional to a ‘future less vivid (FLV)’ conditional. FLV conditional is defined as follows:

- (29) *Future less vivid conditional*
 Assertion: the reader’s favorite semantics for an FNV conditional ‘if *p*, *q*’
 Implicature: the actual world is more likely to become a $\sim p$ world than a *p* world
 (Iatridou 2000:234)

⁷ See Bross 2012 for a summary on German discourse particles and the criteria to identify them.

The unlikelihood that is part of the FLV conditional is seen in the contrast in (30). Unsurprisingly, the same is observed for Vietnamese in (31). Hoàng (2006:666) claims that *nếu* ‘if’ going along with *mà* “expresses a hypothesis which is less likely or which exhibits something abnormal or contra to reality”.

(30a) *If John comes to the party, and I think he will, we will have a great time.* (Iatridou 2000:234)

(30b) *#If John came to the party, and I think he will, we would have a great time.* (ibid.)

(31a) *Nếu Ti đậu, và tôi nghĩ nó sẽ đậu, thì mình sẽ ăn mừng.*
if Ti pass CONJ 1SG think 3SG FUT pass then self FUT celebrate
‘If Ti passes (the exam), and I think he will, then we’ll celebrate.’

(31b) *#Nếu Ti mà đậu, và tôi nghĩ nó sẽ đậu, thì mình sẽ ăn mừng.*
if Ti PRT pass and 1SG think 3SG FUT pass then self FUT celebrate
Int: ‘If Ti passed (the exam), and I think he will, then we’d celebrate.’

This use of *mà* is also well attested in *only-if* and wishing contexts, see (32). Other contexts involve those featuring perceived unreality or state of surprise/unexpectedness, as shown in (33) and the contrast in (34). The inclusion of this particle thus highlights the speaker’s belief by emphasizing the unlikelihood of the scenario portrayed.

(32a) *Phải/giá mà ngày nào cũng là ngày lễ.*
if.only PRT day which also COP holiday
‘If only every day were a holiday.’

(32b) *Ước gì mà ngày nào cũng là ngày lễ.*
wish what PRT day which also COP holiday
‘I wish every day were a holiday.’

(33) *Nó mà tôi mới lạ.*
3SG PRT come then strange
‘It’d be a wonder if he came.’

(34a) *Nó tới à?*
3SG come SFP?
‘He’s coming?’

(34b) *Nó mà tới à?*
3SG PRT come SFP
‘He’s coming? (That’s unlikely/unexpected!)’

It is noteworthy that in all the previous examples, *mà* is attested in neither a clause-initial nor a clause-final position. As a particle, *mà* must be sandwiched between other elements, i.e., it is always clause-internal, a feature shared with discourse/modal particles in other languages (cf. van Kemenade & Links 2020). In (28), when *nếu* ‘if’ is present, *mà* can be found preceding or following the subject. Once *nếu* is dropped (35a), *mà* is banned from the clause-initial position. When it follows the subject (35b), *mà* alone is enough to signal the hypothetical reading of the clause.

(35a) **Mà Ti đậu, mình sẽ ăn mừng.*
PRT Ti pass self FUT celebrate
‘If Ti passed (the exam), we’d celebrate.’

- (35b) *Tí mà đậu, mình sẽ ăn mừng.*
 If PRT pass self FUT celebrate
 ‘If Ti passed (the exam), we’d celebrate.’

Besides a sense of surprise, German *denn* and its OE counterpart *þonne* also express a degree of exasperation or disapproval/reproach about the circumstances communicated in the context (van Kemenade & Links 2020). These shades emerge mainly in non-canonical interrogatives. In a similar vein, the speaker’s attitude *mà* conveys in these contexts is mainly that of negativity (i.e., annoyance/irritation) and aggressiveness. This attitudinal aspect is highlighted when we contrast (36a) with (36b), the former features the adverb *sao*, the latter the predicate *làm sao* (lit. ‘do what’).⁸ As *mà* in (36b) is a conjunctive introducing a purpose (or result) clause (a ‘subordinating particle’ in Thompson’s (1978) term)), the speaker’s aggressive/negative attitude typically associated with *mà* in (36a) is not guaranteed. The same applies to (37).

- (36a) *Tí sao mà giải quyết chuyện này (*vậy)?!* 9
 Ti what PRT handle matter this SFP
 ‘Why/how come Ti handle this matter?!’ (≈ ‘It shouldn’t be so!’)

- (36b) *Tí làm sao mà giải quyết chuyện này vậy?*
 Ti do what CONJ handle matter this SFP
 ‘What does/will Ti do so that he could handle this matter?’

- (37a) *Khóc gì mà khóc (*vậy)?!*
 cry what PRT cry SFP
 ‘What are you crying for?!’ (≈ ‘You shouldn’t cry!’)

- (37b) *Khóc gì mà khóc dữ vậy?*
 cry what CONJ cry fierce SFP
 ‘What is the reason x such that you are crying so hard because of x?’

Incidentally, Bayer & Obenauer (2011) also claim that the German *denn* in the SDQ (26) signals the speaker’s negative or critical concern about the value of the *wh*-variable. We further find in TSM the particle *leh* which contributes to a negative attitude towards the proposition (Lau & Tsai 2020), see (19). Vietnamese *mà*, German *denn* and TSM *leh* are thus comparable in this aspect.

Moreover, these particles all have diachronically related counterparts, which suggests they could be a product of grammaticalization. Lau & Tsai (2020) claim that *leh* is derived from a progressive aspect marker. *Denn* is related to a homonymous conjunctive meaning ‘then’ (Bayer 2012). We entertain the possibility that particle *mà* is a further stage of grammaticalization of the conjunctive *mà*. This conjunctive-to-particle path of grammaticalization is not rare cross-linguistically, as exemplified further with the German *doch* (< *doch* ‘however’) (Thurmair 1989) and the Romanian *doar* (< *dar* ‘but’) (Coniglio & Zegrean 2012).

Note that the strict clause-medial property of particle *mà* effectively distinguishes it from conjunctives (and adverbs). Conjunctive *mà* can be clause-initial, as in (38). When *mà* in (36a) is switched to the clause-initial position, it can only be construed as a conjunctive, as in (39).

- (38) *Tí nói là thích Mai. Mà Mai thì có bạn trai rồi.*
 Ti say that like Mai CONJ Mai TOP have boyfriend already
 ‘Ti says that he likes Mai. But Mai already has a boyfriend.’

⁸ See Phan 2021 for a detailed discussion of the *wh*-element *sao* and its various readings.

⁹ That the SDQs consistently reject the particle *vậy* in these two pairs further shows their distinct nature as non-interrogatives.

- (39) *Mà* *Tí* *sao* *giải quyết* *chuyện* *này* *(vậy)?!*
 CONJ Ti how handle matter this SFP
 #‘Why/how come Ti handle this matter?!’ (≈ ‘It shouldn’t be so!’)
 ‘But why/how come Ti handle this matter?!’ (≈ ‘But it shouldn’t be so!’)

The claim that *mà* in SDQs like (37a) is of a different nature compared to the conjunctive *mà* receives further support with both intra-linguistic and cross-linguistic data. First, *mà* is not the sole particle that fits the above descriptions in Vietnamese. In (40), parallel patterns to (2) are attested with *chứ* and non-*wh*-elements of expletive forms like *khỉ khô* (lit. ‘dried monkey’) or *cái đầu mày* (lit. ‘your head’). This suggests that the two particles could be merged in the same syntactic position. (40a) is parallel to A-SDQs, while (40b) is parallel to B-SDQs.

- (40a) *Mày* *khóc* *khỉ* *khô* *chứ* *khóc!*
 2SG cry monkeydried PRT cry
 ‘You shouldn’t cry!’
 ‘It’s not the case that you’re crying!’
- (40b) *khỉ* *khô* *chứ* *tiết kiệm* *hơn*
 monkey dried PRT economical more
 ‘It’s not the case that it’s more economical’
 (<http://vnsharing.site/forum/showthread.php?t=68297andpage=70>)

Chứ is comparable to *mà* as they are both related to homonymous contrastive conjunctives. Thompson (1978:262) further defines the conjunctive *chứ* as a coordinating marker paraphrasable as ‘and [not], [but] to the contrary, still, as a matter of fact’. Hoàng (2006:190) claims that *chứ* introduces a constituent that negates the possibility to contradict the previous statement, with the intention to further assert said statement. In (41), the clauses introduced by *chứ* feature the statements ‘I forgot’ and ‘this belongs to you’ which contradict their corresponding immediately prior claims and are both under the scope of negation. As the patterns characteristic of the conjunctive *chứ* do not match what is exhibited in the surprise-denial/disapproval exclamatives like (40), we conclude that *chứ* in these sentences is not a conjunctive.

- (41a) *Tôi* *vẫn* *còn* *nhớ*, *chứ* *quên* *thế* *nào* *được?*
 1SG still still remember CONJ forget how can
 ‘I still remember [it], how could it be that I forgot [it]?’
 (Hoàng 2006:190, glossing and translation ours)
- (41b) *Cái* *này* *của* *tôi*, *chứ* *không* *phải* *là* *của* *anh*.
 CL this POSS 1SG CONJ NEG correct COP POSS 2SG
 ‘This belongs to me and not to you.’ (Thompson 1978:262, glossing ours)

Second, concerning A-SDQs, Cantonese and Vietnamese constructions neatly parallel each other, as shown in (42) and (43). However, Cantonese features the particle *aa* which could not be construed as a conjunctive. This is because in Cantonese *aa* is never a conjunctive, only an SFP or a topic marker.

- (42) *Mày* *khóc* *gì* *mà* *khóc?!* (=2a)
 2SG cry what PRT cry
 ‘What are you crying for?!’ (≈ ‘You shouldn’t cry!’)
- (43) *Nei* *haam* *mei* *aa* *haam?!*
 2SG cry what PRT cry
 ‘Why are you crying for?!’ (≈ ‘You shouldn’t cry!’)

The non-conjunctive nature of Vietnamese *chứ* and Cantonese *aa* in SDQs constitutes an indirect argument against the treatment of *mà* simply as a conjunctive device in cases like (2). Drawing parallels between the particle *mà* and functionally similar particles in German, OE, and TSM, we view *mà* as a functional head projecting a Particle Phrase, albeit of the minor category (i.e., “minor functional heads”) in the sense of Rothstein (1991). In German, PrtP is immediately merged with a VP/vP (see (44)), while in OE and TSM ((45) and (46)) it is merged low in the CP domain.

(44) [_{FinP/ForceP} Wh Force°/Fin° [_(TopP) . . . [_{PrtP} **Prt**° [(AdvP*) [_{VP/vP} . . .]]]]]
(Bayer & Obenauer 2011:461)

(45) [_{CP} WhP C° [_{FP} F° [_{PrtP} *bonne* [_{TP} T° . . . [_{VP} . . .]]]]]
(adapted from van Kemenade & Links 2020:15)

(46) [_{AttP} Att° . . . [_{FocP} *sī* . . . [_{PrtP} *leh* . . . [_{TP} . . .]]]] (adapted from Lau & Tsai 2020:279)

Although further research is needed to pinpoint the exact locus of PrtP in Vietnamese, we tentatively take *mà* to merge above TP, since it could precede both temporal adverbial phrase *ngày mai* ‘tomorrow’ and future marker *sẽ* ‘will’ in (47).

(47) *Tí mà ngày mai sẽ đi nước ngoài gì?!*
Ti PRT tomorrow FUT go country outside what
‘It’s not the case that Ti will go abroad tomorrow!’

That PrtP is not part of a split ForceP but nevertheless contributes to the illocutionary force can be accounted for using an agreement mechanism. Bayer & Obenauer (2011) propose a probe/goal agreement based on feature sharing as suggested by Pesetsky & Torrego (2007), while Lau & Tsai (2020) and Tsai (2021) make use of a multiple *Agree* proposed in Hiraiwa 2001. This *Agree* allows the Force° head to probe down into its domain and “integrate elements from lower functional projections to take part in the semantic shaping of illocutionary force” (Bayer & Obenauer 2011:464).

Note that although *mà* and *chứ* both introduce speaker’s negativity/aggressiveness and essentially modify the same illocutionary forces, they are not interchangeable in the above surprise-denial/disapproval constructions. To wit, *mà* is only compatible with the interrogative clause type (and correlative clause, a type of subclause which also features OE *þa* and *þonne* quite prominently (van Kemenade & Links 2020:6)), while *chứ* appears exclusively in exclamatives. Besides SDQs, *mà* seems to be found only in potential or unreal contexts, as exemplified in (28) and (31-34). This is once again reminiscent of OE *þonne* as it is used exclusively in nonfactual contexts: questions, conditionals, and imperatives (van Kemenade & Links 2020:9). Both *mà* and *chứ* are not attested in declarative clauses with no special illocution type. That the choice of these particles is determined by clause types and/or sentential moods further highlights their nature as particles, and not as conjunctives (or adverbs of any type).

3.3 Mono-clausality and movement

The fact that *mà* in SDQs is a particle and not a conjunctive means SDQs are mono-clausal. At first glance, it might be intuitive to relate an SDQ like (36a) with a bi-clausal sentence like (36b) which features the conjunctive *mà*. We have shown in 3.2 that these two instances of *mà* are distinct. Scrutiny on the two constructions further indicates that they are unrelated. First, SDQs do not allow a subject following *mà*, see (48a). The impossibility of a second subject is straightforward if (48a) is mono-clausal in nature. By contrast, an overt subject can always replace a *pro* in the lower clause in (48b).

(48a) *Khóc gì mà (*mày) khóc?!* [SDQ]
cry what PRT 2SG cry
‘What are you crying for?!’

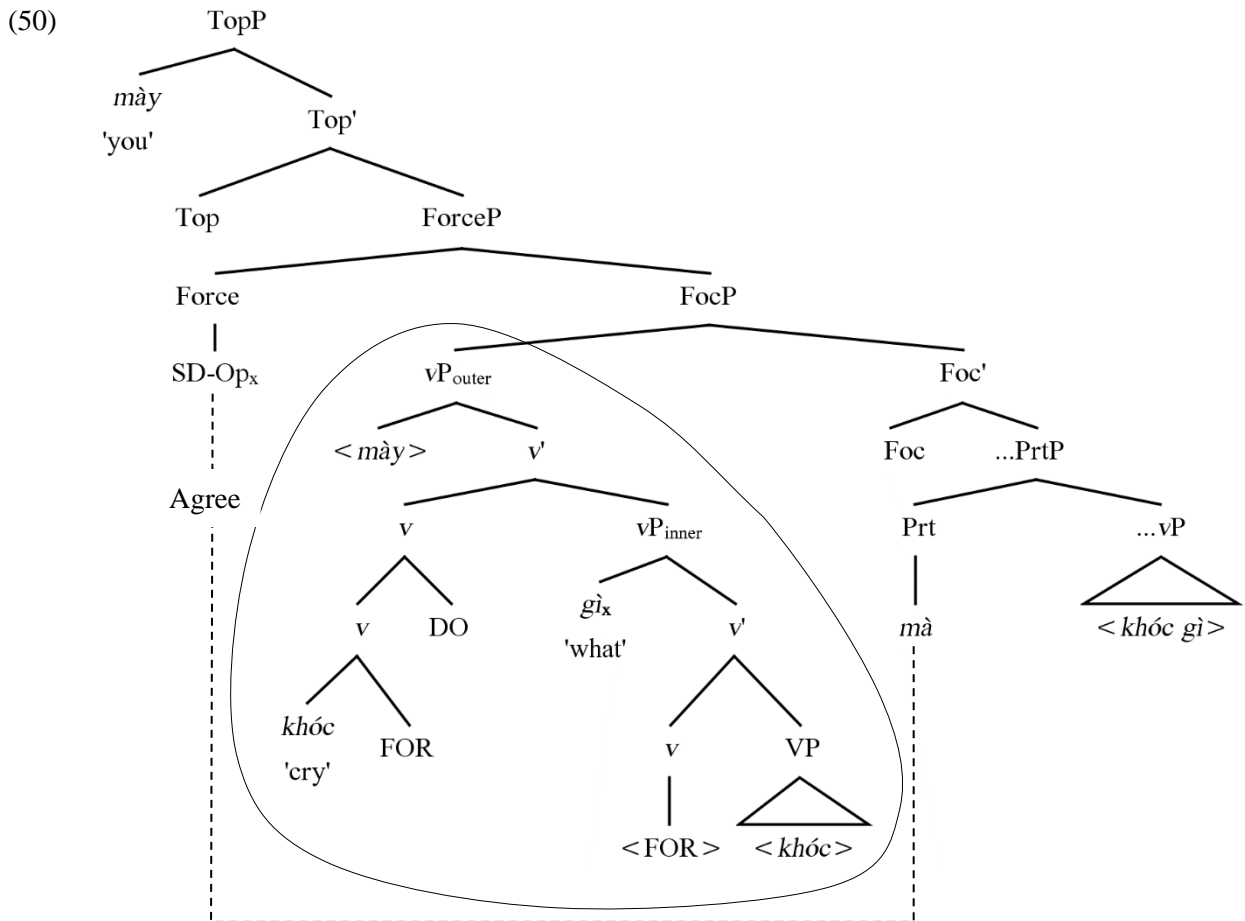
- (48b) *Khóc gì mà pro/mày khóc dữ vậy?* [StQ/RhQ]
 cry what CONJ 2SG cry fierce SFP
 ‘What is the reason x such that you are crying so hard because of x?’

Second, while the two instances of the verb in (36a) must be strictly identical, no such requirement is imposed for (36b). If we assume both sentences share the same configuration, it is perplexing why (49) does not require the same verb *khóc* ‘cry’ to surface simultaneously before and after the conjunctive *mà*. The identity constraint in (36a) is straightforward if these verbal instantiations are in fact copies of the same element. This amounts to saying the verbal constituent preceding the particle *mà* is not base-generated there but is moved from below.

- (49) *Khóc gì mà cả xóm đều nghe mày khóc vậy?*
 cry what CONJ entire neighborhood PRT hear 2SG cry SFP
 ‘What is the reason x such that because of x the entire neighborhood can hear your crying?’

We proposed in 3.1 that the main verb in an A-SDQ is raised to attach to an applicative head, which results in its higher copy preceding the *wh*-element after spell-out. Up until that point, Vietnamese A-SDQs behaved exactly like their counterparts in Mandarin and TSM. However, given the proposal that *mà* is merged above TP, that the verbal chunk *khóc gì* in (36a) surfaces above *mà* suggests a further movement of it across the particle to CP.

Hence, the Vietnamese equivalent of Mandarin and TSM SDQs (or ‘whining’ construction in Lau & Tsai’s (2020) term) in (17) and (19) involves not only the raising of the main verb to attach to an applicative head, but most likely also a *vP*-fronting to CP for feature checking purposes. Specifically, after the verb *khóc* ‘cry’ is raised to the light verb, the subject moves to a high projection in CP, presumably a Top(ic)P or an Att(itude)P, then the rest of the *vP* is A'-moved to FocP to derive the right linear order, as schematized in (50). The verbal chunk preceding *mà* is thus the result of a remnant *vP*-fronting. To complete the picture, a null operator in ForceP binds *gì* to ensure the denial/disapproval reading be realized, while Force[°] and Prt[°] enter an *Agree* relation along the lines of Pesetsky & Torrego 2007.



Recall further that Cantonese exhibits the same phenomenon, that is the particle *aa* surfaces lower than the verbal constituent, see (43), schematized here as (51). This suggests that Vietnamese and Cantonese both further require a *vP*-fronting of the verbal constituent in SDQs, a phenomenon not shared with Mandarin and TSM despite their apparent similitudes.

- (51) [_{TopP} *Nei* Top⁰ [_{FocP} *haam* *mei* Foc⁰ ... [_{PrtP} *aa* ... [_{vP} <*haam* *mei*>]]]]?!
 2SG cry what PRT cry what
 ‘What are you crying for?!’

An immediate question arises here: what is the motivation of this fronting? We suggest the verbal constituent is fronted to FocP for emphatic reason and for signaling a sense of surprise (or annoyance) in a manner similar to Cruschina’s (2012) ‘mirative fronting’. To wit, the fronted constituent is not to be contrasted with another constituent, but is associated with an emphatic interpretation that is accompanied by a sense of surprise and unexpectedness (Cruschina 2006, 2010, a.o). This is well aligned with the now familiar force of surprise-denial/disapproval featured in SDQs.

If the verbal constituent is fronted to Spec,FocP to derive an emphatic interpretation, we expect it to be the locus of prosodic prominence (cf. Cruschina 2009; Authier & Haegeman 2019). This prediction is preliminarily confirmed with a simple production experiment in which three male Vietnamese participants were asked to produce the sentence (2a) with two repetitions each. Praat was used for the extraction of the relevant values. The results show that for each participant pitch movement, intensity, and duration of the higher copy are consistently greater to those of the lower copy (although

to different extents), as illustrated in Figures 3 to 5 respectively.¹⁰ Jannedy (2007) shows that acoustic features like f0, amplitude, and duration are indeed acoustic cues for focus marking in Vietnamese (see also Michaud & Brunelle 2016 for an overview).

Figure 3: The mean f0 values (two tokens per speaker) of the two verb copies in (2a) by three male speakers

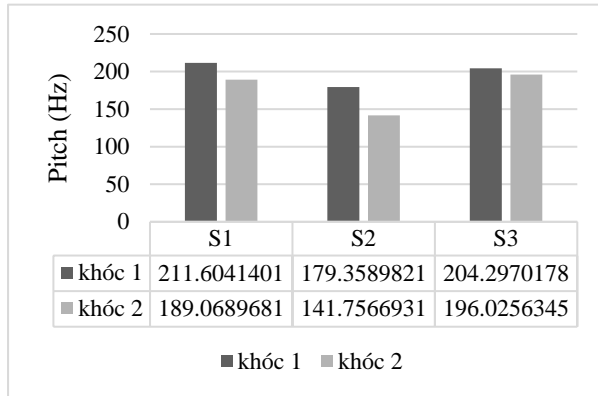


Figure 4: The mean intensity values (two tokens per speaker) of the two verb copies in (2a) by three male speakers

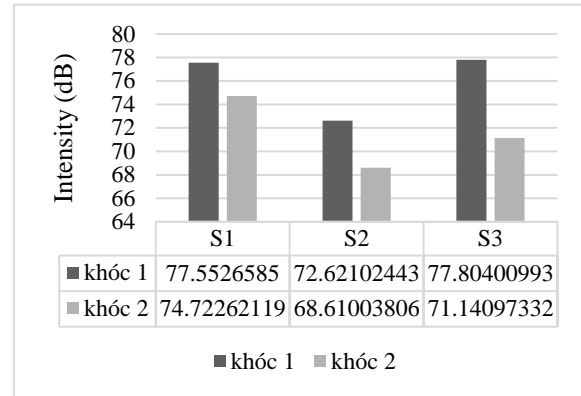
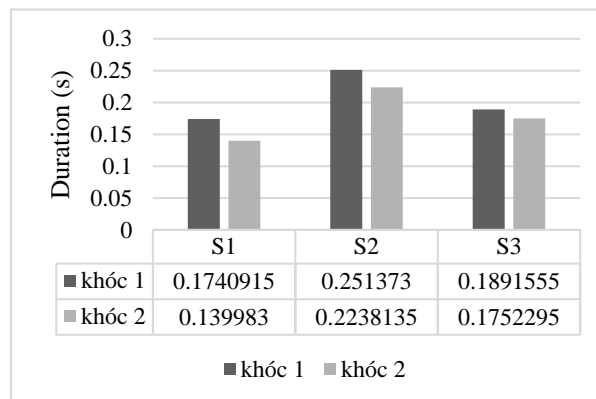


Figure 5: The mean duration values (two tokens per speaker) of the two verb copies in (2a) by three male speakers



Recall that the sequence *mà* + *V* can be omitted in (2a), which results in (52). However, when *mà* is present, the lower copy of the verbal *khóc* ‘cry’ must be spelt out mandatorily, as shown by the ungrammaticality of (53). We hazard a speculation that this phenomenon is tied to *mà*’s obligatory clause-internal position, a property consistently observed for discourse particles cross-linguistically (Thurmair 1989; van Kemenade & Links 2020, a.o.). In a way, it is to say *mà* as a particle must be sandwiched between realized elements. The same phonological requirement is extended to *chứ* and the Cantonese *aa*.

- (52) *Mày khóc gì mà* ~~khóc~~?!
 2SG cry what PRT cry
 ‘What are you crying for?!’

¹⁰ This tendency might be confounded by intonational downtrends such as pitch declination and final lowering to a certain extent. An investigation on how much impact these trends actually have on the prosody of SDQs is however well beyond the scope of this work.

- (53) **Mày khóc gì mà <khóc>?!
 2SG cry what PRT cry
 Int: ‘What are you crying for?!’*

We further hypothesize that this clause-medial requirement is connected to another function of discourse/modal particles in terms of information structuring. To wit, van Kemenade & Links (2020), among others, argue that discourse/modal particles necessarily occur in a fixed position dividing the clause into domains for discourse-given and discourse-new information. As schematized in (54), OE *þonne* is generated in a position higher than discourse-given subjects and pronominal objects and lower than discourse-new nominal subjects. FP here is taken to be part of the C-domain and represents the field hosting given information.

- (54) [_{CP} WhP C° [_{FP} givenNPS F° [_{PrTP} *þonne* [_{TP} newNPS T° . . . [VP . . .]]]]]
 (van Kemenade & Links 2020:15)

This is well aligned with Cao’s (2004) characterization of *mà* as a theme marker which separates the theme (i.e., the topic) from the rheme (i.e., the comment) of a sentence (albeit its greater restriction in use compared to *thì* and *là*, the two other theme markers). Note that a new-information component could undergo a type of movement and ends up preceding a particle (Grosz 2016:346 and citations therein). (55) illustrates the movement of the focused finite verb *kauft* ‘buys’ across the particle *eben* to C°. (56) exhibits a case of scrambling where various VP-internal constituents, but not the finite verb, may move out of the scope of *doch*. Crucially, while certain movements are allowed across a particle, there must always be something remaining to the right of it to ensure grammaticality.

- (55) Tom: *There are these BMX bikes. And Ruth really wants to have one. Currently she’s considering a used bike, but it’s still quite an expensive one.*

Hedi: *And what does her mother do?*

Tom: *Naja, du kennst sie doch. Sie [KAUFT]_F eben dieses Fahrrad t_{KAUFT}
 well you know her DOCH she buys EBEN this bike*

‘Well, you know her. She’s going to [BUY]_F this bike after all.’ (Grosz 2016:346)

- (56a) *Damals hat doch [dein Bruder] [dem Professor] [seine Dissertation]
 then has DOCH your brother.NOM the professor.DAT his dissertation.ACC
 gezeigt.
 shown
 ‘In those days your brother has shown his dissertation to the professor, didn't he?’
 (Bayer 2018:6)*

- (56b) *Damals hat [dein Bruder] doch __ dem Professor seine Dissertation gezeigt. (ibid.)*

- (56c) *Damals hat [dein Bruder] [dem Professor] doch __ __ seine Dissertation gezeigt. (ibid.)*

- (56d) *Damals hat [dein Bruder] [dem Professor] [seine Dissertation] doch __ __ __ gezeigt. (ibid.)*

A similar argument could be proposed for the verbal chunk preceding *mà* in A-SDQs. Its movement in a mirative-fronting fashion would render the right of *mà* phonologically unrealized once PF deletion applies. The lower copy of the verb escapes this deletion in an effort to preserve the strict sentence-medial position of *mà*, which also marks the boundary between thematic information (to its left) and rhematic information (to its right).

While it might seem *ad hoc* to postulate such an apparent ‘selective’ deletion, this phenomenon is well compatible with van Urk’s (2018) partial deletion approach based on Landau’s (2006) economy constraints on copy deletion. Landau (2006) proposes P-Recoverability and Economy of Pronunciation as two principles that enforce copy deletion, as defined in (57) and (58).

(57) *P-Recoverability:*

In a chain $\langle X_1, \dots X_i, \dots X_n \rangle$, where some X_k is associated with phonetic content, X_k must be pronounced. (Landau 2006:31)

(58) *Economy of Pronunciation:*

Delete all chain copies at PF up to P-recoverability. (Landau 2006:30)

The second principle as an economy principle ensures the maximization of deletion. The first principle, as van Urk (2018:964) argues, allows for the spell-out of multiple copies by virtue of an “association with phonetic content”. An element is associated with phonetic content iff it has phonetic content or is “in a position specified with some phonological requirement” (Landau 2006:31). The latter clause allows for certain copies of an element to avoid deletion even when its phonetic content is already realized elsewhere, provided that these copies reside in positions that come with a unique PF requirement. For Hebrew verb copying, that tense morphology needs to be hosted on the verb leads to this phonological requirement (Landau 2006). For pronoun copying in V2 languages, it is the EPP property of v/C that functions as a PF requirement (van Urk 2018). In a similar vein, we take the strict clause-medial nature of the information-structure marker *mà* as the motivation behind the obligatory spell-out of the lower copy of the verbal chunk.

Van Urk (2018) remarks that Economy of Pronunciation predicts such secondary copies must undergo partial deletion if possible, given that this type of deletion will not violate P-Recoverability. To wit, as long as one phrasal copy is realized intact, P-Recoverability is satisfied. Constituents inside other phrasal copies must be pronounced as little as possible, provided that the remaining prosodic unit still satisfies the phonological requirement driving multiple copy spell-out. It amounts to saying that this approach allows for additional copies, but limits them to a “minimal” form, or a single prosodic word (van Urk 2018:966, emphasis ours). This account thus is capable to explain why (2a) allows for the multiple spell-out of the verbal chunk but only *khóc* ‘cry’ survives the PF deletion, not the entire lower copy, i.e., *khóc gì* (lit. ‘cry what’).

Besides the proposed vP fronting, Vietnamese A-SDQs also exhibit another curious phenomenon involving verb copying. Namely, the verb seems to be able to copy itself after the vP is fronted. While this verbal reduplication is optional, its employment appears to lead to the intensification of the disapproving force, see (59). Note that this duplication disallows a denial reading, and does not seem to be compatible with stative verbs which inherently permit only the denial reading (see (60)).

- (59a) *Có để im cho người ta ngủ không, khóc khóc gì mà khóc?!*
 have let silent let people sleep NEG cry cry what PRT cry
 ‘Be silent so that I can sleep, what are you crying for?!’

(<https://emdep.vn/gia-dinh/khi-nuoc-mat-ngung-roi-dan-ba-tan-nhan-hon-bao-gio-het-20180303072705661.htm>)

- (59b) *đã thế lúc nào cũng cười, cười cười cái gì mà cười*
 on.top.of.that time which also smile smile smile CL what PRT smile
 ‘on top of that, you would smile all the time, what did you even smile for?!’

(<https://truyenngan.net/ban/nghi-den-cuoi-cung-nguoi-cau-lay-se-la.html>)

- (60) **Nó giỏi giỏi gì mà giỏi?!*
 3SG good good what PRT cry
 #‘It couldn’t be the case that he is good!’

In syntactic terms, we tentatively propose that the verb is further raised to a higher functional projection, most likely to the Attitudinal Phrase (AttP), to check relevant features. That its lower copy is still pronounced could be due to the fact that this copy is involved in a morphological fusion with the light verb (Tsai 2021) which leads to the failure to reduce a verb chain (cf. Cheng 2007).

This analysis fits the description of a type of *smuggling* (a term coined by Collins (2005)) which specifically involves two A' movements (Belletti & Collins 2021). Smuggling consists of a sequence of two movement operations, referred to here as Step A and Step B in (61), both occurring in the A' system:

- (61) a. Step A: Movement of the chunk/Pied-Piping: YP containing XP undergoes movement.
b. Step B: Extraction: XP undergoes movement evacuating YP. (Belletti & Collins 2021:3)

Belletti & Collin (2021) illustrates this type of smuggling with a case of *wh*-extraction of a PP:

- (62) [Di quale autore] Int [il primo romanzo <PP>] Top [TP non lo regaleresti a nessuno <DP>]?
“Of which author the first novel you (it-CL) would never offer to anybody?”
(Belletti & Collins 2021:7)

Here the PP *di quale autore* ‘of which author’ is extracted out of a DP occupying a left peripheral A' position. The *wh*-PP moves to Spec of an interrogative head higher than the topic head. This sequence of A' movements is in compliance with the criterial approach to *freezing* (Rizzi 2006, 2014), as “under criterial freezing, only a constituent satisfying a relevant criterion is frozen in place, constituents contained in it may be available for further displacement for satisfaction of a different criterion” (Belletti & Collins 2021:3). Since the DP in Spec,TopP satisfies the topic criterion and the *wh*-PP originally contained in it satisfies the interrogative *wh*-criterion in Spec,Int, the operation in (62) is sanctioned.

The same rationale should be behind the legitimacy of movement in (59). Concretely, from Spec,FocP as the landing site of the focused remnant *v*P chunk, the verbal *khóc* ‘cry’ (with interpretable attitude features) forms a probe-goal relation with the higher Att° head which results in its extraction out of FocP to Spec,AttP.

4 Concluding remarks

In previous sections, we have seen that SDQs in Vietnamese exhibit a number of properties not attested in other types of non-canonical interrogatives, including the obligatory non-argumental uses of *what*-elements and their syntactic restrictions. Through a comparison with SDQs in Mandarin and TSM which display apparently comparable configurations, we have shown that Vietnamese A-SDQs involve more movements than these Sinitic counterparts, although it patterns quite closely with Cantonese. The paper also drew a parallel between *mà* in SDQs and discourse/modal particles in other languages. In so doing we argued for a CP-level Particle Phrase which enters an *Agree* relation with ForceP to either modify or indicate illocutionary force in Vietnamese.

By way of conclusion, we want to point out to the fact that certain configurations bearing a close resemblance to A-SDQs could naturally yield a ‘high degree’ reading while expressing an illocutionary force of exclamation, as shown in (63).

- (63a) *Tí giỏi (*cái) gì/ sao mà giỏi (vậy)!*
Ti good CL what what PRT good SFP
‘How good is Ti!’
- (63b) *Người (*cái) gì/ sao mà giàu (vậy)!*
person CL what what PRT rich SFP
‘How rich is (s)he!’

These constructions are different from SDQs in at least three aspects. First, the *wh*-elements seem to be highly grammaticalized as only *gì* ‘what’, but not the morphologically complex (*cái*) *gì*, is allowed. The classifier *cái* is no longer optional, its presence leads to ill-formedness. In another exclamative context, *gì* and *sao* can form a lexicalized unit with the *wh*-element *đâu* ‘where’.

- (64) *Giàu (*cái) gì/ sao đâu (á)!*
 rich CL what what where SFP
 ‘How rich!’

Second, the ‘high degree’ exclamatives have a prosody distinctive from those in SDQ contexts. Specifically, the duration and intensity of the *wh*-element in these contexts seem to be significantly greater than those in SDQs. Third, they are only plausible with gradable verbs like *giỏi* ‘be good’ or *giàu* ‘be rich’. Fourth, they are factive in nature, thus allowing SFPs like *thế* and *vậy* ‘so’. Exactly how these ‘high degree’ exclamatory constructions syntactically differ from those of surprise-denial/disapproval readings would make an interesting topic for future research.

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YES-NO QUESTIONS AND THE VIETNAMESE CLAUSE STRUCTURE

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Abstract

Despite lively discussion in the literature on Vietnamese, the behavior of question markers is still elusive. The aim of this paper is to provide a comprehensive and systematic view of Vietnamese question particles integrating novel generalisations concerning their distributional and interpretational properties. We also show how this description leads us to a deeper understanding of Vietnamese clause structure in general.

Keywords: question, negation, focus, tense, aspect, Vietnamese
ISO 639-3 codes: vie

1 Introduction

In Vietnamese, an assertion such as (1) can be turned into a matrix yes-no question¹ by adding a variety of different particles at the end of the clause, as illustrated in (2).

- (1) John thích học tiếng Việt
John like study language Vietnamese
'John likes to study Vietnamese'
- (2) a. John thích học tiếng Việt **không?**
John like study language Vietnamese Q²
'Does John like to study Vietnamese?'
- b. John thích học tiếng Việt **chưa ?**
John like study language Vietnamese Q
'Does John like to study Vietnamese yet?'
- c. John thích học tiếng Việt **à ?**
John like study language Vietnamese Q
Roughly: 'Does John like to study Vietnamese? (I guess/ Can you confirm that)'
- d. John thích học tiếng Việt **chăng ?**
John like study language Vietnamese Q
Roughly: 'Does John like to study Vietnamese? (by any chance/ Can you confirm that)'
- e. John thích học tiếng Việt **ư ?**

¹ A note should be made here in terms of terminology: yes-no questions are to be distinguished from constituent questions and alternative questions for only the former can be answered by Yes or No or their variants.

² Abbreviations used in the glossing lines: ANT: anterior, ASR: assertion, CL/CLF: classifier, DEM: demonstrative, DUR: durative, EM: emphatic, FUT: future, IMP: imperative, LOC: locative, NEG: negative, PASS: passive, PST/PAST: past, PERF: perfect, POL: polite, PROG: progressive, PRN: pronoun, PRT: particle, Q: question, SFP: sentence-final particle, TOP: topic, 2SG: second singular.

John like study language Vietnamese Q
 Roughly: ‘Does John like to study Vietnamese? (I’m surprised/ Can you confirm that)’

- f. John thích học tiếng Việt **sao?**³
 John like study language Vietnamese Q
 Roughly: ‘Does John like to study Vietnamese? (I’m surprised/ Can you confirm that)’

Embedded yes-no questions, on the other hand, can be formed by inserting *không* to the end of the clause as in (3a), or *liệu* to the beginning of the clause as in (3b), or both as in (3c):

- (3) a. Mary muốn biết [John có thích học tiếng Việt **không**]
 Mary want know John yes like study language Vietnamese Q
- b. Mary muốn biết [**liệu** John có thích học tiếng Việt]
 Mary want know whether John yes like study language Vietnamese
- c. Mary muốn biết [**liệu** John có thích học tiếng Việt **không**]
 Mary want know whether John yes like study language Vietnamese Q
 ‘Mary wants to know whether John likes to study Vietnamese’

Given such a large inventory of yes-no question particles in Vietnamese, a major concern to be addressed is how to distinguish them descriptively.

2 Previous accounts

Yes-no question particles have received a great deal of interest in research on Vietnamese grammar, most relevantly Cao (2004), Trinh (2005), Duffield (2013), and Le (2015). However, the list of question markers and the precise characterization of their interpretation and distribution both remain elusive.

2.1 Cao (2004)

One of the first attempts to provide an extensive description of Vietnamese yes-no questions is Cao (2004), in which he distinguishes between ‘general questions’ with *có ... không* or *đã ... chưa* and ‘metalinguistic questions’ with *à, hả, ư, or sao*.

- (4) a. Anh Nam **có** đến đây **không?**
 brother Nam yes come here Q
 ‘Does Nam come here?’ (Cao’s example 2004: 396, translation ours)
- b. Anh Nam **đã** đến đây **chưa?**
 brother Nam ANT come here Q
 ‘Has Nam come here yet?’ (Cao’s example 2004: 396, translation ours)

³ In addition to marking yes-no questions, Vietnamese *sao* also marks wh-questions meaning *why* or *how*. This paper is only concerned with the former use of *sao*.

- c. Ông Nam về rồi à/ u/ sao/hả?⁴
 Grandpa Nam leave already Q/Q/Q/ Q
 ‘Nam left, didn’t he?’ (Cao’s example 2004: 396, translation ours)

‘Metalinguistic’ questions like those in (4c) have a presupposition along the lines of ‘I know P, but I want you to confirm whether P’ (Cao 2004:398). Cao briefly notes that, *u* and *sao* have an additional surprise effect, without going into detail.

Thompson (1965), Nguyen (1997), and Tran (2009) on the other hand describe all of these particles - including *à*, *u*, *sao*, and *hả* - as surprise markers. The following examples illustrate the surprise reading:

- (5) a. Chị quên rồi à?
 2SG forget already A⁵
 ‘You forgot already? (I’m surprised)’ (Example of Thompson 1965:60)
- b. Thằng Huân nó chưa ngủ à?
 boy Huan he not.yet sleep I’m surprised
 ‘Isn’t little Huan asleep yet?’ (Example of Nguyen 1997:125)
- c. Lan mua quyển sách đó à?
 Lan buy CLF book that A
 ‘Did Lan buy that book? (I am surprised)’ (Example from Tran (2009:42)
- d. Tân đã gặp Lan à/u/hả?
 Tan PST meet Lan Q/Q/Q
 ‘Did Tan meet Lan? (I am surprised)’ (Example from Tran (2009:19)

The description of *à* as a ‘confirmation request’ as in Cao (2004) or a ‘mild surprise’ marker as in Thompson (1965), Nguyen (1997), and Tran (2009) is however incomplete. It turns out that *à* sometimes does not require the speaker’s surprise nor prior knowledge, see sections 2.3 and 3.2 below.

2.2 Trinh (2005)

Trinh (2005) discusses three particles, namely *không*, *chưa*, and *à*, which according to him instantiate two kinds of questions in Vietnamese: *không* and *chưa* mark pragmatically neutral ‘polarity questions’, whereas *à* marks pragmatically biased ‘checking questions’, used to ‘check what the speaker finds hard to believe’ (Trinh 2005: 31). For instance, (6c) implies that the speaker suspects that John does not read books, whereas no such implicature can be inferred from (6a-b).

- (6) a. John có đọc sách không?
 John CO read book KHONG
 ‘Does John read books?’ (Trinh’s example 2005:30)
- b. Nó đã đọc sách chưa?
 he DA read book KHONG
 ‘Has he read books (yet)?’ (Trinh’s example 2005:48)

⁴ Note that *hả* is listed in Cao (2004) and Tran (2009) as a yes-no question particle, but we decided not to include *hả* in our list for reasons which will become clear in the discussion of Le (2015) below.

⁵ The gloss of the cited examples is kept intact as in the original text, here and elsewhere.

- c. John đọc sách à?
 John read books Q
 ‘Does John read books?’ (Trinh’s example 2005:30)

On the syntactic side, Trinh notes that the two types differ in that the neutral, but not the biased, particles can be embedded:

- (7) a. Tôi muốn biết nó có đọc sách **không**
 I want know he CO read book KHONG
 ‘I want to know whether he reads books’
- b. *Tôi muốn biết nó đọc sách à
 I want know he read book Q
 Intended: ‘I want to know whether he reads books’ (Trinh’s examples 2005:31)

Polarity questions marked by *không*, *chưa* can thus be either root or embedded, and are pragmatically neutral, whereas checking questions marked by *à* are root-only and pragmatically biased.

2.3 Le (2015)

Le (2015) argues against the surprise interpretation (e.g, Thompson 1965, Nguyen 1997, Tran 2009) and in favor of the confirmation reading of *à* (e.g., Cao 2004, Trinh 2005), via contexts such as:

- (8) **Context:** The speaker just returned from a different area where it didn’t rain and noticed that the streets at the location of speaking were wet. (S)he asks a local person:
 Hôm qua trời mưa à?
 yesterday it rain SFP
 ‘It rained yesterday?’ (Le’s example and context 2015:29)

In this context, the question with *à* does not have any surprise meaning component since the speaker already made a guess based on what (s)he saw in the street and (s)he simply asked for confirmation.

The literature is thus focused on trying to decide either-or questions: a particle is either neutral or pragmatically loaded, and when pragmatically loaded, the pragmatics is either surprise or confirmation. Section 3.2 below suggests that these either-or approaches are not descriptively correct.

Le (2015) goes beyond the *không*, *chưa*, *à* trio, providing the most extensive list of interrogative particles in the formal literature: *không*, *chưa*, *chẳng*, *à*, *ư*, *sao* (abbreviated as SFP (‘sentence-final particle’) in Le’s glossing lines).

- (9) a. Ngày mai chị có đi làm **không?**
 tomorrow 2SG CO go work SFP
 ‘Do you go to work tomorrow?’ (Le’s example 2015:23)
- b. Em về nhà **chưa?**
 2SG go home SFP
 ‘Have you gone home yet?’ (Le’s example 2015:26)
- c. Chị có đi Pháp à?
 2SG CO go France SFP
 ‘You went to France?’ (Le’s example 2015:30)

- d. Chị có đi học hôm qua **chăng?**
 2SG CO go study yesterday SFP
 ‘Did you go to school yesterday?’ (Le’s example 2015:28)
- e. Anh đang ăn **ư?**
 2SG PROG eat SFP
 ‘You’re eating?’ (Le’s example 2015:35)
- f. Chị có đi Pháp **sao?**
 2SG CO go France SFP
 ‘Have you been to France?’ (Le’s example 2015:37)

One defining characteristic of this set of sentence-final particles, according to Le, is that they only license yes-no questions, not other types of questions such as wh-questions. This is shown by elements such as *gì* that are ambiguous between an indefinite reading, ‘something’, and a wh reading, ‘what’. When they occur in a question without a yes-no marker, they typically take their wh-reading, yielding a wh-question such as (10a), (11a), (12a). But as soon as one of the yes-no markers is added to the clause, the wh-reading is impossible and hence the indefinite reading of *gì* emerges:

- (10) a. Anh muốn ăn **gì?**
 2SG want eat what
 ‘What do you want to eat?’
- b. Anh muốn ăn **gì không?**
 2SG want eat what SFP
 ‘Do you want to eat something?’ (Le’s example 2015:24)
 NOT ‘What do you want to eat?’
- (11) a. Em nhớ **gì?**
 2SG remember what
 ‘What do you remember?’
- b. Em nhớ **gì chẳng?**
 2SG remember what SFP
 ‘Do you remember something?’ (Le’s example 2015:27)
 NOT ‘What do you remember?’
- (12) a. Anh học **gì?**
 2SG study what
 ‘What do you study?’
- b. Anh học **gì à?**
 2SG study what SFP
 ‘Are you studying something?’ (Le’s example 2015:29)
 NOT ‘What do you study?’

This is to be distinguished from other sentence-final particles which are sometimes also classified as question markers in other work, such as *hả* and its variant *hử* as in Cao (2004) and Tran (2009). According to Le, *hả* is not a genuine yes-no question marker because adding them at the end of a wh-question does not change the clause into a yes-no question, as seen above with other particles:

(13) a. Bây giờ muốn làm gì?
 now want do what
 ‘Now what do you want to do?’

b. Bây giờ muốn làm gì hả?
 now want do what SFP
 ‘Now what do you want to do (tell me)?’
 NOT ‘Now do you want to do something?’ (Le’s example 2015:125)

Unfortunately, no further distinctions within the six elements is provided (and the clause-initial interrogative marker *liệu* is not discussed). What is thus missing from the literature is a comprehensive but detailed study of the differences between Vietnamese yes-no question particles. In Section 3, we will show how our study fills in some of those empirical gaps.

2.4 Duffield (2013)

Duffield (2013) extends the empirical picture to include the question marker *liệu*, surfacing on the left edge of the clause, (14c), unlike the rightward *không/chưa*, (14a-b):

- (14) a. Chị có mua cái nhà không?
 PRN ASR buy CL house NEG
 ‘Did you (elder sister) buy (the) house?’ (Duffield’s example 2013:128)
- b. Con đã uống thuốc chưa?
 PRN ANT drink medicine not.yet
 ‘Have you (child) taken your medicine yet?’ (Duffield’s example 2013:128)
- c. Người đàn ông tự hỏi [liệu cô bạn có ở lại
 person man self ask whether PRN friend ASRbe.loc stay
 với ông ấy (hay không)]
 with PRN DEM or NEG
 ‘The man wondered whether (or not) his girlfriend would stay with him’
 (Duffield’s example 2013:136)

Duffield starts from the theoretical assumption that Vietnamese is a uniformly head-initial language: verbs precede their objects, nouns precede their adjectival modifiers, and hence Duffield expects a fully-qualified interrogative complementizer to precede its complement clause. Only *liệu* fulfills this expectation, and hence only *liệu* is considered a legitimate interrogative marker. To handle the clause-final *không* and *chưa*, Duffield proposes that underlyingly they are negative markers preceding their complements, but at the surface they appear at the right edge of the clause due to the movement of their complement phrase to their left.

However, not only do we need to explain why final *không* and *chưa* are able to type the clause on their own, we also need to explain why *không/chưa* can co-occur with *liệu* inside the same clause. Clearly, *không/chưa* occupy a different position than *liệu* but they both are still able to type clauses. Furthermore, we also need to explain why sometimes *liệu* requires the presence of *không/chưa*, such as in interrogative sentential subjects:

- (15) a. **Liệu** John (có) thích học tiếng Việt **không,** chẳng quan trọng
 whether John ASR like study language Vietnamese Q NEG important
 ‘Whether John likes to study Vietnamese isn’t important’
- b. ***Liệu** John (có) thích học tiếng Việt, chẳng quan trọng
 whether John ASR like study language Vietnamese NEG important
 Intended: ‘Whether John likes to study Vietnamese isn’t important’

This is furthermore not a minor fact of the syntax of Vietnamese: the pattern whereby markers of the same category can surface both at the left edge and at the right edge of the clause is recurrent in other domains, suggesting that it is central to the underlying grammar of Vietnamese. For instance, this pattern also holds of perfect markers: the perfect particle *đã* is VP-initial whereas perfect *rồi* is final and the two can co-occur:

- (16) a. John **đã** thích học tiếng Việt
 John PERF like study language Vietnamese
 ‘John liked to study Vietnamese already’
- b. John thích học tiếng Việt **rồi**
 John like study language Vietnamese PERF
 ‘John liked to study Vietnamese already’
- c. John **đã** thích học tiếng Việt **rồi**
 John PERF like study language Vietnamese PERF
 ‘John liked to study Vietnamese already’

Focus constructions exhibit the same pattern: the focus particle *chỉ* is VP-initial whereas focus *thôi* is final and the two can co-occur:

- (17) a. John **chỉ** thích học tiếng Việt
 John only like study language Vietnamese
 ‘John only likes to study Vietnamese’
- b. John thích học tiếng Việt **thôi**
 John like study language Vietnamese only
 ‘John only likes to study Vietnamese’
- c. John **chỉ** thích học tiếng Việt **thôi**
 John only like study language Vietnamese only
 ‘John only likes to study Vietnamese’

We leave the explanation of such a pattern for separate work; what is relevant here is that the initial/final distribution involves two distinct positions, capable of both co-occurring and of handling the same function alone (rather than a single position with or without movement around it). We will come back to this point in Section 3.1.

Duffield (2013:136-137) characterizes *à* as an ‘extra-sentential (possibly extra-grammatical)’ morpheme in the right periphery of the Vietnamese sentence, on a par with the politeness marker *ạ* in being extra-sentential:

(18) a. Thế à?
so A
'Is that so?'

b. Anh đang làm gì thế ạ?
2SG DUR do what Q POL
'What are you doing? (Duffield example 2013:137)

However, the yes/no question marker *à* has a different syntactic distribution from the politeness marker *ạ*. As noted in Le (2015:152), *à* is a clause-typer while *ạ* isn't, therefore *à* cannot co-occur with another clause-typer (an imperative marker, for instance) whereas *ạ* can. In (19), while *ạ* is final, appearing after *đi*, (19a), *à* cannot appear in that position, (19b).

(19) a. Học tiếng Việt đi ạ!
Study language Vietnamese IMP POL

b. *Học tiếng Việt đi à
Study language Vietnamese IMP POL
'Study Vietnamese! Please!'

We will come back to this point in section 4.2, but it suffices to say that we thus need at least three descriptive positions/distributions: an initial element, *liệu*, a final non-pragmatic element *không/chưa*, and a final pragmatically loaded element *à* – where both of the final elements are distinct from the right-peripheral politeness position.

3 Three core properties of yes-no question particles in Vietnamese

We propose that the seven yes-no particles can be divided along at least the following dimensions:

- (i) clausal position
- (ii) pragmatic import
- (iii) matrix clause restriction
- (iv) interaction with focus
- (v) interaction with tense/negation/aspect/voice

We discuss the first three in this section, and the interactions in section 4.

3.1 Yes-no question particles and clausal position

Among the seven particles under investigation, only *liệu* surfaces at the left edge of the interrogative clause, cf. (3b), whereas the other six appear clause-finally, as illustrated in (2). This is the only possible order: placing *liệu* at the end of the clause results in ungrammaticality, (20), and so does inserting the other six particles at the start of the clause, (21):

(20) *Mary muốn biết [John có thích học tiếng Việt liệu]
Mary want know John yes like study language Vietnamese Q
Intended: 'Mary wants to know whether John likes to study Vietnamese'.

- (21) a. ***Không** John thích học tiếng Việt?
 Q John like study language Vietnamese
 Intended: ‘Does John like to study Vietnamese?’
- b. ***Chưa** John thích học tiếng Việt?
 Q John like study language Vietnamese
 Intended: ‘Does John like to study Vietnamese yet?’
- c. ***À** John thích học tiếng Việt?
 Q John like study language Vietnamese
 Intended: ‘Does John like to study Vietnamese? (I guess/ Can you confirm that)’
- d. ***Chăng** John thích học tiếng Việt?
 Q John like study language Vietnamese
 Intended: ‘Does John like to study Vietnamese? (by any chance/ Can you confirm that)’
- e. ***Ừ** John thích học tiếng Việt?
 Q John like study language Vietnamese
 Intended: ‘Does John like to study Vietnamese? (I’m surprised/ Can you confirm that)’
- f. ***Sao** John thích học tiếng Việt?⁶
 Q John like study language Vietnamese
 Intended: ‘Does John like to study Vietnamese? (I’m surprised/ Can you confirm that)’

Traditionally, being head-initial versus head-final was assumed to be a language-level distinction, or per construction/functional sequence/categories. The contrast observed between (3a) vs (3b), or within (3c), however, illustrates that the initial versus final distinction goes lexical item by lexical item rather than language by language, or category by category. The first cut within the set of question particles is thus:

Table 1: Yes-no question particles: clausal position

yes-no question particles	<i>liệu</i>	<i>không</i>	<i>chưa</i>	<i>à</i>	<i>chăng</i>	<i>ừ</i>	<i>sao</i>
clause-final	-	+	+	+	+	+	+

3.2 Yes-no question particles and pragmatic import

As well observed in the literature, the six clause-final question particles fall into two groups: one group of particles including does not seem to trigger any special pragmatics (*không* and *chưa*), while the other group has some pragmatic import (*chăng*, *à*, *ừ*, and *sao*). For instance, in contexts incompatible with prior beliefs, it is possible to ask questions with the pragmatically neutral *không/chưa*, but not with the pragmatically loaded *à/ừ/sao/chăng*.

(22) **Context:** Ann is hired to organize a party and she is working on ordering the food and drinks. Bill, her helper, tells her that “Jane and Mary do not eat meat”. Since Ann has no idea about any of the guests, she asks about the next one: (*adapted from Romero & Han 2003*)

- a. John thì sao? John có ăn thịt **không**?⁷
 John TOP what John yes eat meat Q
 ‘What about John? Does he eat meat?’

⁶ (21f) can only be grammatical under a wh-question interpretation of *sao*, i.e., ‘Why does John likes to study Vietnamese?’, which falls outside the scope of this paper.

⁷ Interrogative *chưa* is also felicitous if we change the context into a perfect-induced context.

- b. *John thì sao? John có ăn thịt à/chăng/ư/sao ?
 John TOP what John yes eat meat Q/ Q/ Q/ Q
 Intended: ‘What about John? Does he eat meat?’

Note that a similar contrast holds in English between questions with and without contracted negation (Romero & Han 2004, Roberts 1993, Zwicky and Pullum 1983, Collins 2018, De Clercq 2020).

- (23) a. What about John? Does he **not** eat meat?
 b. # What about John? Doesn’t he not eat meat?

The added flavor of *doesn’t he...* compared to *does he not* seems to be very similar to the added flavor of the Vietnamese particles with pragmatic import.

Let us first zoom in on the pragmatics of *à*, and then on that of other particles including *chăng*, *ư*, *sao*.

As noted above, the existing literature takes the relationship between *à* and *không/chưa* to be an either-or choice: *không/chưa* never have pragmatic import whereas *à* always does. This description is however inaccurate, as *à* can also lack pragmatic import, and this happens under illustrative circumstances. Take the following situation, where the speaker does not have any prior belief:

(24) **Context:** Ann is hired to organize a party and she is working on ordering the food and drinks. Bill, her helper, tells her that “Jane and Mary do not eat meat”. Since Ann has no idea about any of the guests, she asks about the next one: (*adapted from Romero & Han 2004*)

- John thì sao? John cũng chẳng ăn thịt à?
 John TOP what John also NEG eat meat Q
 ‘What about John? Does he not eat meat either?’

There is no surprise, or confirmation expressed here, in fact no relevant pragmatics. This is a neutral use of *à*, and hence *à* is in fact sometimes felicitous in pragmatically neutral contexts.

Why is *à* suddenly possible without pragmatic import? The solution is given by the fact that *không/chưa* are impossible in this context (we will come back to this in Section 4.3):

(25) **Same Context:** Ann is hired to organize a party and she is working on ordering the food and drinks. Bill, her helper, tells her that “Jane and Mary do not eat meat”. Since Ann has no idea about any of the guest, she asks about the next one: (*adapted from Romero & Han 2004*)

- a. * John thì sao? John cũng chẳng ăn thịt không/chưa ?
 John TOP what John also NEG eat meat Q/ Q
 Intended: ‘What about John? Does he not eat meat either?’

- b. John thì sao? John cũng chẳng ăn thịt à?
 John TOP what John also NEG eat meat Q
 ‘What about John? Does he not eat meat either?’

And hence instead of being mutually exclusive either-or alternatives, the semantics of the particles are in a superset/subset relationship: the semantics of *à* is a superset of that of *không/chưa*.

This leads us to a prediction: If the readings of *à* and *không* are not in complementary distribution with each other, there should be some circumstances in which they combine within the same clause. This prediction is borne out:⁸

⁸ We thank Tue Trinh for drawing our attention to this context.

(26) Speaker A asks Speaker B a straight question about whether John is studying Vietnamese, using *không*. For some reason, B cannot hear the question well, and asks for confirmation

Speaker A: John có học tiếng Việt không?
 John yes study language Vietnamese Q
 ‘Does John study Vietnamese?’

Speaker B: John có học tiếng Việt không à?
 John yes study language Vietnamese Q Q
 ‘Can you confirm that your question is whether John studies Vietnamese?’

Notice also that when *không* and *à* co-occur, *à* stays more clause-peripheral than *không*, a fact that we will come back to.

The correct generalisation seems to be that *à* is pragmatically neutral when it does not compete with *không/chưa* and is pragmatically loaded when it does compete with *không/chưa*. Which in turn suggest that *không/chưa* are the preferred way to express a neutral meaning, and only when the grammar independently rules out *không/chưa* (for instance the negation in (25) excludes the final *không/chưa*), the less preferred option for a neutral context, *à*, can surface.

Let us briefly note that a similar conclusion seems to hold of the ‘surprise’ versus ‘confirmation’ readings of *à*. A confirmation-without-surprise can be brought out by simply continuing an *à* sentence with *Tôi không ngạc nhiên* (‘I am not surprised’):

(27) a. Chị quên rồi à? Tôi không ngạc nhiên
 2SG forget already A 1SG NEG surprise
 ‘You forgot already? I am not surprised’

b. Lan mua quyển sách đó à? Tôi không ngạc nhiên
 Lan buy CLF book that A 1SG NEG surprise
 ‘Did Lan buy that book? I am not surprised’

Similarly, a surprise-but-not-confirmation reading can be brought out by an *à* sentence continued with ‘I am surprised, but I don’t care’:

(28) a. Chị quên rồi à? Tôi ngạc nhiên nhưng tôi chẳng quan tâm
 2SG forget already A 1SG surprise but 1SG NEG care
 ‘You forgot already? I am surprised but I don’t care’

b. Lan mua quyển sách đó à? Tôi ngạc nhiên nhưng tôi chẳng quan tâm
 Lan buy CLF book that A 1SG surprise but 1SG NEG care
 ‘Did Lan buy that book? I am surprised but I don’t care’

The pragmatically loaded particle *à* thus seems to have access to *both* the surprise and confirmation readings, rather than an either-or situation. Of course, it remains to be seen if there are grammaticalised restrictions on the distribution of these two readings.

Unlike *à*, the other pragmatically loaded particles cannot lose their pragmatics: negative questions with *chẳng* (if possible at all) cannot be followed by ‘I am sure’ as in (29a), and negative questions with *ừ* and *sao* cannot be followed by ‘I am not surprised’, as in (29b-c):

(29) **Same context as (25):** Ann is hired to organize a party and she is working on ordering the food and drinks. Bill, her helper, tells her that “Jane and Mary do not eat meat”. Since Ann has no idea about any of the guest, she asks about the next one: (*adapted from Romero & Han 2004*):

?John thì sao? John cũng **chẳng** ăn thịt **chẳng?** * Tôi chắc chắn thế.
 John TOP what John also NEG eat meat Q 1SG sure PRT
 ‘What about John? Does he not eat meat either, by any chance?’ (*I’m sure of that).

John thì sao? John cũng **chẳng** ăn thịt **ư?** * Tôi không ngạc nhiên.
 John TOP what John also NEG eat meat Q 1SG not surprised
 ‘What about John? Does he not eat meat either? I’m surprised.’ (*I’m not surprised)

John thì sao? John cũng **chẳng** ăn thịt **sao?** * Tôi không ngạc nhiên.
 John TOP what John also NEG eat meat Q 1SG not surprised
 ‘What about John? Does he not eat meat either? I’m surprised.’ (*I’m not surprised)

It thus follows that *không* and *chưa* are limited to only one reading, the pragmatically neutral one, whereas *à* has two readings at its disposal, the pragmatically neutral and the pragmatically loaded ones. *Chẳng*, *ư*, and *sao*, on the other hand, must be pragmatically loaded.

The second cut within the set of question particles is thus:⁹

Table 2: Yes-no question particles: adding pragmatic import¹⁰

yes-no question particles	<i>liệu</i>	<i>không</i>	<i>chưa</i>	<i>à</i>	<i>chẳng</i>	<i>ư</i>	<i>sao</i>
clause-final	-	+	+	+	+	+	+
pragmatic import	-	-	-	+/-	+	+	+

3.3 Yes-no question particles and matrix clause restriction

Whether question particles can be pragmatically loaded correlates with their ability to appear in embedded clauses, as briefly noted in Trinh (2005).

So if we look at (30a-b), in embedded clauses, only the non-pragmatically loaded particles are possible, while the pragmatically loaded ones are impossible.

- (30) a. Mary muốn biết [John thích học tiếng Việt **không/chưa**]
 Mary want know John like study language Vietnamese Q / Q
 b. *Mary muốn biết [John thích học tiếng Việt **à**]
 Mary want know John like study language Vietnamese Q
 ‘Mary wants to know whether John likes to study Vietnamese’

And this is true across a number of embedded contexts, such as embedded questions as in (31):

- (31) a. Mary muốn biết [John thích học tiếng Việt **không/chưa**] **à ?**
 Mary want know [John like study language Vietnamese Q / Q Q
 b. *Mary muốn biết [John thích học tiếng Việt **à**] **không/chưa ?**
 Mary want know John like study language Vietnamese Q Q / Q
 ‘Does Mary want to know whether John likes to study Vietnamese?’

⁹ Due to space limitations, we do not give examples on *liệu* here, but it should be clear from (3) that *liệu* marks a neutral embedded question.

¹⁰ See Nguyen (2021) for a detailed discussion on the felicity conditions of some of the Vietnamese polar question markers.

The embedding asymmetry is also present with left-dislocated objects:

- (32) a. [John thích học tiếng Việt **không/chưa**], Mary chẳng biết
 John like study language Vietnamese Q / Q Mary NEG know
 b. * [John thích học tiếng Việt **à**], Mary chẳng biết
 John like study language Vietnamese Q, Mary NEG know
 'Whether John likes to study Vietnamese (yet), Mary doesn't know'

as well as sentential subjects:

- (33) a. [John thích học tiếng Việt **không/chưa**], chẳng quan trọng
 John like study language Vietnamese Q /Q NEG important
 b. * [John thích học tiếng Việt **à**], chẳng quan trọng
 John like study language Vietnamese Q, NEG important
 'Whether John likes to study Vietnamese isn't important.'

All of these contexts give us exactly the same point: there is a correlation between which particles can have pragmatic import and which particles can be embedded: if one has pragmatic import, it cannot be embedded (i.e., it is restricted to matrix clauses only), as schematized in Table 3.¹¹

Table 3: Yes-no question particles: adding matrix clause restriction

yes-no question particles	<i>liệu</i>	<i>không</i>	<i>chưa</i>	<i>à</i>	<i>chẳng</i>	<i>ư</i>	<i>sao</i>
clause-final	-	+	+	+	+	+	+
pragmatic import	-	-	-	+/-	+	+	+
matrix clause only	-	-	-	+	+/- ¹²	+	+

4 Clausal co-occurrence restriction of yes-no question particles

Aside from their position, interpretation and root-restrictions, Vietnamese yes-no particles are subject to interesting and hitherto unnoticed generalisations restricting their co-occurrence with other clausal particles. To show this, we will examine the co-occurrence of *không/chưa* with focus markers, and then with particles for tense, negation, aspect and voice, showing that they reduce to an elegant underlying pattern.

4.1 Yes-no question particles and focus restriction

Let us start with the interaction between the question markers and the focus markers *chỉ ... thôi*. The pragmatically flavored question markers can combine with it, (34a), and so does *liệu*, (34b), whereas *không/chưa* do not, (34c).

¹¹ This is a one-way correlation: [+pragmatic import] => [+matrix clause only]. The other direction, namely [-pragmatic import] => [-matrix clause only] does not hold, as *à* can be [-pragmatic] but cannot be embedded.

¹² A reviewer suggests that *chẳng* differs from *à*, *ư*, and *sao* in co-occurring with *liệu* in an embedded context.

(i) Phương Thanh kêu gọi 'showbiz chuẩn bị tinh thần', netizen thắc mắc **liệu** có biến gì **chẳng**?

PT call.upon showbiz prepare mind netizen wonder LIEU have unforeseen.event what CHANG

'PT calls upon the showbiz 'to be ready', netizens wonder if some unforeseen event has happened?'

(<https://saostar.vn/giai-tri/phuong-thanh-keu-goi-showbiz-chuan-bi-tinh-than-202110182304583842.html>,

accessed 2 December 2021).

- (34) a. John **chỉ** thích học tiếng Việt **thôi à/ư/sao/chẳng?**
 John only like study language Vietnamese only Q/ Q/ Q/ Q
 ‘Does John only likes to study Vietnamese?’
- b. Mary muốn biết **liệu** John **chỉ** thích học tiếng Việt **thôi**
 Mary want know whether John only like study language Vietnamese only
 ‘Mary wants to know whether John only likes to study Vietnamese’
- c. * John **chỉ** thích học tiếng Việt **thôi không/chưa?**
 John only like study language Vietnamese only Q/ Q
 Intended: ‘Does John only likes to study Vietnamese?’

We thus have another cut among these yes-no question particles: only interrogative *không/chưa* are incompatible with focus markers, as shown in Table 4.

Table 4: Yes-no question particles: adding focus restriction

yes-no question particles	<i>liệu</i>	<i>không</i>	<i>chưa</i>	<i>à</i>	<i>chẳng</i>	<i>ư</i>	<i>sao</i>
clause-final	-	+	+	+	+	+	+
pragmatic import	-	-	-	+/-	+	+	+
matrix clause only	-	-	-	+	+/-	+	+
freely co-occur with focus markers	+	-	-	+	+	+	+

4.2 Two positions for final yes-no question particles

An additional new pattern is worth mentioning here, though the facts are less transparent. Let’s start with an additional fact about *chỉ ... thôi*: it turns out that *không* does combine with *chỉ ... thôi*, but at the cost of losing its yes-no particle reading. The combination becomes a focus expression, with no interrogative semantics, as in (35a). It turns out that *à* can also combine in a non-interrogative way with *chỉ ... thôi*, as in (35b). (Again, other pragmatically loaded particles contrast with *à*: they cannot combine with *chỉ ... thôi*.) There is, however, a sharp asymmetry between *không* and *à*: *không* precedes *thôi*, whereas *à* follows *thôi*:

- (35) a. ✓ John **chỉ** thích học tiếng Việt **không thôi**
 John only like study language Vietnamese KHONG only
 ‘John only likes to study Vietnamese’
- b. ✓ John **chỉ** thích học tiếng Việt **thôi à**
 John only like study language Vietnamese only A
 ‘John only likes to study Vietnamese’

We thus have a *không* > *à* in the right periphery, with respect to *thôi*. Recall that this order was also found above in (26) when *không* and *à* co-occur, repeated here:

- (27) John có học tiếng Việt **không à?**
 John yes study language Vietnamese Q Q
 ‘Can you confirm that your question is whether John studies Vietnamese?’

There are therefore two different positions in the right periphery. First come the neutral yes-no markers, and then the pragmatically loaded question markers. The same point is also made by the co-occurrence

of the two types of yes-no markers with the deictic particle *thế* and the politeness marker *ạ*. Again, we find *không/chưa* towards their left, in (36-37a), while *à/ư/sao/chẳng* cannot occur in that position, in (36-37b):

- (36) a. John thích học tiếng Việt **không/chưa** **thế ?**
 John like study language Vietnamese Q / Q deictic
 'Does John like to study Vietnamese (yet)?'
- b. * John thích học tiếng Việt **à/ư/sao/chẳng** **thế ?**
 John like study language Vietnamese Q/ Q/ Q/ Q deictic
 Intended: 'Does John like to study Vietnamese?'
- (37) a. John thích học tiếng Việt **không/chưa** **ạ ?**
 John like study language Vietnamese Q/ Q POL
 'Does John like to study Vietnamese (yet)?' (politely)
- b. * John thích học tiếng Việt **à/ư/sao/chẳng** **ạ ?**
 John like study language Vietnamese Q/ Q/ Q/ Q POL
 Intended: 'Does John like to study Vietnamese?' (politely)

Again, it seems that *à/ư/sao/chẳng* are more right-peripheral than *không/chưa*. The bigger picture thus becomes that the radically right-peripheral particles have access to pragmatics and are root-only, whereas the not-so-right-peripheral particles do not have access to pragmatics but can be embedded.

4.3 Yes-no particles versus Tense, Aspect and Voice markers

Let us now turn to the interrogative *không*. A number of tense/aspect markers can co-occur with interrogative *à* but not with interrogative *không*. For example, when the future tense is explicitly marked by *sẽ*, it is only possible to ask questions with *à*, not with *không*.

- (38) a. *Bữa tối có cá đây. Bạn sẽ ăn **không?**
 dinner evening has fish PRT 2SG FUT eat Q
 'Fish is served for dinner. Will you eat?'
- b. Bữa tối có cá đây. Bạn sẽ ăn **à?**
 dinner evening has fish PRT 2SG FUT eat Q
 'Fish is served for dinner. Will you eat?'

Similarly, the past tense *đã* is bad with interrogative *không*, but is good with interrogative *à*.

- (39) a. *Bữa tối đã sẵn-sàng lúc 6 giờ. Bạn **đã** ăn **không?**
 meal evening PAST ready at 6 hour. 2SG PAST eat Q
 'Dinner was ready at 6pm. Did you eat?'
- b. Bữa tối đã sẵn-sàng lúc 6 giờ. Bạn **đã** ăn **à?**
 meal evening PAST ready at 6 hour. 2SG PAST eat Q
 'Dinner was ready at 6pm. Did you eat?'

Furthermore, in the presence of a negative marker, we cannot form a yes-no question using *không*; we must use *à*.

- (40) a. *John **chẳng** thích học tiếng Việt **không?**
 John NEG like study language Vietnamese Q
 Intended: ‘Doesn’t John like to study Vietnamese?’
- b. John **chẳng** thích học tiếng Việt **à?**
 John NEG like study language Vietnamese Q
 ‘Doesn’t John like to study Vietnamese?’

On the other hand, the progressive particle *đang* and the passive particle *bị* are compatible with both *không* and *à*:

- (41) Phone call context:
- a. Chào John. Bạn có **đang** ăn **không?**
 hi John. 2SG yes PROG eat Q
 ‘Hi Trang! Are you eating?’
- b. Chào John. Bạn **đang** ăn **à?**
 hi John! 2SG PROG eat Q
 ‘Hi John! Are you eating?’
- (42) a. Con cá có **bị** ăn thịt **không?**
 CLF fish yes PASS eat meat Q
 ‘Was the fish eaten?’
- b. Con cá **bị** ăn thịt **à?**
 CLF fish PASS eat meat Q
 ‘Was the fish eaten?’

The empirical pattern that emerges is as follows:

- (43) Future tense *sẽ*: *không ✓ à
 Past tense *đã*: *không ✓ à
 Negative markers *chẳng*: *không ✓ à
 Progressive *đang*: ✓ không ✓ à
 Passive *bị*: ✓ không ✓ à

When we put this in cross-linguistic perspective, a beautiful generalisation emerges: *không* is incompatible with higher functional elements, and compatible with lower functional elements. Future and past markers are higher in the clause than progressive and passive markers, and so is negation. A simple example of that is the relative positioning of *will*, *not* and *-ing* in English, eg. ‘*you will not be doing any of this*’ (see Chomsky 1957, Pollock 1989, Cinque 1999, also Phan 2013 for the functional sequence of Vietnamese clause).

Recall from section 4.1 that *không* is also incompatible with the focus marker *thôi*. This too falls into place, as Focus is even higher than past/future and negation: Focus > Past/Future > Negation > Progressive > Passive. The elements that *không* is thus incompatible with thus constitute a continuous stretch of syntactic structure, from Focus down to Negation.

We will leave the task of proposing an explanation for this generalisation for a future work, focusing here on improving the description of facts. Let us then turn to the interrogative *chưa*: what particles can interrogative *chưa* co-occur with? As illustrated in (44), like *không*, it cannot co-occur with future tense or negation, and can co-occur with the passive marker *bị*. Unlike *không*, however, *chưa* is crucially unable to co-occur with the progressive aspect marker *đang*:

- (44) a. *John **sẽ** thích học tiếng Việt **chưa?**
 John FUT like study language Vietnamese Q
 ‘Will John like to study Vietnamese yet?’
- b. *John **đang** thích học tiếng Việt **chưa?**
 John PROG like study language Vietnamese Q
 *‘Is John liking to study Vietnamese yet?’
- c. *John **chẳng** thích học tiếng Việt **chưa?**
 John NEG like study language Vietnamese Q
 ‘Isn’t John liking to study Vietnamese yet?’
- d. John **bị** bắt học tiếng Việt **chưa?**
 John PASS force study language Vietnamese Q
 ‘Is John forced to study Vietnamese yet?’

The empirical pattern that emerges from (44) is as follows:

- (45) Future tense *sẽ*: *chưa
 Negative markers *chẳng*: *chưa
 Progressive *đang*: *chưa
 Passive *bị* ✓chưa

The same generalization holds, but of an apparently longer stretch of structure: *chưa* cannot combine with functional elements from Focus down to Progressive, in the hierarchy Focus > Past/Future > Negation > Progressive > Passive.

The source of that apparent difference is clear: interrogative *không* and interrogative *chưa* are aspectually different, in that the former is imperfect, whereas the latter is perfect. *Chưa* being perfect is incompatible with the imperfect marker *đang* (but compatible with the perfect marker *đã*), while *không* being imperfect is compatible with the imperfect marker *đang*, but incompatible with the perfect markers *đã*:

- (46) a. *John **đã** thích học tiếng Việt **không?**
 John PERF like study language Vietnamese Q
 Intended: ‘Does John like to study Vietnamese yet?’
- b. *John thích học tiếng Việt **rồi không?**
 John like study language Vietnamese PERF Q
 Intended: ‘Does John like to study Vietnamese yet?’
- c. *John **đã** thích học tiếng Việt **rồi không?**
 John PERF like study language Vietnamese PERF Q
 Intended: ‘Does John like to study Vietnamese yet?’

The aspectual difference between *không* and *chưa* can be seen in (2a-b), repeated here as (47a-b):

- (47) a. John thích học tiếng Việt **không?**
 John like study language Vietnamese Q
 ‘Does John like to study Vietnamese?’
- b. John thích học tiếng Việt **chưa ?**
 John like study language Vietnamese Q
 ‘Does John like to study Vietnamese yet?’

The overall picture is thus transparent: the higher layer of the “middle field”, such as tense, aspect, negation markers, are compatible with pragmatically flavored question particles,¹³ not with interrogative *không/chưa*. The lower layer of the middle field, composed of aspect and passive markers, is compatible with all question markers. The five different dimensions of variation are summarized in Table 5:

Table 5: Yes-no question particles: bringing everything together

yes-no question particles	<i>liệu</i>	<i>không</i>	<i>chưa</i>	<i>à</i>	<i>chẳng</i>	<i>ư</i>	<i>sao</i>
clause-final	-	+	+	+	+	+	+
pragmatic import	-	-	-	+/-	+	+	+
matrix clause only	-	-	-	+	+/-	+	+
freely occur with focus markers	+	-	-	+	+	+	+
freely co-occur with tense/negation/aspect/voice markers	+	-	-	+	+	+	+

As a side note, let us briefly consider the fact that the pre-verbal negative versions of *không/chưa* are immune to these restrictions, being compatible with all the tense/aspect/voice markers:

- (48) a. John **sẽ** không học tiếng Việt
 John FUT NEG study language Vietnamese
 ‘John won’t study Vietnamese’
- b. John **đã** không học tiếng Việt
 John PAST NEG study language Vietnamese
 ‘John didn’t study Vietnamese’
- c. John **đang** không học tiếng Việt
 John PROG NEG study language Vietnamese
 ‘John isn’t studying Vietnamese’
- d. John **không** bị bắt học tiếng Việt
 John NEG PASS force study language Vietnamese
 ‘John isn’t forced to study Vietnamese’

¹³ Space limitations again do not allow us to give examples with *liệu*; the fact in short is all of these middle field markers can occur in questions marked by *liệu*. That is, *liệu* patterns with the pragmatic question markers.

- (49) a. John **sẽ** chưa học tiếng Việt
 John FUT NEG study language Vietnamese
 ‘John won’t study Vietnamese yet’
- b. John **đang** chưa học tiếng Việt
 John PROG NEG study language Vietnamese
 ‘John isn’t studying Vietnamese yet’
- c. John **chưa** bị bắt học tiếng Việt
 John NEG PASS force study language Vietnamese
 ‘John isn’t forced to study Vietnamese yet’

Again, we leave for later the explanation of why these patterns hold; our aim here is to show how the theory enables us to crisply describe the patterns.

5 Conclusion

The seven yes-no particles discussed here all show clear patterns of syntactic distribution, covarying with semantic/pragmatic differences. Those patterns are clearly not random: only the root of the sentence has access to pragmatic meanings, a well-established pattern cross-linguistically, and incompatibilities between particles target continuous, cross-linguistically consistent stretches of syntactic structure. We aim to propose an explanation for these patterns in upcoming work, but we hope that this work already shows how a theory-aware and cross-linguistic approach to Vietnamese syntax can reveal underlying order in otherwise mysterious and disparate observations.

The particles *à*, *chăng*, *ư*, and *sao* belong to the highest part of the clause, and as such they have access to pragmatic import but can only appear in matrix clauses. Further, being segregated so high, they can co-occur with the focus/tense/negation/aspect/voice markers. The particles *không* and *chưa* occur lower down in the functional sequence of the clause, and thus have no pragmatic import but can appear in embedded clauses. Furthermore, they are mutually incompatible with the entire focus/tense/negation domain, co-occurring only with the low aspectual and voice markers.

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AN ANTISYMMETRY APPROACH TO POST-NOMINAL MODIFICATION IN VIETNAMESE

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Abstract

This work analyzes the syntactic structure of post-nominal modifiers in Vietnamese, based on the Antisymmetry approach (Kayne 1994) to phrase structure. We propose that post-nominal modifiers in Vietnamese are underlyingly prenominal, and the movement of the NP to Spec, DP derives the surface order. The structure of post-nominal modifiers in Vietnamese is right-branching rather than left-branching. Supporting evidence includes the following three syntactic phenomena in Vietnamese: the extraction of the NP out of DP, the binding relation between an antecedent/quantifier and a pronoun/variable, and the structure of restrictive and non-restrictive relative clauses.

Keywords: post-nominal modifiers, Vietnamese nominal phrases, Antisymmetry, anaphor binding, restrictive reading

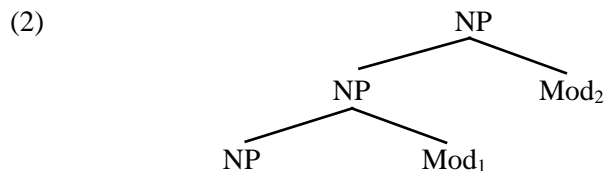
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1 Introduction

Nominal modifiers in Vietnamese occur after the head noun, as exemplified in (1). The head noun *sách* ‘book’ in (1) precedes all the nominal modifiers, including an adjective phrase (AP), a genitive phrase (GEN), a relative clause (RC), and a demonstrative (DEM).¹

- (1) *cuốn sách [AP mới] [GEN của Chomsky] [RC mà Nam vừa mua] [DEM này]*
CL book new GEN Chomsky REL Nam just
buy this
‘this new book of Chomsky which Nam just bought’

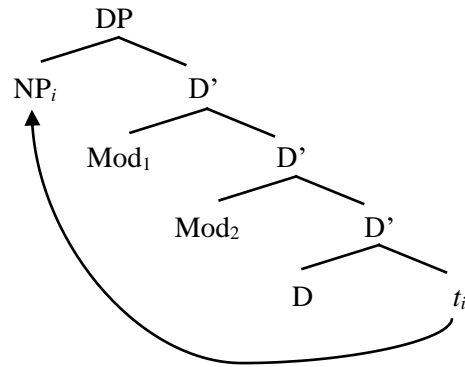
The internal structure of noun phrases in Vietnamese has been subject to intensive discussions (see Thompson 1965, Beatty 1990, Nguyen 2004, Simpson and Ngo 2018, among others). However, the structure of post-nominal modifiers in Vietnamese has received less attention in the literature. From a traditional viewpoint, these modifiers could be intuitively analyzed as merging to the right of the NP, as shown in (2). Each modifier is right-merged to the NP in the order shown in the surface structure.



In this work, however, we adopt the Antisymmetry approach (Kayne 1994) to the post-nominal modifiers in Vietnamese. Our proposal is that post-nominal modifiers in Vietnamese DP are base-generated as pre-nominal elements, and the movement of the NP to Spec, DP renders the modifiers post-nominal.

¹ Abbreviations used in the glosses are: CL = classifier, GEN = genitive marker, MOD = modification marker, REL = relativization marker, PRT = particle.

(3)



Our proposal is based on three syntactic facts. First, the NP in Vietnamese can be extracted. Specifically, the noun phrase in a DP can be moved to a higher position and separated from its modifiers. This phenomenon indicates that the NP and the nominal modifiers are independent constituents, and that the post-nominal modifiers are not adjuncts to the NP. Second, when two co-referred nominals are located in different modifiers, the antecedent/quantifier must precede the pronoun/variable. This shows that the modifier on the left should be located higher than the modifier on the right, which is unexpected if binding requires c-command and if the nominal structure in Vietnamese is left-branching. This phenomenon, however, is consistent with the Antisymmetry approach because it indicates that the post-nominal modifiers in Vietnamese are right-branching. Third, the structures of restrictive and non-restrictive relative clauses in Vietnamese can be accounted for if our right-branching analysis is adopted; namely, a post-nominal modifier in Vietnamese c-commands a modifier to its right. This leads to an account of the restrictive/nonrestrictive relatives in Vietnamese in terms of different scope relations between the demonstrative and the relative clause (see Huang 1982).

This work is organized as follows. In sections 2 to 4, we present three syntactic facts that support our proposal, namely the extraction of NP, the binding between an antecedent/quantifier and a pronoun/variable occurring in post-nominal modifiers, and the structures of the restrictive and non-restrictive relative clauses. Section 5 is the conclusion.

2 Extraction of the head NP

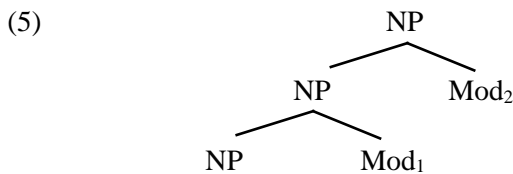
In Vietnamese, the noun phrase in a DP can be extracted, as shown in the following examples. The NP *sách* ‘book’ in the two DPs, *cuốn sách mà anh ấy mua* ‘the book he bought’ and *cuốn sách mà em mua* ‘the book I bought’, can be topicalized and moved in an across-the-board fashion to the initial position of the sentence, as in (4b).²

- (4a) *Cuốn sách mà anh ấy mua đắt hơn cuốn sách mà em mua.*
 CL book REL he buy expensive than CL book REL
 I buy
 ‘The book he bought is more expensive than the book I bought.’

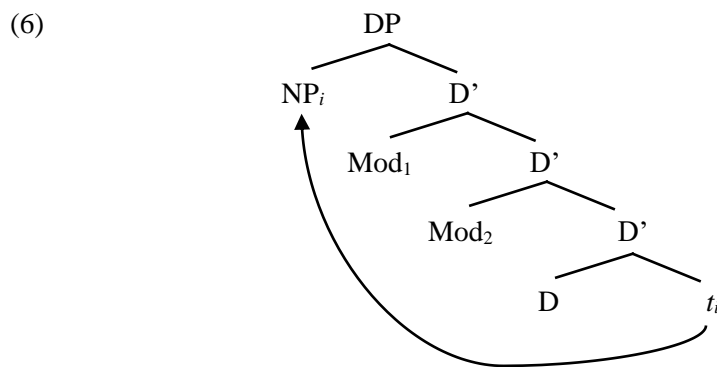
² Some people may think the topicalized NP is in fact base-generated at a higher position and the post-nominal modifier merges to a small pronominal *pro*. It could be a possible case. However, this would not affect our assumption. If the NP is a small *pro* rather than a gap, we can still assume the NP moves to Spec, DP, since the NP itself is a constituent.

- (4b) *Sách, cuốn — mà anh ấy mua đắt hơn cuốn —*
 book CL REL he buy expensive than CL
mà em mua.
 REL I buy
 ‘As for books, the one he bought is more expensive than the one I bought.’

This syntactic fact indicates that the NP and its post-nominal modifier are separate constituents, since only an independent constituent may undergo movement. This further indicates that the post-nominal modifiers in Vietnamese cannot be adjuncts right-adjoined to the NP. If the post-nominal modifiers in Vietnamese were rightward adjuncts in a structure like (2) above, when the NP moves away, they would lose the host to adjoin to, as shown in (5).



We propose instead that the post-nominal modifiers in Vietnamese are left-adjoined to D’ iteratively, as shown in (6).



In this structure, the nominal modifiers left-adjoin to D’. The NP moves to the specifier of DP, deriving the surface structure and word order.

This proposal is consistent with the Antisymmetry approach of Kayne 1994. According to this approach, the c-command relations among the syntactic elements determine their word order. Specifically, if X c-commands Y, then all elements dominated by X will precede all elements dominated by Y in linear order – this is known as the *Lexical Correspondence Axiom* (LCA). A corollary that follows from the LCA is that all human languages have the underlying word order Specifier/Adjunct - Head - Complement. Note that according to the corollary, there is no rightward adjunction in natural languages; all modifiers that look like instances of leftward adjuncts are actually derived in a way that is consistent with the LCA.³ In the present case (6), the first modifier Mod₁ precedes and c-commands the second modifier Mod₂, and both of them are underlyingly pre-nominal. It is the movement of the NP that renders them post-nominal. This analysis, therefore, is in line with the LCA and also other analyses compatible with LCA theory.

In the following, we will provide more evidence for the structural analysis in (6) and show that the Antisymmetry approach provides greater explanatory power than the traditional approach.

³ Our analysis of the post-nominal modifiers is consistent with the LCA, but this does not mean that Kayne’s (1994) analysis of relative clauses must be adopted also, which involves movement of the NP to Spec, CP. We simply treat relative clauses in Vietnamese on a par with other post-nominal modifiers, namely as adjuncts. The relevant questions will be left to future studies.

3 Binding between an antecedent/quantifier and a pronoun/variable

The second argument for our proposal is the binding relation between two co-referential nominals.⁴ We present two examples, one on the antecedent-pronoun binding and the other on the quantifier-variable binding.

First, when a pronoun and its antecedent are in different modifiers of the same DP, the modifier which contains the antecedent must precede the modifier which contains the pronoun. In (7a), the pronoun *anh ấy* ‘he’ is in a relative clause, and its antecedent *John* is in a genitive phrase. In this case, the binding relation is grammatical. The reverse order, as the situation in (7b), yields ungrammaticality.⁵

(7a) *cuốn sách [của John_i] [mà viết về anh ấy_i]*
 CL book GEN John REL write about he
 ‘John’s book which is written about himself’

(7b) **cuốn sách [mà viết về anh ấy_i][của John_i]*
 CL book REL write about he GEN John
 Intended reading: ‘John’s book which is written about himself’

Second, when there is a quantifier-variable binding relation, the quantificational nominal must occur to the left of the variable, as shown in (8a). The pronoun *nó* ‘he’ is in a relative clause and the quantificational nominal *mọi đứa bé* ‘every kid’ is in a genitive phrase, and the genitive phrase must precede the relative clause. The reverse order is not grammatical, as in (8b).

(8a) *Tranh [của mọi đứa bé_i][mà vẽ (chính) nó_i] đều dễ thương.*
 picture GEN every kid REL draw PRT he all cute
 ‘Every kid’s drawing of his own image is cute.’

(8b) **Tranh [mà vẽ (chính) nó_i] [của mọi đứa bé_i] đều dễ thương.*
 picture REL draw PRT he GEN every kid all cute
 Intended reading: ‘Every kid’s drawing of his own image is cute.’

In variable binding (Truswell 2014), the binder must take scope over the variable. If we analyze post-nominal modifiers in Vietnamese in the traditional way, the structure does not meet this requirement, as shown in (9). The binder *của mọi đứa bé* ‘every kid’s’ does not take scope over the variable *nó* ‘he’.⁶

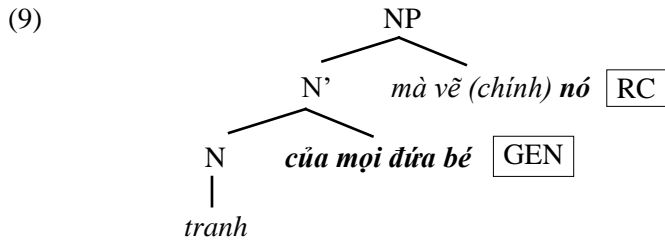
⁴ This argument is inspired by Larson’s (1988) analysis of bi-transitive structures in English.

⁵ A reviewer suggests the following examples showing that both the POSS-RC and RC-POSS orders are grammatical, and therefore the ungrammaticality of (7a) is solely due to binding violation.

(ia) *cái con mèo [PossP của tôi] [RC mà Hoa mới nhận nuôi]*
 CAI CL cat GEN I REL Hoa just adopt raise
 ‘the cat of mine that Hoa has just adopted’

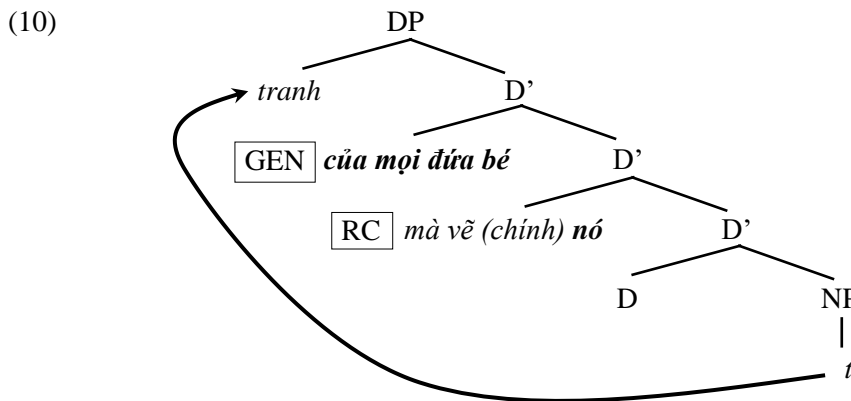
(ib) *cái con mèo [RC mà Hoa mới nhận nuôi] [PossP của tôi]*
 CAI CL cat REL Hoa just adopt raise GEN I
 ‘the cat of mine that Hoa has just adopted’

⁶ We assume that the genitive phrase *của mọi đứa bé* ‘every kid’s’ in (8a) is a unitary element as a binder. This is like the English nominal phrase *the book of John’s about himself*, where the binder is a genitive phrase, namely *John’s*.

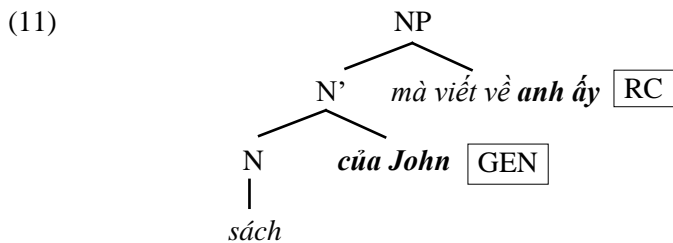


(The example of (8a))

However, if the post-nominal modifiers in Vietnamese are base-generated as pre-nominal elements, as our analysis proposes, the scope requirement is met. In (10), the binder *của mọi đứa bé* ‘every kid’s’ scopes over the variable *nó* ‘he’.



In the case of the antecedent-pronoun binding in (7a), again, the structure that our theory proposes works. If the post-nominal modifiers are right-adjuncts, the nominal *của John* ‘John’s’ cannot be the binder of the pronoun *anh ấy* ‘he’ because it does not c-command the pronoun, as shown in (11).



(The example of (7a))

The above two examples, therefore, show that a postnominal modifier X in Vietnamese that is to the left of another post-nominal modifier Y is structurally higher than Y, as our analysis predicts. This is once again consistent with our proposal.

4 The structure of restrictive and non-restrictive relative clauses

Vietnamese grammar shows the contrast between restrictive vs. non-restrictive relative clauses, as Nguyen (2004) points out. When a relative clause (RC) precedes a demonstrative (DEM) in a DP, the RC has a restrictive reading. If the order is reversed, the RC has a non-restrictive reading. See the following examples (from Nguyen 2004:62).⁷

(12a) *Tôi thích cái đầm [RC mà cô ấy chọn] [DEM này].*
 I like CL dress REL she choose this
 ‘I like this dress that she has chosen.’

(12b) *Tôi thích cái đầm [DEM này] [RC mà cô ấy chọn].*
 I like CL dress this REL she choose
 ‘I like this dress, which she has chosen.’

In (12a), the RC *mà cô ấy chọn* ‘that she has chosen’ precedes the demonstrative *này* ‘this’. The RC receives a restrictive reading. In contrast, the RC *mà cô ấy chọn* ‘that she has chosen’ follows the demonstrative *này* ‘this’ in (12b). In this case, the RC is non-restrictive.

We agree with Nguyen’s grammatical judgments of the examples and provide a supporting observation. In the context of (13), the RC which modifies *lá thư* ‘the letter’ only allows for a restrictive reading.⁸ In (13a), the RC *gửi từ Pháp* ‘sent from France’ precedes the demonstrative *đó* ‘that’, and the sentence is acceptable. In (13b), the order of the demonstrative and the RC are reversed, but, in this case, the sentence is unacceptable and infelicitous.

● Restrictive reading:

(13a) *Nam nhận được ba lá thư, một từ Pháp và hai từ Mỹ.*
 Nam receive gain three CL letter one from France and two
 from America
Lá thư [gửi từ Pháp] [đó] Nam vừa làm mất.
 CL letter send from France that Nam just do lost
 ‘Nam received three letters, one from France and two from America. He just lost the one letter which was sent from France.’ (RC > DEM)

(13b) *Nam nhận được ba lá thư, một từ Pháp và hai từ Mỹ.*
 Nam receive gain three CL letter one from France and two
 from America
 ****Lá thư [đó], [lá gửi từ Pháp], Nam vừa làm mất.***
 CL letter that CL send from France Nam just do lost
 Intended reading: The same as (13a). (DEM > RC)

In the context of (14), on the other hand, the relative clause that modifies *lá thư* ‘the letter’ only allows for a non-restrictive reading. In (14a), the demonstrative *đó* ‘that’ precedes the relative clause *gửi từ*

⁷ Incidentally, the Vietnamese speakers that we consult inform us that the sentence in (i) below is more natural than the sentence in (12b). That is, a classifier is needed that introduces the non-restrictive RC (i.e., *cái* in (i)).

(i) *Tôi thích cái đầm [này] [cái mà cô ấy chọn].*
 I like CL dress this CL REL she choose
 ‘I like this dress, which she has chosen.’

We will not go into the relevant questions and will leave them open.

⁸ The two contexts of (13) and (14) are adopted from Ishizuka (2008).

Pháp ‘sent from France’, and the sentence is acceptable. In (14b), the demonstrative follows the relative clause; however, the sentence becomes unacceptable and infelicitous against the intended context.

● Non-restrictive reading:

- (14a) *Nam chỉ nhận được một lá thư.*
 Nam only receive gain one CL letter
Lá thư [đó], [lá gửi từ Pháp], Nam vừa làm mất.
 CL letter that CL send from France Nam just do lost
 ‘Nam only received one letter. He just lost that letter, which was sent from France.’
 (DEM > RC)
- (14b) *Nam chỉ nhận được một lá thư.*
 Nam only receive gain one CL letter
 **Lá thư [gửi từ Pháp] [đó] Nam vừa làm mất.*
 CL letter send from France that Nam just do lost
 Intended reading: The same as (14a). (RC > DEM)

The word orders of the RC and DEM in the above contexts are exactly as pointed out by Nguyen (2004). That is, the restrictive reading is associated with the order RC-DEM, while the non-restrictive reading is associated with the order DEM-RC.

In Mandarin, there are also restrictive and non-restrictive relative clauses. They are also closely associated with specific orders of the demonstrative and the relative clause (Chao 1968; Huang 1982). See (15) (taken from Huang 1982:68). When the demonstrative *nei* ‘that’ precedes the relative clause *wo zuotian mai de* ‘which I bought yesterday’, as in (15a), the relative clause has a non-restrictive reading. In (15b), the relative clause *wo zuotian mai de* ‘which I bought yesterday’ precedes the demonstrative *nei* ‘that’. In this case, the relative clause obtains a restrictive reading. The restrictive reading is associated with the order RC-DEM, while the non-restrictive reading is associated with the order DEM-RC. All this is the same as Vietnamese.

- (15a) *neiben wo zuotian mai de shu* (Non-restrictive)
 that.CL I yesterday buy MOD book
 ‘that book, which I bought yesterday’
- (15b) *wo zuotian mai de neiben shu* (Restrictive)
 I yesterday buy MOD that.CL book
 ‘the book that I bought yesterday’

Huang (1982) proposes that the word order of restrictive RC and non-restrictive RC in Mandarin receives a natural explanation in terms of the c-command relations. When an RC precedes a demonstrative, the RC c-commands the demonstrative and scopes over it. The referential value of the demonstrative is subject to the restrictive modification of the RC, and thus the RC has a restrictive reading. If an RC follows a demonstrative, the RC is c-commanded by the demonstrative and is within the scope of the demonstrative. In this case, the dominating demonstrative has already provided an independent denotation; consequently, the restrictive function of the RC has nowhere to apply to, and thus can only be interpreted as non-restrictive.

Since the word order phenomena about the restrictive/non-restrictive contrast in Vietnamese are the same as the Mandarin case – namely, the order RC-DEM triggers a restrictive reading, and the order DEM-RC triggers a non-restrictive reading – the same account can be carried over to Vietnamese. The only difference between the two languages is the position of the head NP. The head NP in Mandarin follows the modifiers, while the head NP in Vietnamese precedes the modifiers.

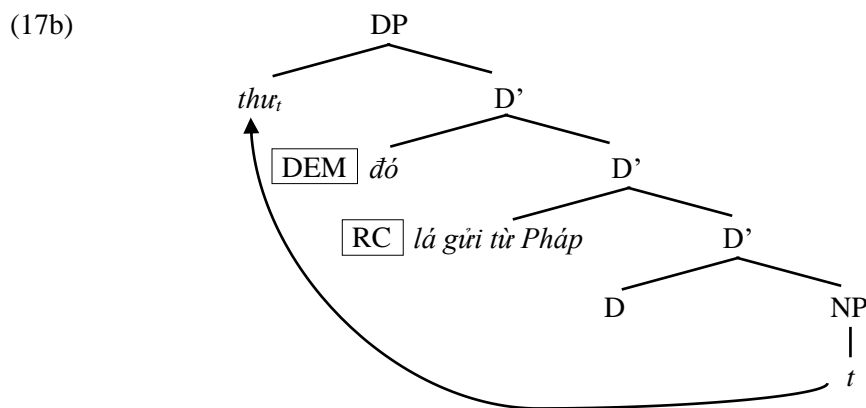
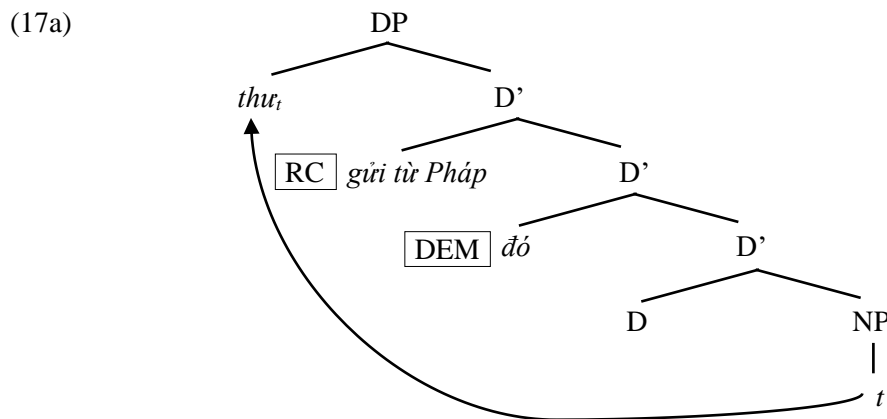
Our analysis is as follows. Assume that the DP structures in Vietnamese and Mandarin are underlyingly the same. The only parametric difference is that, in Vietnamese, the NP moves to a higher

position in front of all those modifiers, whereas the NP in Mandarin does not move. This will give us the following patterns.

- (16a) **Restrictive RC**
 In Mandarin: [RC - DEM] NP
 In Vietnamese: NP_i [[RC - DEM] t_i]
- (16b) **Non-restrictive RC**
 In Mandarin: [DEM - RC] NP
 In Vietnamese: NP_i [[DEM - RC] t_i]

If the Vietnamese DP and the Mandarin DP are underlyingly the same, then the account for the restrictive/non-restrictive contrast in the Mandarin DP can be carried over straightforwardly to the Vietnamese DP. Movement of the NP accounts for the occurrence of the pre-nominal modifiers in the Mandarin DP and the occurrence of the post-nominal modifiers in Vietnamese. This is exactly what is predicted by the Antisymmetry approach that we adopt.

In our analysis, the structure of (13a) is as (17a). The RC *gửi từ Pháp* ‘sent from France’ c-commands and scopes over the demonstrative *đó* ‘that’; hence, a restrictive reading is obtained. The structure of (14a) is as (17b). The demonstrative c-commands and scopes over RC; therefore, the relative clause obtains a non-restrictive reading.



If this analysis is correct, “post-nominal” modifiers in Vietnamese are actually prenominal in their underlying syntactic positions, and it is the fronting of the NP that causes the modifiers to surface post-nominally. The syntactic phenomena discussed above provide strong support to the postulated right-branching analysis in (6).

5 Conclusion

The nominal phrase in Vietnamese appears to be head-initial as the nominal modifiers always follow the head noun on the surface. However, we propose that those modifiers are actually pre-nominal in the underlying structure, and it is the movement of the NP that makes them post-nominal. Our proposal is based on the Antisymmetry theory and the syntactic phenomena discussed above, namely the extraction of NP, the binding between two co-referenced nominals, and the structures of restrictive and non-restrictive relative clauses. All this indicates that the structure of post-nominal modifiers in Vietnamese should be right-branching, consistent with the Antisymmetry approach to the phrase structure of natural language.

Acknowledgements

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THREE WAYS OF REFERRING TO DISCOURSE PARTICIPANTS IN VIETNAMESE

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Abstract

This note discusses the fact that in Vietnamese, speakers and hearers can refer to themselves by pronouns, proper names, or relational nouns. This makes Vietnamese different from English and many other languages which require discourse participants to refer to themselves by pronouns only. We sketch an account for this difference which involves a syntactically represented speech act level, a parameterization of Rule I with respect to its candidate set, and a well-formedness principle concerning the structure of bound nominals.

Keywords: pronouns, names, binding, coreference, speech acts

ISO 639-3 codes: eng, vie

1 Preliminaries

Let us briefly lay some groundwork. I assume the familiar set-up of truth-conditional semantics which is presented in well-known expositions (cf. Montague 1973, Heim & Kratzer 1998, Chierchia & McConnell-Ginet 2000). Linguistic expressions belong to different types depending on their semantic values. The basic types are t and e , and the derived types are $\langle a, b \rangle$ where a and b are types. Let D_a be the set of semantic values of expressions of type a . Then D_t is the set of truth values, D_e is the set of individuals, and $D_{\langle a, b \rangle}$ is the set of functions from D_a to D_b .¹ The set of truth-values, D_t , has two members, T (true) and F (false), while the set of individuals, D_e , is countably infinite. Interpretation is relativized to an assignment g : $[[\alpha]]^g$ is the semantic value of α with respect to g . We can think of g as representing aspects of the context which determine the semantic value of certain expressions, specifically those that refer to individuals such as *he* or *John*. Such expressions are of type e , and are syntactically of the form X_n where n is a natural number. We call n the "index" of X_n . The assignment g is a function from indices to individuals: it maps X_n to the individual $g(n)$, provided $g(n)$ satisfies the condition specified by X .

- (1) a. $[[he_2]]^g = g(2)$, provided $g(2)$ is male
b. $[[John_4]]^g = g(4)$, provided $g(4) = \text{John}$

If the condition after "provided" is not satisfied, $g(n)$ is undefined. Thus, X represents the "presuppositional" and n represents the "denotational" content of the expression X_n . Apparently, all languages are similar to English in that the presuppositional content of type e expressions is phonologically realized but their denotational content is not. This universal may have a functional explanation. Suppose English did realize the index phonologically. Then, instead of hearing *he* and guessing what its silent index refers to, we would hear both *he* and the index and then guess what the index refers to. Obviously, neither procedure is practically better than the other. If the index is present

¹ For example, the sentence *John smokes* is an expression of type t : its semantic value is either T , if John smokes, or F , if John does not smoke. The proper name *John* is an expression of type e , since John, its semantic value, is an individual. The verb phrase *smokes* is an expression of type $\langle e, t \rangle$, having as semantic value the function $[\lambda x: x \in D_e. x \text{ smokes}]$ which maps each individual x to T if x smokes and to F if x does not smoke. I will use the "lambda notation" to represent functions in the manner of Heim & Kratzer (1998). Specifically, $[\lambda \alpha: \beta. \varphi]$ represents the function from each α such that β to T if φ and to F if it is not the case that φ . The condition on the domain of the function will be made explicit only when necessary.

by default and we have to guess which individual it is mapped to in the context anyway, then there is no reason for pronouncing it.¹

For this discussion, we will assume that every expression of type *e* is either a pronoun or a name.² Let us now discuss the following distinction between pronouns and names.

(2) Binding Condition

Pronouns can be bound or free while names must be free

We consider the Binding Condition to be definitional: among expressions of type *e*, some must be free. We call these "names" and call the rest "pronouns". For α_n to be "bound" by *X* is for the sister of *X* to be of the form $[\beta_n Y]$ where *Y* contains α_n and no other instance of β_n which *c-commands* α_n . If α_n is not bound then it is "free". The binding operator β_n , which is phonologically covert and can be freely inserted between the subject and the VP, is interpreted by the rule in (3), where $g^{x/n}$ is the function which maps index *n* to *x* and which is identical to *g* with respect to every other index, i.e., $g^{x/n}(n) = x$ and $g^{x/n}(m) = g(m)$ for every $m \neq n$ (cf. Buring 2005).³

(3) Interpretation of β_n

$$[[\beta_n VP]]^g = [\lambda x. [[VP]]^{g^{x/n}}(x) = 1]$$

We can now distinguish between binding and coreference, or more specifically, between anaphoric relations established by β_n and anaphoric relations established by co-indexing (cf. Reinhart 1983a). Consider sentence (4), which can be parsed as (4a) or (4b).⁴

(4) *Only John thinks he is intelligent*

a. *Only John*₂ [_A *thinks he*₂ *is intelligent*]

b. *Only John*₂ [_B β_7 *thinks he*₇ *is intelligent*]

In both sentences, *John* carries index 2, which means both sentences presuppose $g(2) = \text{John}$. In (4a), the anaphoric relation between *John* and *he* is established by co-indexing. We say that the two expressions are coreferent. The semantic value of *A*, the VP of (4a), is the function $[\lambda x. x \text{ thinks } g(2) \text{ is intelligent}]$, which maps each individual who thinks of John as intelligent to *T* and every other individual to *F*. In (4b), the anaphoric relation between *John* and *he* is established by β_n : the sister of *John* is $[\beta_7 Y]$ where *Y* contains *he*₇ and no other instance of β_7 which *c-commands* *he*₇. This means, given what we said above, that the pronoun is "bound" by the name. Applying (3), the semantic value of *B*, the VP of (4b), will be the function $[\lambda x. x \text{ thinks } x \text{ is intelligent}]$ which maps each individual who thinks of himself as intelligent to *T* and every other individual to *F*. Thus, what (4a) asserts is that no one other than John thinks of John as intelligent, and what (4b) asserts is that no one other than John thinks of

¹ Of course, overt indices would help in anaphoric contexts such as *John met Bill, and he promised to help him* (Heim 1982, 1990). The functionalist would have to supplement her explanation for the silence of indices with the claim that such contexts are not of primary concern for the "superengineer" when she designed language, or with some other auxiliary hypothesis.

² Two classes of expressions which have been considered to be of type *e* by several analyses are definite descriptions such as *the man* or traces created by movement (cf. Fox 2000, 2003, Sauerland 2004). We leave these out of consideration in this paper. Note, also, that anaphors such as *himself* or reflexives such as *each other* will be ignored as well. These are essentially pronouns that must be bound (cf. Chomsky 1981).

³ For the purpose of this discussion, we consider only binding from the subject position.

⁴ Note that *John* carries index 2 while β and its bindee *he* carry index 7. Obviously, the meaning would be the same if all three expressions carry the same index, but in that case, the co-indexation would be accidental. We take the principle of avoiding accidental co-indexing to be operative in language (cf. Buring 2005).

himself as intelligent.¹ These are, of course, two different propositions: in a situation where everyone, including John, considers John, and only John, to be intelligent, (4a) will be false while (4b) true. Reflection upon (4) shows that it has both of these readings. We will adopt standard terminology and call the reading involving coreference and represented by (4a) the "strict reading" and the reading involving binding and represented by (4b) the "sloppy reading". The ambiguity of (4) between the strict and the sloppy reading is evidence that (4) has (4a) and (4b) as possible parses, i.e., that the anaphoric relation between a pronoun and a name can be established by either coreference or binding. This is predicted by the Binding Condition, which says that pronouns can be bound or free.

We have used *he*, a third person pronoun, as example. Let us now discuss the first and the second pronoun, which are *I* and *you*, respectively.²

- (5) a. $[[I_n]]^g = g(n)$, provided $g(n)$ is the speaker
 b. $[[you_n]]^g = g(n)$, provided $g(n)$ is the hearer

The question we raise is whether the two options of binding and coreference are available to the first and the second pronoun just as they are to the third person pronoun. Consider the sentences in (6).

- (6) a. *Only I have the courage to do what I think is right*
 b. *Only you have the courage to do what you think is right*

These sentences turn out to be ambiguous between the strict and the sloppy reading in the same way as (4) is (cf. Partee 1989, Kratzer 1998, Heim 2008, Kratzer 2009). Specifically, (6a) can be read as asserting that no person x other than the speaker has the courage to do what the speaker thinks is right, or as asserting that no person x other than the speaker has the courage to do what x thinks is right. Similarly, (6b) can be read as asserting that no person x other than the hearer has the courage to do what the hearer thinks is right, or as asserting that no person x other than the hearer has the courage to do what x thinks is right. This is evidence that (6a) has (7a) and (7b), while (6b) has (8a) and (8b), as possible parses. This means that both the first person pronoun *I* and the second person pronoun *you* can be bound or free.³

- | | | | |
|-----|----|---|--------|
| (7) | a. | <i>Only I_3 [_{VP} have the courage to do what I_3 think is right]</i> | strict |
| | b. | <i>Only I_3 [_{VP} β_7 have the courage to do what I_7 think is right]</i> | sloppy |
| (8) | a. | <i>Only you_4 [_{VP} have the courage to do what you_4 think is right]</i> | strict |
| | b. | <i>Only you_4 [_{VP} β_7 have the courage to do what you_7 think is right]</i> | sloppy |

What about the second part of (2), which says that names cannot be bound? Consider (9).

¹ In other words, (4a) says that John thinks John is intelligent but Bill does not think John is intelligent and Sue does not think John is intelligent, etc., while (4b) says that John thinks John is intelligent but Bill does not think Bill is intelligent and Sue does not think Sue is intelligent, etc. I thank a reviewer for suggesting this way of describing these two different meanings.

² We will not discuss plural expressions of type *e* such as *they* or *we* or *John and Mary*.

³ I assume a standard semantics for *only*, according to which $[[only\ p]]^g$ presupposes that p is true and asserts that alternatives of p which are not entailed by p are false (cf. Horn 1969, Rooth 1985, 1992, Krifka 1993). Following Sauerland (2013), Bassi & Longenbaugh (2018, Bassi (2019), I assume that presuppositions of bound nominals do not project onto the focus alternatives. In (7b), for example, the VP of the prejacent denotes the function $[\lambda x: x \text{ is the speaker. } x \text{ has the courage to do what } x \text{ thinks is right}]$, but the VP of the alternatives would denote the function $[\lambda x. x \text{ has the courage to do what } x \text{ thinks is right}]$.

- (9) *Only John₅ has the courage to do what John₅ thinks is right*
 a. *Only John₅ [VP has the courage to do what John₅ thinks is right]* strict
 b. *Only John₅ [VP β₇ has the courage to do what John₇ thinks is right]* *sloppy

This sentence can only be read as asserting that no person *x* other than John has the courage to do what John thinks is right. It cannot be read as asserting that no person *x* other than John has the courage to do what *x* thinks is right. This indicates that (9) only has the parse in (9a) but does not have the parse in (9b), as (9b) would express the latter, unavailable, reading. This observation is evidence that the name *John* cannot be bound and, consequently, that the anaphoric relation between the two instances of *John* in (9) can only be established by coreference.¹

2 Referring to discourse participants using proper names

Vietnamese has three basic pronouns: *tao*, *mày* and *nó* for first, second, and third person, respectively.² With respect to binding and coreference, these behave similarly to their English counterparts: they can be either free or bound, as evidenced by the ambiguity between the strict and the sloppy reading of the following sentences.

- (10) *Mỗi tao dám làm cái tao cho là đúng*
 only I dare do what I think is right
 a. No *x* other than the speaker has the courage to do what the speaker thinks is right
 b. No *x* other than the speaker has the courage to do what *x* thinks is right
- (11) *Mỗi mày dám làm cái mày cho là đúng*
 only you dare do what you think is right
 a. No *x* other than the hearer has the courage to do what the hearer thinks is right
 b. No *x* other than the hearer has the courage to do what *x* thinks is right
- (12) *Mỗi John dám làm cái nó cho là đúng*
 only John dare do what he thinks is right
 a. No *x* other than John has the courage to do what John thinks is right
 b. No *x* other than John has the courage to do what *x* thinks is right

Also, names cannot be bound in Vietnamese, as evidenced by the lack of the sloppy reading for (13). Thus, Vietnamese obeys the Binding Condition just as English does.

- (13) *Mỗi John dám làm cái John cho là đúng*
 only John dare do what John thinks is right
 a. No *x* other than John has the courage to do what John thinks is right
 b. #No *x* other than John has the courage to do what *x* thinks is right

There is, however, a striking difference between Vietnamese and English with respect to the first and the second pronouns: whereas the use of these pronouns are obligatory in English, it is optional in Vietnamese (Reinhart 1983b, Trinh & Truckenbrodt 2018).

¹ The argument is of course based on the premise that the parse (9b) would yield the sloppy reading. This premise, in turn, requires the assumption that presuppositions of bound nominals do not project onto the alternatives (see previous note).

² The plural forms are derived by adding the morpheme *chúng*. Thus, *chúng tao*, *chúng mày* and *chúng nó* are the first, second and third person plural pronouns. As mentioned above, we will not discuss plural pronouns. Note, also, that *tao*, *mày* and *nó* are used only among close friends of equal social ranks. Thus, their pragmatics is different, specifically more limited, than that of their English counterparts. We will abstract from the pragmatics of pronouns in this paper.

(14) Generalization

In English, discourse participants must be referred to by pronouns, while in Vietnamese, they can be referred to either by pronouns or by names

An individual is a "discourse participant" if she is either the speaker or the hearer. What (14) says of English is a fact so familiar to speakers of this language that they may not even be aware of it, namely that *I* and *you* must be used when they can be. Suppose John wants to tell Mary that he will help her, what he would have to say is (15a), not (15b), even though the two sentences are semantically equivalent.

(15) Context: John is telling Mary that he will help her

- a. *I will help you*
- b. *#John will help Mary*

This curious restriction, which is pervasive among European languages, does not hold for Vietnamese. In this language, people in conversations can refer to themselves by name. If John is telling Mary the same thing in Vietnamese, he can say either (16a) or (16b).

- (16) a. *Tao sễ giúp màỵ*
I will help you
- b. *John sễ giúp Mary*
John will help Mary

Let us now try to make sense of the generalization in (14). The first ingredient to our analysis is the following hypothesis (Trinh & Truckenbrodt 2018). I use strikethrough to represent syntactic materials without phonological content.

(17) Performative Hypothesis

Every sentence ϕ spoken by α to β is parsed as [α [~~want~~ [β [~~believe~~ [ϕ]]]]]

What (17) amounts to is the claim that certain aspects of meaning which have often been classified as "pragmatic", i.e., as resulting from principles of language use, are actually logical, i.e., part of the literal meaning. When α tells β that ϕ , what becomes true in the world after the utterance is neither ϕ nor that β believes that ϕ , but that α wants β to believe that ϕ .¹ The Performative Hypothesis says that this truth obtains by virtue of a sentence, or more precisely a grammatical representation, becoming true.²

The second ingredient of our analysis is a condition called Rule I, proposed by Grodzinsky & Reinhart (1993). I hypothesize that Rule I is parameterized in the sense that its precise interpretation for English and Vietnamese differs slightly (Trinh 2019).

¹ Note that this account can, and should, be extended to other speech acts as well, since the generalization in (14) is meant to hold for sentences beyond declaratives. A straightforward way to implement such an extension would involve replacing *want* and *believe* in (17) with other predicates (cf. Austin 1962, Searle 1969). In fact, even for declaratives, whose paradigmatic use is to make assertions, the choice of *want* and *believe* is not crucial. I make this choice largely to simplify the exposition, and similar views have been expressed in the literature (cf. e.g., Bach & Harnish 1979, Zaefferer 2001, Truckenbrodt 2006). However, the reader is free to substitute these verbs with other relations as stated by her favorite theory of assertions (cf. McFarlane 2011, Krifka 2021).

² The idea that certain aspects of speech acts are grammatically represented has a long history, cf. Frege (1879), Stenius (1967), Ross (1970), Lakoff (1970), Sadock (1974), Gazdar (1979), Cinque (1999), Krifka (2001), Gärtner (2002), Gunlogson (2003), Speas and Tenny (2003), Hacquard (2006), Trinh & Crnic (2011), Haegeman & Hill (2013), Krifka (2015), Sauerland & Yatsushiro (2017), among others.

- (18) Rule I
Choose binding over coreference!
- a. Interpretation for Vietnamese
If a free pronoun can be replaced by a bound pronoun without changing the truth-conditional meaning of the sentence, it must be
 - b. Interpretation for English
If a free pronoun or a name can be replaced by a bound pronoun without changing the truth-conditional meaning of the sentence, it must be

Recall the examples we discussed to illustrate the difference between binding and coreference. They are cases where choosing between these syntactic options has semantic consequence. However, this is not always true. Consider the three structures (19a), (19b) and (19c), which all express one and the same proposition, namely that $g(2)$ thinks $g(2)$ is intelligent, where $g(2) = \text{John}$.

- (19) a. *John*₂ [_{VP} *thinks John*₂ *is intelligent*]
b. *John*₂ [_{VP} *thinks he*₂ *is intelligent*]
c. *John*₂ [_{VP} β_7 *thinks he*₇ *is intelligent*]

What Rule I tells us is that in this case, English must choose (19c), while Vietnamese must choose either (19a) or (19c). Both languages would rule out (19b). In other words, English considers a bound pronoun to be better than a corefering name and a corefering pronoun, while Vietnamese only considers a bound pronoun to be better than a free pronoun: Vietnamese does not compare pronouns and names.

Let us now put the two ingredients together to derive the facts. Let $g(2) = \text{John}$ and $g(3) = \text{Mary}$, and suppose $g(2)$ is telling $g(3)$ that $g(2)$ will help $g(3)$. The Binding Condition and the Performative Hypothesis alone would predict all three structures in (20) to be viable options. I present how the sentence sounds in parentheses next to its syntactic analysis.¹

- (20) a. [*John*₂ [*want* [*Mary*₃ [*believe* [*John*₂ *will help Mary*₃]]]]] ("John will help Mary")
b. [*John*₂ [*want* [*Mary*₃ [*believe* [*I*₂ *will help you*₃]]]]] ("I will help you")
c. [*John*₂ [β_7 *want* [*Mary*₃ [β_8 *believe* [*I*₂ *will help you*₃]]]]] ("I will help you")

Rule I for English would exclude both (20a) and (20b), as the first contains a corefering name and the second a corefering pronoun, both of which can be replaced by a bound pronoun without changing the truth-conditional meaning of the sentence. On the other hand, Rule I for Vietnamese would exclude only (20b), as Vietnamese only compares, and prefers, bound pronouns to corefering pronouns. It does not compare bound pronouns and corefering names. We thus derive the fact that discourse participants can be referred to by either pronouns or names in Vietnamese, but must be referred to by pronouns in English.

3 Referring to discourse participants using relational nouns

It is also possible in Vietnamese to refer to discourse participants by relational nouns. Suppose John is Mary's father, and he is telling her that he will help her. What he can say, and in fact would most likely say, is (21).

- (21) Bó sê giúp con
father will help child

¹ Note that the pronouns anaphorically related to *John* and *Mary* in (20b) and (20c) must be *I* and *you*, respectively. This is because John is the speaker and Mary is the hearer, and pronouns anaphorically related to the speaker and the hearer must be in the first and the second person. I believe this requirement can be derived from Maximize Presupposition (Heim 1991), but will leave the task of working out the details of this derivation for another occasion.

Sentence (21) would be translated as "I will help you" in English. Note, importantly, that John will be referred to as *bố* and Mary as *con* throughout the conversation, independently of who is the speaker and who is the hearer. Thus, if Mary tells John she will help him too, she would say (22), which is translated as "I will help you too" in English.

- (22) *Con cũng sẽ giúp bố*
 child also will help father

Evidence that these relational nouns have been co-opted for use as pronouns is the fact that they can be bound. Thus, both sentences in (23) are ambiguous between the strict and the sloppy reading.

- (23) Context: John and Mary are talking and John is Mary's father
- a. *Mỗi bố dám làm cái bố cho là đúng*
 only father dare do what father think is right
 i. No x other than John has the courage to do what John thinks is right
 ii. No x other than John has the courage to do what x thinks is right
- b. *Mỗi con dám làm cái con cho là đúng*
 only child dare do what child think is right
 i. No x other than Mary has the courage to do what John thinks is right
 ii. No x other than Mary has the courage to do what x thinks is right

Why does Vietnamese allow reference to discourse participants by relational nouns but English does not? I will now propose a tentative answer to this question.

First, let us say that a relational noun N, for example "bố" (father) or "con" (child), when used as a pronoun, has the syntactic structure $[N(\alpha)]_n$, where α is a phonologically null expression of type e and n an index. Thus, these derived pronouns are interpreted by g just like proper names and basic pronouns. Obviously, the presupposition introduced by "N(α)" should be related to the semantics of N as a noun. Let us take "bố" and "con" as examples.

- (23) a. $[[[bố(\alpha)]_n]]^g = g(n)$, provided g(n) is the father of $[[\alpha]]^g$
 b. $[[[con(\alpha)]_n]]^g = g(n)$, provided g(n) is a child of $[[\alpha]]^g$

Now suppose, again, that John, who is Mary's father, is telling Mary he will help her, using the derived pronouns *bố* and *con* to refer to himself and Mary, respectively. Consider the two structural options in (24a) and (24b).¹ I will use English instead of Vietnamese words to facilitate reading.

- (24) Context: John is Mary's father and he is telling her he will help her
- a. *John₇ β₁ want Mary₈ β₂ believe [father(Mary₈)]₁ will help [child(John₇)]₂*
 b. *John₇ β₁ want Mary₈ β₂ believe [father(you₂)]₁ will help [child(me₁)]₂*

What we want is for Vietnamese to admit at least one of these options and for English to exclude them both. Suppose we say that UG contains the following principle, which I will call the "b-within-b" condition.²

- (25) b-within-b
 * $[_A \dots B \dots]$ if A and B are bound

¹ We consider only structures in which the derived pronouns are bound, as one where they are free is excluded by Rule I for both English and Vietnamese.

² Where "b" is mnemonic for "bound". My choice of name and formulation for this condition is obviously due to its similarity to Chomsky's (1981) "i-within-i" condition: $*[_A \dots B \dots]$ if A and B bear the same index.

The condition rules out structures in which a bound nominal is contained within another bound nominal. This means (24b) is ruled out for both Vietnamese and English. What about (24a)? This structure should be admitted in Vietnamese. It does not violate the b-within-b condition, and as it contains only names and bound pronouns, it does not violate the Vietnamese version of Rule I either. As for English, it turns out that (24a) is not available: the interpretation of Rule I for English requires the second occurrence of *Mary*₈ and *John*₇ be replaced with *you*₂ and *me*₁, respectively. But such a replacement would yield (24b), which violates the b-within-b condition.

The question is, of course, whether there is any independent evidence for (25)? Unfortunately, the answer, at this point, is no. I hope to pursue the issue in future research.

4 Conclusion

We discussed three ways of referring to discourse participants in Vietnamese: by pronouns, by proper names, and by relational nouns. We propose an account which derives the availability of the latter two options in Vietnamese versus their absence in English from one parametric difference between these two languages which concerns how Rule I is precisely interpreted. Specifically, English prefers the use of bound pronouns to both the use of corefering pronouns and the use of corefering names, while Vietnamese only prefers the use of bound pronouns to the use of corefering pronouns, leaving the option of corefering names out of the competition. Our account, as it relates to the observation about relational nouns, also requires the postulation of a new principle of grammar which disallows bound nominals containing other bound nominals.

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