On a possible convergence area in Northern China*

Abstract
The received view that the differences among Sinitic languages are mostly limited to their phonology and, to a lesser extent, to the lexicon (Chao 1968), has been challenged in recent years, with plenty of studies showing that Chinese 'dialects' are, indeed, diverse at all levels, including morphology and (morpho-)syntax (see Chappell 2015a for an overview). Some major differences within the Sinitic branch follow areal patterns, in which contact is often claimed to play a crucial role. In our contribution, we would like to propose that there is an area within Northern China, spread over the Shanxi, Henan, Hebei, and Shandong provinces, in which we find Sinitic languages possessing some features not seen (or, at least, uncommon) elsewhere. These include: 1. reduced/nonconcatenative morphology (see Arcodia 2013, 2015; Lamarre 2015); 2. object markers based on speech act verbs (see Chappell 2013); and 3. structural particles with an *l*-initial (see Chen A. 2013, a.o.). Based on our own survey of a sample of 96 dialects, we shall discuss the distribution of these features, as well as their possible origins.

Keywords: Sinitic, Mandarin, Jin, Differential Object Marking, nonconcatenative morphology, grammaticalisation, linguistic areas

1. Introduction

The Sinitic branch is a well-differentiated independent branch of the Sino-Tibetan family (Sagart et al. 2019), which may be further divided into 7 to 10 major groups, depending on the classification (Li 1973 [1937] and Li 1989). While in Chinese the established convention is to call each Sinitic variety a 'dialect' (方言 ***fāngyán***), in linguistic works written in English both 'Chinese dialects' and 'Sinitic languages' are used (see e.g. Chappell 2004, 2015a). Indeed, from the sociolinguistic point of view, Sinitic languages other than Standard (Mandarin) Chinese may be regarded as 'dialects' because of their status (lack of standardization, lack of official recognition, no or limited written tradition). However, from a strict linguistic perspective, Sinitic varieties are sister languages of Standard Chinese,[1] just as e.g. French is to Portuguese. Indeed, as pointed out by Norman (2003: 72), the Sinitic branch is "a vast dialectal complex

* An earlier version of this paper was presented at the 32nd Paris Meeting on East Asian Linguistics (Paris, 27-29 June 2019); the author would like to thank the participants to the discussion for their insightful comments. I would also like to thank Alain Peyraube for his invaluable suggestions; the usual disclaimers apply. Simplified Chinese characters are used as a default throughout the article; traditional characters are used when required for consistency with the source. I did not add characters when the sources do not provide them. The Pinyin system is used for the transliteration of Standard Mandarin, and the Yale romanization (in Matthew and Yip's 2011 modified version) is used for Cantonese. For all other varieties, I used (italicized) transcriptions as provided by the sources; when no transcription is provided, I used SMALLCAPS (toneless) Pinyin transcriptions following the Standard Mandarin reading of the characters. When present, superscript numbers indicate tone height on a 1-5 scale (see Chao 1968: 25-26). The glosses follow the general guidelines of the Leipzig Glossing Rules when applicable; additional glosses include ASSOC 'associative', CONT 'continuous aspect', CRS 'current relevant state', MOD 'marker of modification', SFP 'sentence-final particle'.

[1] In this paper, we use 'Standard Chinese' to refer to the official language of the People's Republic of China, i.e. the 普通话 Pǔtōnghuà 'common language' of official documents. We do not use the (arguably) more common English term 'Mandarin (Chinese)' to avoid confusion with 'Mandarin' as the designation of a whole branch of Sinitic.

containing hundreds of mutually unintelligible local varieties, each of which can be viewed as a distinct object for comparison".

However, at least until the late 1970s, a very common view in Chinese linguistics was that the differences among Chinese dialects were mostly limited to their phonology and, to a lesser extent, their lexicon, while the grammars were basically the same, apart from "minor divergencies" (Chao 1968: 13). This view has been often challenged in recent years, with a slow but steady growth of studies showing that Chinese 'dialects' are, indeed, diverse at all levels, including morphology and syntax (see Chappell 2015a). Also, it appears that much of the diversity within the Sinitic branch follows areal patterns, and that language contact very likely played a crucial role in the establishment of areal types.

In this paper, we would like to propose that there is another area within Northern China, spread over the Shanxi, Henan, Hebei, and Shandong provinces, in which we find Sinitic (Mandarin and Jin) languages possessing some features not seen (or, at least, uncommon) elsewhere in Chinese. These include: 1. reduced/nonconcatenative morphology (see Arcodia 2013, 2015; Lamarre 2015); 2. object markers based on speech act verbs (see Chappell 2013); and 3. structural particles with an *l*-initial (see Chen A. 2013 a.o.). While these three features do not necessarily occur with very high frequency in the same dialects, we argue that this may well be an artifact of the data, and that their distribution is anyway clearly skewed, with a stronger presence in Henan and in Central Plains Mandarin dialects. As to their diffusion, we propose that they are innovations, rather than retentions, in line with the innovative profile of (most) Mandarin dialects, and that they are likely to be the product of convergent development within the area at issue, fully within (part of) the Northern Sinitic branch.

This paper is organized as follows. Firstly, we shall provide an overview of the areal typology of Sinitic (§ 2), followed by a presentation of the methodology and data used for the present study (§ 3). In Sections 4, 5 and 6 we will discuss the three features introduced above, elaborating on their distribution and on their possible origins. In Section 7, we will provide arguments in favor of my areal hypothesis. Lastly, we will summarize our conclusions and provide some hints for further research (§ 8).

2. The areal typology of Sinitic: an overview

As mentioned in the introduction, Sinitic languages are usually divided into 7 or 10 branches, depending on the classification. If we take the (arguably) more established 7-group model, the family tree for Sinitic should be represented as follows:

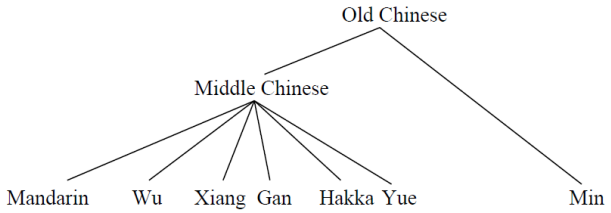

Figure 1. The family tree of Sinitic languages[2]

In this commonly accepted view, based on Li's (1973 [1937]) seminal paper, Min dialects detached from 'mainstream' Chinese earlier than other groups, before the so-called 'Middle Chinese' stage, while the other six branches 'derive' somehow from this stage. In this model, the partition into groups heavily relies on a single phonological criterion: namely, the evolution of Middle Chinese voiced obstruents (Norman 1988; Chirkova 2013; Handel 2014). Thus, for instance, the main defining feature of Mandarin dialects is the evolution of Middle Chinese voiced obstruent initials into voiceless aspirated consonants for the 平 *píng* tone, and into voiceless unaspirated consonants for all other tone categories, while the basic defining feature of the Wu group is the retention of the distinction between voiced, voiceless, and aspirated voiceless initial obstruents (for an overview, see Yan 2006).

The classification sketched above, together with the alternative, 10-way classification (see Li 1989), still represent the standard view of genealogical relationships within Sinitic. However, it has been often criticized in the recent literature for a number of reasons. Firstly, relying on a single phonological criterion for the identification of language groups has limited predictive value, as the groups are not always homogeneous enough, and this can pose problems for the classification of varieties with hybrid features (see e.g. VanNess Simmons 1999a-b on the Hangzhou dialect). Also, the very idea that there was a Tang period *koinè*, i.e. what is usually termed 'Middle Chinese' in this context (represented in traditional lexicographic works known as 'rime books' and 'rime tables'), from which all non-Min dialects derive, and that those groups all split from 'mainstream' Chinese at the same time, has been challenged in the literature (Norman & Coblin 1995; Chappell 2001, a.o.).[3]

Besides the issues mentioned here (and many others which could not be included due to space constraints), there is another problematic aspect of the traditional *Stammbaum* model which is particularly relevant for our discussion: namely the fact that it can represent only historical relationships of vertical (genealogical) transmission, failing to account for horizontal transmission, i.e. the transmission of features through contact, rather than by inheritance (see e.g. Wang & Minett 2005). This appears to be especially true in the Chinese context: indeed, Sinitic languages developed in a situation of prolonged contact, both within the family and with unrelated (non-Sinitic, and also non-Sino-Tibetan) languages, with the 'superimposition' of different historical strata and diatopic varieties of Northern Chinese on Central and Southern dialects. While the 'cradle' of Chinese civilization may be located in the Yellow River Basin, since the establishment of the Qin dynasty (221-206 BCE), i.e. the first dynasty of Imperial China, there have been many waves of migration of the Chinese-speaking population, both towards what is now Southern China, and towards Western China (LaPolla 2001; Chappell 2004). Those migrants did not have a homogeneous background, and likely spoke different dialects (Coblin 1994; 2002), adding to the complexity of the picture.

According to Chappell (2004), between the Qin and Song (960-1279) dynasties there were at least four waves of migration from Northern to Southern China which deeply influenced the development of Sinitic languages, leading to admixture between Sinitic-speaking and non-Sinitic people, who spoke Austroasiatic, Hmong-Mien, and Tai languages (customarily referred

[2] Note that this is an oversimplified representation: indeed, a single branching event resulting in six dialect groups is very unlikely (I would like to thank an anonymous reviewer for pointing this out to me). What this *Stammbaum* is meant to show is that Min detached from the rest of Sinitic before the 'Middle Chinese' stage.

[3] For instance, Norman (2006) substitutes the traditional notion of 'Middle Chinese' with that of 'Common Dialectal Chinese' (CDC): CDC reconciles the rime book phonological system with modern dialect phonology, thus eliminating categories and constrasts which have no reflex in modern Sinitic languages.

to in Chinese as 百越 *Bǎi Yuè* 'Hundred Yue'; Zhou & You 1986; Yue-Hashimoto 1991; LaPolla 2001). Besides, once the major dialect groups began to differentiate from Northern Chinese, i.e. what we now call 'Mandarin,' further migration from the North brought about successive waves of 'Mandarinization': thus, this was a crucial period for the formation of Central and Southern Sinitic languages, as well as for the differentiation of Mandarin dialects in the South (Zhou 1991: 39-40). Then, from the Yuan Dynasty (1279-1368) on, migrations of Chinese-speaking people followed mostly the East-West route, spreading Northern dialects in the Southwestern border regions (i.e. present-day Sichuan, Yunnan, Guizhou), in the West of China, and also in the Northeast. To this, we must add that, after the end of the Han dynasty, there were 'irregular' movements of people in Northern China, and more waves of migration (more or less) forced by political situations or by local conflicts (Zhou & You 1986; You 1992; Coblin 1994; we will get back to this in § 7): for instance, as pointed out by LaPolla (2001: 230), the current capital of the P.R.C., Beijing, was "a political centre of non-Chinese people" for most of the second millennium CE, and changes in the ruling people often brought with them huge population movements. While the languages of the 'Hundred Yue' played an important role in the development of Sinitic languages in Southern China, Northern Sinitic varieties were influenced by contact with speakers of 'Altaic'-type languages (Mongolic, Turkic, and Tungusic) in the North (LaPolla 2001; on language contact in Northern China, see Cao & Yu 2015).[4]

Thus, to sum up, Chinese dialects can be described as "fuzzy entities", the characteristics of which have been shaped not only by vertical, genealogical inheritance, but also, to a significant degree, by language contact (Sagart 1998: 299). Besides contact between Sinitic and non-Sinitic languages, we should not forget the relevance of contact among dialects which occurred after the separation of the main groups. The traditional Stammbaum model obscures the complexity of the relationship among Chinese dialects: in order to properly account for the structure of Sinitic, an areal approach is also needed (Sagart 1998; Norman 2003; Chappell 2001, 2004).

Indeed, as mentioned in the Introduction, several typological differences within Sinitic have been analyzed as areal contact phenomena in the literature. First and foremost, the difference between Northern Sinitic and Southern Sinitic languages was famously attributed by Hashimoto (1976, 1986) to the 'Altaicisation' of Northern Chinese, and to the 'Taiisation' of Southern Chinese. In a nutshell, while the above-mentioned Altaic-type languages with which Chinese came into contact in the North are typically verb-final, place modifiers before the modified element, and make extensive use of agglutinative morphology, languages as those belonging to the Kra-Dai and Hmong-Mien families are representative of the East and Mainland Southeast Asian (henceforth: EMSEA) type (Bisang 2014; Enfield 2005, 2021), with strong isolating features, verb-medial order, etc.; the influence they had, respectively, on Northern Sinitic and Southern Sinitic explains the differences between those two areas within China, according to Hashimoto. The main features of the 'Altaicised' Northern Sinitic languages and of the 'Taiised' Southern Sinitic languages are shown in Table 1.

[4] As pointed out by an anonymous reviewer, the idea that Mongolic, Turkic and Tungusic languages all share the same structural properties is an oversimplification. Those languages actually differ in many details, and some peripheral varieties may be quite different.

North	South
Stress-based and fewer tones	More tones
Higher proportion of polysyllabic words	Higher proportion of monosyllabic words
Simpler syllable structure	More complex syllable structure
Smaller inventory of classifiers	Larger inventory of classifiers
Preponderance of modifier-modified	More instantiations of modified-modifier
Indirect object – direct object order for ditransitives	Direct object – indirect object order for ditransitives
Preverbal adverbs	Possibility of postverbal or clause-final adverbs
Marker-standard-adjective order in the comparative construction	Adjective-marker-standard order in the comparative construction
Passive markers based on causative speech act verbs	Passive markers based on the verb 'give'

Table 1. Main differences between Northern and Southern Sinitic (adapted from Chappell 2015b: 17)

Some aspects of Hashimoto's proposal have received criticism in the literature. The 'Altaic' origin of the Northern Sinitic features listed in Table 1 was called into question by Bennett (1979), and more recently by McWhorter (2007). Also, some Northern features may be found in Southern Chinese varieties, and vice versa (see e.g. Chappell 2015b on the order of constituents in ditransitive constructions). Nevertheless, the idea of a strong North-South divide in Sinitic has gained widespread acceptance in Chinese linguistics, and is still regarded as valid to the present day (see e.g. Ansaldo 2010; Szeto & Yurayong 2021).

Further areal patterns of variation have been proposed in the literature since Hashimoto's pioneering work. Hashimoto's basic North/South division was further elaborated by Norman (1988; 2003), who added a Central transitional zone between Northern and Southern Sinitic, with hybrid properties, including Wu, Xiang, and Gan dialects. Also, it has been shown that in Northwestern China there is an area, overlapping with the historical Amdo Tibetan Region (in present-day Qinghai and Gansu), where we find Mandarin dialects which have undergone significant restructuring due to contact with Tibetic, (Khitano-)Mongolic, and Turkic languages, developing Tibetan and Altaic-type features to a much greater extent than other Northern Sinitic languages (see Slater 2003; Sandman 2016). Mandarin dialects as Linxia (Dwyer 1992), Gangou (Zhu et al. 1997) and Tangwang (Xu 2017) switched from basic VO order to OV, and developed case marking: for instance, the Linxia comitative/instrumental marker *liaŋkə*, deriving from the Chinese numeral 两 *liǎng* 'two' and the generic classifier 个 *ge* (arguably a calque from Baonan and Santa *-qala* 'two together'; Dwyer 1992: 165).[5] More recently, typological research has shown that, for some specific phenomena, there are more areal divisions within China which, interestingly, sometimes cross-cut the North-South border (Chappell 2015b). On the basis of the existing studies on areal patterns of variation within Sinitic, and of her own research on the typology of (differential) object marking (see below, § 5), passive constructions, and

[5] For a list of the main areal features of the Amdo region, see Sandman (2016).

comparative constructions, Chappell (2015b: 45-46) proposes a refinement of the areal typology of Sinitic, with as many as five different areas:

a. Northern
b. Central Transitional
c. Southwestern
d. Far Southern
e. Southeastern

In this classification, Northern China is still seen as a unified area, well-differentiated from Southern China. Also, Chappell's definition of the Central Transitional area is, in essence, quite similar to Norman's (see above), even though it is based on more features: languages from this area are seen as having characteristics found both in the North and South, and also others "which are not at all predictable" (Chappell 2015b: 50), i.e. independent both from the northern and southern model. As to Southern China, Chappell's revision better accounts for the variation in this region: she divides it into three distinct areas (Southwestern, Far Southern, and Southeastern) which, while having common features not shared with Northern dialects, do differ significantly from each other. Interestingly, her division cross-cuts genealogical subgroupings: Mandarin dialects are found not only in the Northern Area, but also in the Central Transitional area (Jiang-Huai Mandarin dialects) and in the Southwestern area (Southwestern Mandarin dialects). Besides, while confirming the earlier typologies in stating that Northern China is a rather homogeneous area, this covers only part of the Mandarin group. Also, she notes that there are two 'aberrant' enclaves within Northern China: namely, the Jiaoliao and Ji-Lu subgroups of Mandarin, mostly spoken in Eastern Shandong, a possible 'relic zone' which possess some important non-Northern, conservative features, and the above-mentioned languages of the Qinghai-Gansu region in Northwestern China.

Thus, Chappell's typology challenges the received view that Mandarin dialects have a high degree of uniformity. Szeto, Ansaldo, and Matthews (2018) analyze a sample of 42 Chinese dialects, 26 of which belong to the Mandarin group, based on 21 typological features (including phonological, lexical and morphosyntax features). They show that a North-South divide exists not only in Sinitic, but also within Mandarin, with Mandarin dialects to the South (i.e. Southwestern and Jiang-Huai Mandarin) showing a tendency to cluster areally. However, just as in Chappell's survey, according to Szeto, Ansaldo and Matthews (2018), Southern Mandarin dialects are much more diverse than Northern Mandarin dialects, which appear to be rather homogeneous (again, with the notable exception of the Amdo Mandarin varieties). Within Northern China, Jin dialects (traditionally grouped with Mandarin, but seen as a separate group in the more recent 10-group classification; see the Introduction) are also said to diverge from the rest of Northern China due to some conservative features, but these are found mostly in the phonology. In a very recent paper, Szeto & Yurayong (2021) compare 30 linguistic features in a sample of 361 language varieties belonging to the Sinitic, Turkic, Mongolic. Tungusic, Kra-Dai, Hmong-Mien, and Austroasiatic groups, and they identify four major areal groups for Sinitic languages:

a. Northern Sinitic
b. Transitional Sinitic
c. Central Southeastern Sinitic
d. Far Southern Sinitic

While this classification partly overlaps with Chappell's (2015b) own typology, a major difference between them is that Szeto & Yurayong's proposal is based on the relative degree of Altaic and EMSEA influence. Unsurprisingly, the Northern and the Far Southern areal groups are those that show the strongest degree of Altaic and EMSEA influence, respectively, while the Transitional and Central Southeastern region do not show a clear 'preference' either for Altaic or for EMSEA features. What is worth remarking is that, despite the fact that the purpose and methodology of Szeto & Yurayong's classification is different from Norman's (2003) and Chappell's (2015b), Northern China is seen as the least diverse region within Sinitic (see Table 12 in Szeto & Yurayong 2021: 42). Note that Northern China here includes Jin dialects and all the subgroups of Mandarin (Northeast, Beijing, Jiaoliao, Ji-Lu, Central Plains, Lan-Yin), except for Southwestern and Jiang-Huai Mandarin: thus, even in this typological classification, all the Mandarin and Jin dialects of Northern China are seen as a quite homogeneous and consistent set.

To sum up, the research on the areal typology of Chinese has shown that there is a rather strong North-South divide within Sinitic, with a 'buffer zone' in-between, and that the greater degree of diversity may be seen in Southern China.[6] Not only do Southern Sinitic languages appear to be more diverse than Northern Sinitic but, also, even within the Mandarin group the greatest degree of variation is apparently found in the dialects spoken to the South. The major 'exceptions' in a seemingly uniform Northern Chinese area are the languages of the Qinghai-Gansu area; also, the Jiaoliao and Ji-Lu Mandarin dialects of Eastern Shandong and, to some extent, the Jin dialects do show some peculiarities that set them apart from the rest of Northern China.

3. Methodology and data

As stated in the introduction, the main aim of this paper is highlighting an areal pattern of convergence in a region of Northern China, which includes three unrelated grammatical features: reduced/nonconcatenative morphology, object markers based on speech act verbs, and structural particles with an */-initial. Ideally, in order to assess the areal distribution of linguistic features, we would build a sample containing languages from within this area, a comparison sample with languages outside of this area. As Mauri (2008: 13) puts it,

> [a]n important factor in establishing whether the linguistic uniformity within a given geographic area constitutes an instance of linguistic area or not is the presence/absence of the relevant bunch of features in the neighboring languages. It is indeed necessary to delimit the area with respect to the surrounding linguistic contexts and to verify whether that bunch of features is widely attested in the world's languages or if it is characteristic of the specific languages spoken in the area

Note that this does not entail that the features listed above must be exclusively found in the area at issue (Thomason 2000): indeed, as we shall see in greater detail below, some instances may be found also elsewhere in China, at least for reduced/nonconcatenative morphology. However, even for features which have occasional occurrences outside the region, we expect to see a clearly skewed pattern, i.e. they should be found in much greater concentration within

[6] Ramsey (1987) suggests that the greater linguistic diversity of Southern China may be explained (also) by environmental and historical factors, such as the fact that communication and transportation were quicker and easier in the North, due to the relative absence of physical barriers as those found in the South (e.g. waterways). I would like to thank an anonymous reviewer for pointing this out to me.

the area considered here. Also, given that we are looking for a combination of traits, rather than a single feature, we would need descriptions for each sampled variety which include information about all three phenomena: a detailed grammar, or at least descriptive works, on those aspects.

In fact, neither requirement has been met in this case. This is due to limitations in the data available: even though there are plenty of descriptions of Chinese dialects, there are still many varieties for which a complete grammar has not been published yet. Besides, not all grammars/descriptions include information on all the phenomena at issue here. This is especially true for nonconcatenative morphology: as pointed out by Lamarre (2015: 278),

> [a] proper description of coalesced verbal suffixes requires investigating full utterances, not only word lists, i.e. grammar, not only lexicon. On the other hand, a full training in dialectology is needed to account for tone sandhi patterns and various phonetic adaptation phenomena, which often differ according to the rime (which means investigation on the phonological system and the whole lexicon of the dialect, to grasp phonetic changes and sandhi rules). Eventually, one also needs to overcome the bias of character writing (one syllable = one character) and the widespread dogma that Chinese has no morphology

Wu & Han (2016) also mention the 'writing bias' in dialectological research. Nonconcatenative morphology involves modifications in the shape of a syllable: given the almost perfect 1:1 correspondence between syllables and characters in the Chinese writing tradition, using characters to record this type of variation is problematic and, for this reason, phenomena of fusion may just be left out of descriptions. Besides, these variations are not always easy to perceive, and thus can be just missed by fieldworkers (Ai 2012; Wu & Han 2016).

A related issue is that works written in Chinese on Sinitic languages often rely on characters only, i.e. they do not provide any transcription for language data. This is especially problematic for the survey of the third feature considered here, i.e. structural particles with an *l*-initial: the choice of character may obscure the actual nature of the particle, as when the character 的 *de* (/tə/ in Standard Chinese) is used for a particle with an *l*-initial (e.g. Huojia 的 *li*ʔ; He 1989). If no transcription is offered, these cases are easily overlooked or misinterpreted.

Lastly, all of the features at issue here may be attested in a dialect as alternatives to other, more 'standard-like' constructions, or may anyway be subject to syntactic, semantic, pragmatic, or stylistic constraints which limit their distribution: this entails that they may be absent in a limited text sample, but do surface if a more thorough analysis is performed. A case in point is Datong, in which both an object marker based on a 'take' verb (把 pəʔ^{32}) and an object marker based on a speech act verb (叫 tɕiɐo^{24}) are used, but in different constructions (Ma & Liang 1986; Li & Chappell 2013a).

On the other hand, there is no shortage of publications on the features at issue, both in individual dialects and in specific areas/groups, or even in Sinitic as a whole. Apart from papers on single languages and areas, we have overview articles on nonconcatenative morphology in Sinitic (Arcodia 2013, 2015; Lamarre 2015; Xin & Zhuang 2019), on object markers (see e.g. Chappell 2013; Li & Chappell 2013a-b), and on the typology of structural particles (Lu 2013; see also Chen A. 2013 on Henan). These publications, while being limited in scope, as they normally discuss only data on one of the three features considered here, do provide detailed information on the phenomena at issue. Moreover, based on published works, we may get a rough idea of the extent and distribution of these phenomena.

Thus, the choice of languages and the collection of data for the present study was conducted as follows:

a. We performed a keyword search on the CNKI (中国知网 Zhōngguó Zhīwǎng)[7] database to identify all the relevant publications on the features at issue
b. We tentatively established the area where we expected to find these features (in greater concentration)
c. We consulted the grammatical descriptions available to us, including those of languages mentioned in specific papers when possible

Based on the above, we built a list of languages, indicating for each of them the absence or presence of each of the three features (see Appendix 1). However, as pointed out above, for most languages we lack the complete picture and, hence, we do not know whether a particular feature is actually present or absent. Thus, while it may seem that these three features do not necessarily occur with very high frequency in the same dialect, I argue that this may well be an artifact of the data.

Note that this is not meant to be a balanced sample: we did not include a comparable number of languages within the area and outside the area (compare Mauri 2008). As pointed out above, the existing literature already points to some clear tendencies for each of the features at issue; consulting a comprehensive database provides further support for our characterization of these phenomena as areally skewed. While it is true that the absence or rarity of these features in published works on languages outside this area does not in itself constitute conclusive evidence of their actual absence (i.e. the phenomenon itself might just be unreported), by combining different sources we feel confident enough to propose, at least tentatively, that an areal bias does exist.

Also, as is often the case in typological surveys, data differs in quantity and quality for each variety considered. As said above, the data comes from articles, mentions in books and dissertations, and grammars, but we had more than one source available only for some languages. Whereas for some varieties we had detailed studies of one or more of the phenomena at issue available, for many others we had only (brief) mentions in grammars, or even just unanalyzed examples in texts. The total number of dialects surveyed amounts to 96. In Appendix 2, we provide a list of the varieties in our sample with the indication of the sources consulted (divided by type).

4. Reduced/nonconcatenative morphology

Chinese is often seen as a "textbook example" (Sagart 2004: 123) of the analytic isolating language type (for a definition, see Aikhenvald 2007), in which we expect to find very stable morpheme boundaries, with little or no synthetic grammatical morphology. Cumulative exponence is said to be rare, and morphemes generally have a single phonological form, with no allomorphy or suppletion; affixes should be clearly distinct from the root/stem they combine with (Packard 2006; see also Bickel & Nichols 2007). This is claimed to be the case not only for Standard Chinese, but also, generally speaking, for all Sinitic languages (Sagart 2004).

The presence of the above-mentioned hallmarks of isolating morphology is said to be connected to a more general typological feature of Sinitic and of other languages of the East and Mainland Southeast Asian type, namely grammaticalization "without coevolution of form

[7] URL: oversea.cnki.net (last access: 31/3/2021).

and meaning" (Bisang 2004; see also Bybee, Perkins & Pagliuca 1994). In a nutshell, in EMSEA languages, grammaticalized signs tend to retain their phonological form: 'primary' grammaticalization (i.e. the development of lexical items into functional/grammatical items) is not generally accompanied by 'secondary' grammaticalization (i.e. morphological bonding/fusion, phonetic erosion; Traugott 2002). A case in point is Standard Chinese 在 *zài*, which is used as a verb ('to be at'), as a preposition ('at, in') and as a marker of progressive aspect, without significant differences in its shape (Bisang 2004; constructed examples):[8]

(1) 我在图书馆。
wǒ *zài* *túshūguǎn*
1SG be.at library
'I'm at the library'

(2) 我在图书馆看书。
wǒ *zài* *túshūguǎn* *kàn-shū*
1SG at library read-book
'I'm reading/studying in the library'

(3) 我在看书。
wǒ *zài* *kàn-shū*
1SG PROG read-book
'I'm reading/studying'

This feature of grammaticalization is said to be connected to another general typological characteristic of EMSEA languages; namely, 'indeterminatedness'. As Bisang (1996:535) puts it,

> In a language in which almost every grammatical category almost always can be inferred from the context, i.e., in a language where there is almost no obligatory grammatical category, even a highly grammaticalized linguistic item shows a higher degree of informative value than in a language showing a lower degree of indeterminateness. This higher degree of informative value is reflected by the fundamental phonological stability of a linguistic sign even in a context of high grammaticalization

However, at least since Zhang (1958), several instances of nonconcatenative (or anyway reduced) morphological exponents for derivational and inflectional/grammatical categories[9] have been reported in the literature on Chinese dialects. For instance, while in Standard Chinese perfective aspect is mainly marked by the postverbal particle -了 -le, in Huojia, a Jin variety of Henan, the same meaning may be conveyed by changing the rhyme of the verb. Compare (4a) and (4b) (He 1989: 58, tone markers adapted, my glosses):

[8] However, Ansaldo & Lim (2004: 346) suggest that when 在 zài is used as a progressive marker it bears "weakened stress".
[9] Note that, in this context, we use 'inflectional' in a loose sense, as opposed to 'derivational', to refer to grammatical categories as aspect, number, etc., with no implication that those categories are obligatorily marked in the languages at issue here.

(4a)我买葱
uaʔ mai^{53} *tsʼuŋ*^{33}
I buy scallion
'I am buying / will buy scallion'

(4b)*uaʔ mɛ*^{53} *tsʼuŋ*^{33}
I buy.PFV scallion
'I bought scallion'

This is but one of many different patterns of reduced and nonconcatenative morphology which are attested in Sinitic. This type of synthetic expression of grammatical meaning is clearly not typical of an EMSEA language, a fact which has been recognized also in Bisang's recent work (see e.g. Bisang 2014; Ansaldo, Bisang & Szeto 2018), and its diffusion indeed appears to be limited. A discussion of the relevance of those phenomena for typology and grammaticalization theory is beyond the scope of the present paper (the reader is referred to Arcodia 2013, 2015; Lamarre 2015; Lamarre & Ōta 2017; Bisang 2014; Bisang 2015; Arcodia 2020). Here, we shall rather focus on the scope and distribution of reduced/nonconcatenative morphology, as well as on its possible historical origins.

Firstly, as mentioned above, there are several distinct patterns of reduced and nonconcatenative morphology, which may interact in different ways in individual dialects and/or may coexist with less reduced exponents with the same function. For instance, in the Boshan Mandarin dialect of Shandong, perfective aspect may be expressed with three different constructions:

a. With the addition of the suffix 了 *-liɔ*, cognate to the above-mentioned Standard Chinese perfective aspect marker -了 *-le* (adapted from Qian 1993: 18)

(5) 吃了饭，出了门，来了客
tʂʻɻ^{21}*- liɔ* *fã*^{31} *tʂʻu*^{214}*- liɔ* *mə̃*^{55} *lɛ*^{55}*-liɔ* *kʼə*^{214}
eat-PFV food exit-PFV door come-PFV guest
'(I, she, etc.) ate, went out, and a guest arrived'

b. With a single vowel suffix, conventionally indicated with a schwa, the actual phonetic shape of which is related to the shape of the rhyme of the lexical item it attaches to (here, *-ɤ* and *-ɛ*; adapted from Qian 1993: 18)

(6) 吃 ə 饭，出 ə 门，来 ə 客
tʂʻɻ^{21}*-ɤ* *fã*^{31} *tʂʻu*^{214}*-ɤ* *mə̃*^{55} *lɛ*^{55}*-ɛ* *kʼə*^{214}
eat-PFV food exit-PFV door come-PFV guest
'(I, she,etc.) ate, went out, and a guest arrived'

c. With tone change and/or lengthening of the nucleus vowel, in the absence of any concatenative exponent (Chen 2006: 320)
(7) 换一双鞋
xuãː^{214} YI SHUANG XIE
change.PFV one pair shoe

'(I, she, etc.) changed a pair of shoes'

While in the Boshan example above (7) the verb xuã^{31} 'change' undergoes both tone change and lengthening of the nucleus vowel, in other dialects only one of the two types of suprasegmental modifications is used to mark grammatical or derivational categories (as e.g. in Xi'an; Sun 2007).

Another possible exponent of inflectional/grammatical and derivational meaning is the so-called 'rhotacisazion' (known in Chinese linguistics as 儿化 *érhuà*), i.e. the addition of a 'rhotic' consonant to the nucleus of a syllable, as in the following example from Qixia (a Mandarin dialect of Shandong; Zhang & Li 2007: 98), again involving the marking of perfective aspect:

(8) 我问老师
WO uər^{41} LAOSHI
1SG ask.PFV teacher
'I asked the teacher'

Note that the unmarked form of the verb 'to ask' in Qixia is *uən^{41}*, with a nasal coda: thus, rhotacisation is not the mere addition of a rhotic coda, since it involves the deletion of the coda of the syllable it attaches to, blurring morpheme boundaries.[10]

Also, the nucleus and, if present, the coda of the syllable may undergo segmental change to mark grammatical/derivational meaning, a phenomenon which is generally known as 变韵 *biànyùn* 'rhyme change' in Chinese linguistics, and corresponds to (segmental) ablaut as defined in Bickel & Nichols (2007). Rhyme change may be exemplified with the Huojia minimal pair seen above (4a-b), i.e. *mai^{53}* 'buy' vs. *mɛ^{53}* 'buy.PFV'. Note that segmental rhyme change and tone change are not mutually exclusive: for instance, Xingyang (a Mandarin dialect of Henan) has a system of grammatical ablaut akin to that of Huojia, but in Xingyang some verbs also change their tone, and not only their rhyme, as e.g. 捆 [k'uən^{55}] 'tie' > [k'uɛ^{33}] 'tie.PFV' (Wang 1998: 277).

Lastly, a seemingly marginal pattern of nonconcatenative marking is 'partial rhyme reduplication' (韵母局部重叠 *yùnmǔ júbù chóngdié*; Wu & Han 2016), which involves the repetition of the rhyme of the syllable, i.e. the nucleus vowel and coda. Interestingly, this 'reduplication' is not necessarily a perfect replica of the original rhyme: for instance, *iŋ*, *əŋ*, *uŋ*, and *yŋ* all reduplicate as *aŋ^{21}*. Also, reduplicated rhymes may be reduced to a schwa: for instance, *ɤ* may reduplicate as *ə^{21}*. See the following example of the Qishan Mandarin dialect (Shaanxi province; Wu & Han 2016: 226):

(9) 说呃一遍，考说呃一遍
ʂɤ^{31}-ə^{21} i^{53} piæ̃^{21} k^{h}ɔ^{31} ʂɤ^{31}-ə^{21} i^{53} piæ̃^{21}
say-PFV one time again say-PFV one time
'(I, she,etc.) said it once, and then said it once again'

[10] Incidentally, rhotacisation is attested also in Standard Chinese, with derivational functions: for instance, 干 *gān* [kan55] 'dry, dried food' > 干儿 *gānr* [kaɚ55] 'dried food' (Duanmu 2007: 41). This rhotic coda is virtually the only subsyllabic morpheme in the standard language, except for few residual instances of derivation by tone change (凉 *liáng* 'cool' vs. 凉 *liàng* 'make cool').

Commented [1]: I would double check this pronunciation… it is huan4 in standard Mandarin and while the rest of the sentence is the same, that seems like quite a divergence. I couldn't find much when I looked, likely in part due to the issues mentioned in this article about under-reporting of dialects

Commented [GFA2R1]: Thanks for the comment, but I'm afraid there's a misunderstanding here: the rest of the sentence is transcribed in Standard Mandarin, that's why this is the same. The source had a proper IPA transcription only for the verb undergoing rhyme change. I clarified the use of smallcaps transcriptions in the note on the first page.

In our sample, Qishan is the only dialect for which this pattern is reported, hence its significance appears to be limited until more data (especially on neighboring dialects) is available. There are however some interesting similarities with the Boshan 'schwa suffix' seen above (6), which in some cases does look like an imperfect copy of the syllable rhyme, as e.g. lɛ[55]-ɛ 'come-PFV' (see Qian 1993: 24-25 for more examples).

Note that the patterns described above may coexist in an individual dialect, as hinted at earlier. For instance, in the already mentioned Xi'an Mandarin dialect, perfective aspect (as well as some other categories) may be expressed by rhyme change, accompanied by vowel lengthening, for a subset of verbs, as e.g. 毁 xuei[53] 'to ruin' > xuæ:[53] 'ruin.PFV'; for other verbs, the same aspectual category may be expressed by tone change, as e.g. 活 xuɤ[35] 'to live' > xuɤ[242] 'live.PFV'; for yet other verbs (and functions), tone change is accompanied by vowel lengthening, and sometimes lengthening alone is used (Sun 2007). In Zhaoxian (a Mandarin dialetct of Hebei), perfective aspect and attainment of a goal may be expressed by lengthening the nucleus vowel, by lengthening of nucleus vowel and adding a schwa, or by lengthening both the nucleus vowel and the nasal coda, again depending on the rhyme of the verb; in all three cases, the tone profile of the verb is 'stretched' following lengthening (e.g. '35' becomes '3533'; Li 2013). Moreover, often sound change (especially, rhyme change) is available only for a subset of rhymes in a language (Arcodia 2013). Hence, classifying individual varieties according to the pattern of sound change they follow often means looking at the dominant pattern, and may anyway be tricky.

Besides the differences in the formal patterns of reduced/nonconcatenative morphology attested in Sinitic briefly described above, this type of exponents does differ also in their functions. The most important distinction is that between derivational and inflectional/grammatical categories. In the Chinese tradition of linguistic description and analysis, it is customary to refer to derivational rhyme change as 子 (or 'Z') 变韵 zi biànyùn, and to inflectional/grammatical rhyme change as D 变韵 *dī biànyùn* (see e.g. Xin 2006, a.o.; see also Xin & Zhuang 2019 for a list of some other labels which may be found in the literature). However, as mentioned above, 变韵 *biànyùn* 'rhyme change' in the narrow sense refers to segmental changes to the syllable nucleus (and coda):[11] therefore, we believe that, as a generic label, 'sound change' (which translates the Chinese word 变音 *biànyīn*)[12] is more appropriate, as it also covers cases exemplified in (4) and (7-9). Also, for the purposes of the present research, cases of allomorphy of concatenative exponents as those seen in (6) may be included, even though the change affects an exponent separate from the root, rather than the root itself.

While the examples seen above all involve inflectional/grammatical categories, basically the same variety of formal patterns is attested for derivational sound change: tone change, lengthening, rhyme change, addition of reduced forms of exponents, and combinations of the above. Indeed, the systems of derivational sound change in individual dialects most often involve more than one pattern, rather than following just of those models (see Xin 2006; Xin & Zhuang 2019), similarly to what we saw above for inflectional/grammatical sound change. Perhaps the most typical function of derivational sound change in Sinitic is marking nominal word class, even though it is often used also with morphemes which are already nominal, as

[11] Note, however, that 变韵 *biànyùn* 'rhyme change' is sometimes used in the literature in a looser sense, to refer also to suprasegmental changes (see e.g. Wang J. 2012)

[12] Indeed, Xin & Zhuang (2019) and Li (2020) use the terms Z 变音 *zi biànyīn* and D 变音 *dī biànyīn* to refer, respectively, to derivational sound change and to inflectional/grammatical sound change.

e.g. Xunxian 篮 *lan*^{42} ‘basket’ > *læ*^{42} ‘basket’ (Xin 2006: 51); this is also the main function of the Standard Chinese suffix -子 *-zi* (compare 例 *lì* ‘example’ and 例子 *lìzi* ‘example’). Indeed, as we shall see in greater detail below, patterns of derivational sound change as the Xunxian example seen above are often interpreted as the product of the fusion of a suffixal morpheme cognate to -子 *-zi* with the lexical root (see e.g. Wang 1999): this is the reason why the above-mentioned label 子变韵 *zi biànyùn* is commonly used in the Chinese literature on the topic. However, here we understand ‘derivational’ in a broader sense, and we include also patterns of sound change which might be historically and/or semantically unrelated to -子 *-zi*. For instance, the above-mentioned patterns of partial rhyme reduplication of the Qishan dialect may be used to build so-called ‘place words’ (处所词 *chùsuǒcí*, i.e. locative nouns) from ordinary nouns, as e.g. 手 *ʂou* ^{53} ‘hand’ > 手欧 *ʂou* ^{53}*ou* ^{21} ‘in one’s hand’ (Wu & Han 2016: 349).

The distinctions introduced above on the different forms and functions of sound change in Sinitic are not unproblematic. We already mentioned that, in many cases, individual varieties cannot be associated with a single pattern of sound change, as these marking strategies often coexist in a language. Moreover, the distinction between inflectional/grammatical and derivational sound change, as well as the distinction among different functions of inflectional/grammatical and of derivational sound change, is not very neat in many dialects. For instance, in Boshan, the above-mentioned ‘schwa suffix’ (6) and tone change/lengthening (7) cover a wide range of functions, both in the domain of derivation and in the domain of inflectional/grammatical meaning, which include, among others, the marking of nominal word class (10; Chen 2006: 316), possession/modification (11; Qian 1993: 82), perfective aspect (above, Exx. 5-7), and continuous aspect (12; Chen 2006: 320)

(10) 夹 *tɕia*^{33} ‘press (from both sides)’ > 夹 *tɕia*^{12} ‘clip’

(11) 他说 ə 话你得听
t’a^{214} *ʂuə*^{53} *ə* *xua*^{31} *ni*^{55} *tei*^{55} *t’iŋ*^{214}
3SG.M say MOD word 2SG must listen
‘you must listen to what he says’

(12) 站个人
tʂã:^{214} GE REN
stand.CONT CL person
‘a person is standing’

Indeed, while we said above that sound changes which convey inflectional/grammatical meanings are often referred to as D 变韵 *dī biànyùn* in Chinese, the same label, and the same patterns, are used in some varieties to convey a much broader range of meanings, again including both derivational and inflectional/grammatical categories. In (4a-b), we showed how rhyme change in Huojia may be used to convey perfectivity: however, in He’s (1989) grammar of this dialect, ‘D’ rhyme change is associated with a very long list of functions, besides that of marking perfective aspect, involving different word classes and disparate meanings. For instance, marking the names of local small villages; turning an ordinary noun into a locative noun (just as the Qishan example seen above); specifying that the sound represented by an onomatopeic words is low and deep; marking continuous aspect; marking the attainment of a goal (He 1989: 51-79). In Wang J.’s (2012) description of Fengxiang (a Mandarin dialect of

Shaanxi), we find phenomena of sound change which he describes as 子变韵 *zi biànyùn* and D 变韵 *dī biànyùn* (actually consisting in lengthening and tone change), which cover many of the functions seen above in the derivational and inflectional domain: however, there appears to be no formal distinction between them, i.e. they all follow the same pattern of change. Li (2020) also discusses patterns of derivational and inflectional/grammatical sound change in dialects of Hebei which are functionally different, but formally identical, blurring the distinction between 'Z' and 'D' sound change.

These seemingly 'chaotic' associations of form and meaning may be explained by probing into the origins of those patterns of reduced/nonconcatenative morphology. Unfortunately, the phenomena described above are attested in dialects which have little or no written tradition; moreover, as mentioned earlier (§ 3), patterns of subsyllabic sound change are not easily recorded with Chinese characters, and are thus likely to be overlooked. Hence there is almost no direct historical evidence for their genesis (but see below, § 7). However, even by looking at synchronic data it can be argued that, despite the different outcomes, the reduced and nonconcatenative markers at issue here are the product of growing integration of a concatenative exponent in a lexical root (see e.g. Lamarre 2009, 2015, a.o.), at least in most cases (Lamarre & Ōta 2017: 29, Fn. 1). For some varieties, the evidence for a gradual process of reduction may be drawn simply by comparing competing strategies for marking the same grammatical meaning. A case in point is Boshan, in which, as seen above, the same meaning may be expressed by a concatenative formative with a single, invariant form (5), by a concatenative suffix with a more reduced shape, and with several allomorphs, conditioned by the shape of the root (6), or by tone change and lengthening, without any concatenative exponent (7). Another example of an analogous process of evolution from our sample is Nanhe (a Jin dialect of Hebei). In Nanhe, the perfective marker cognate to MSC −了 *le* has the allomorphs −*la*, −*a*, or −*a*: (10a): the addition of this suffix often causes, again, tone change and lengthening in the verb root, and the suffix itself may coarticulate with the root −*a*. The suffix may be dropped, and the 'burden' of conveying its meaning then lies on the modified verb root (Zhang 2011). The mechanisms of tone change involved in those processes are described in detail in Lamarre (2015) and we shall not discuss them further here; we shall limit ourselves to pointing out that they occur in the same environment: namely, when a tonic verb root is followed by a neutral tone (and unstressed) syllable. Rhyme change *senso strictu*, i.e. segmental change, happens in an analogous prosodic environment, although the mechanisms behind its genesis may be slightly different (Arcodia 2020).

The diachronic processes by which derivational and inflectional/grammatical sound change arise may account for the attested polyfunctionality of reduced/nonconcatenative morphology. While some general aspectual meaning has been proposed to account for some of the functions of inflectional/grammatical sound change (see Lamarre 2015: 291-295), it seems unlikely that we can come up with a Gesamtbedeutung for meanings as distant as those seen above. In Arcodia (2013), it is argued that no unitary meaning may be assigned to polysemic reduced/nonconcatenative exponents as those seen above of the Boshan and Huojia dialects: according to his analysis, this is merely the product of the fact that different markers were all reduced to the same pattern (see the source for the details of this analysis; see also Li 2020). Indeed, for dialects in which segmental exponents coexist with more reduced or nonconcatenative exponents with the same functions, the different origin of apparently identical patterns is somehow preserved. For instance, in the above-mentioned Xingyang dialect, rhyme change may be used to convey a wide range of meaning, including seemingly incompatible functions as marking perfective and continuous aspect: however, the same meanings may be

expressed also by segmental suffixes, distinct for each function, without rhyme change (Wang 1998).

With the caveats discussed above in mind, we can now analyze the distribution of different types and patterns of sound change in Sinitic. As mentioned earlier (§ 3), several published studies already suggest that the phenomena at issue here are chiefly found in certain regions of Northern China; namely, Shanxi, Shaanxi, Henan, Hebei, and Shandong. Arcodia (2013; 2015) and Lamarre (2015), based on their own survey, paint a largely overlapping picture of the areal distribution of the phenomena at issue. Specifically, while reduced/nonconcatenative morphology is spread over a continuous area, the patterns and functions we find are not homogeneous. A neat division does not seem to be possible, but some tendencies are clearly visible, and at least four clusters within this region may be identified, according to Arcodia's and Lamarre's analysis:

a. Northern Henan (along the border with Shanxi, Hebei, Shandong), the area around Zhengzhou and Kaifeng, and Southern Hebei, which are characterized by ablaut morphology, both derivational and inflectional/grammatical
b. Central-Southern Shaanxi (e.g. Xi'an, Shangzhou, Fengxiang), which is characterized by tonal morphology and, to a lesser extent, ablaut (mostly, inflectional/grammatical)
c. Central-Eastern Shandong (especially the area around Zibo and the Jiaodong Peninsula), which is characterized by rhotacization and tonal morphology (derivational and inflectional/grammatical)
d. Shanxi, characterized by (mostly) ablaut morphology, derivational or used to mark number in pronouns (but usually not for verbal categories)

Actually, Lamarre (2015) also makes a more fine-grained distinction between 'pure' tone alternation and tone change with lengthening: according to her survey, both are attested in Shandong and Hebei, but only the latter is found also in Shaanxi.

Also, in a recent paper, Xin and Zhuang (2019) discuss the distribution of derivational sound change (here, Z 变音 *zi biànyīn*) and inflectional/grammatical sound change (D 变音 *dī biànyīn*). Based on their own fieldwork data and on a survey of the literature, they found 62 locations in which derivational sound change is attested: in their sample, Z 变音 *zi biànyīn* is mostly concentrated in Northern and Central Henan, and Southern and Southeastern Shanxi; scattered attestations are found also in Hebei, Shaanxi, and Shandong. They also show that while, as said above, each variety does not follow just one pattern of sound change, there appear to be similarities within three subregions, namely Henan, Shanxi, and Hebei. As to the distribution of inflectional/grammatical sound change, they emphasize that it is mostly attested in Henan, and the dialects which make use of D 变音 *dī biànyīn* most often also make use of Z 变音 *zi biànyīn*; also, Xin and Zhuang point out that inflectional/grammatical sound change does not seem to be found in Shanxi, and attestations outside Henan are said to be sporadic. Note, however, that here Xin and Zhuang point out that inflectional/grammatical sound change in Henan takes the form of rhyme change: the fact that this specific type of ablaut morphology is indeed found in great concentration in this specific region is indeed in line with Arcodia's and Lamarre's analysis. Xin and Zhuang do not seem to take into consideration other patterns of inflectional/grammatical sound change. Li (2020) discusses the distribution of derivational and grammatical sound change in Hebei dialects: she points out that phenomena of Z 变音 *zi biànyīn* and D 变音 *dī biànyīn* have been reported in the literature only in a limited number of dialects in

this province, but she also suggests that this might be due a gap in the research on the topic; namely, the lack of a systematic survey of sound change in Hebei dialects.

The analysis of our sample appears to confirm the trends outlined above, but also helps us to refine the picture. There are 51 dialects in our sample for which some form of inflectional/grammatical sound change has been reported: roughly half of them (25) are Henan dialects, and nearly all the rest are located in Shaanxi, Shanxi, Hebei, and Shandong. Derivational rhyme change indeed appears to be widespread in Shanxi, and it is quite common also in Jin and Mandarin dialects of Northern and Central Henan, and in Hebei, where it often takes the form of lengthening and rhyme change. Li (2020) also points out some cases in dialects of Central and Northern Hebei, suggesting a broader distribution in this area. On the other hand, the Shanxi dialects in our sample seem to be 'immune' from inflectional/grammatical sound change (apart from number marking in pronouns; Hou & Wen 1993), as expected, with the possible exception of the Qixian dialect (Jin; Wang 1992), in which the attainment of a result may be marked by ablaut on the verb. Suprasegmental changes, namely tone change and/or vowel lengthening, are indeed very widespread: different subtypes are common in Hebei and Shandong, and may be found also in Shaanxi. Rhotacisation with inflectional/grammatical (and, occasionally, derivational) meaning appears to be typical of Shandong, but has limited attestations also in Hebei, in some varieties of the Qinhuang and Tangshan area (Li 2020). In our sample, Shaanxi dialects are the least represented, and it appears that derivational and inflectional/grammatical sound change are probably not very common here. On the other hand, in this region we find an unexpectedly broad range of patterns, including ablaut, tone change, lengthening, and rhyme reduplication.

Interestingly, as pointed out by Arcodia (2015), the trends in the distribution of patterns and functions of sound change discussed above cross-cut genetic subgroupings. A case in point is that of the Jin dialects of Northern Henan and Southern Hebei, many of which show inflectional/grammatical sound change (in the form of rhyme change and, also, tone change/lengthening), which, as said earlier, appears to be virtually non-existent in Shanxi, the 'heartland' of Jin dialects. This provides support for our general hypothesis of areal, rather than genetic origin for those phenomena. Also, it appears that there are some shared features in patterns of suprasegmental change (and, to a lesser extent, rhotacisation) with an inflectional/grammatical function between Hebei and Shandong dialects (see also Lamarre 2009).

Note, however, that the use of tone change to mark derivational and inflectional/grammatical meaning is attested also in a geographically and typologically very different region of China, namely, in the Yue dialects of Guangdong and Hong Kong. A commonly cited example is that of the loss of the perfective aspect marker 咗 *jó* in Cantonese, which however leaves a trace on the verb by tone assimilation (ex. from Matthews & Yip 2011:31; for other examples in Yue dialects, see Gan 2010):

(13)a. 食咗飯未呀?
sihk-jó-faahn meih a

eat-PFV-rice not.have Q
b. 食飯未呀?
sík-faahn *meih* *a*
eat.PFV-rice not.have Q
'have you eaten?'

The fundamental difference between the patterns of tone change of Northern Sinitic seen above and those found in Yue dialects is that in the former, the concatenative exponents which become integrated in the root are generally toneless, while in the latter there are no neutral tone syllables. While (13) may look superficially similar to the Boshan and Nanhe cases discussed above, what happens here is not the interaction of a tonal verb root with a toneless exponent but, rather, the assimilation of the high rising tone of the suffix 咗 *-jó* in the verb root. Derivational and inflectional/grammatical tone change in Mandarin and Jin dialects is often seen as an instance of a general sandhi phenomenon of Northern Sinitic, namely "tone change before toneless syllables" (轻声字前变调 *qīngshēngzì-qián biàndiào*; Lamarre 2015: 283), while in Yue dialects it is generally understood as contraction (合音 *héyīn*), i.e. fusion of the verb and the suffix (see Yu 2007; Lamarre & Ōta 2017). It is however worth remarking here that, arguably, different diachronic processes led to similar results in dialect groups as distant as Mandarin and Yue. Moreover, derivational tone change is found also in other dialect groups, as e.g. in Wu (see Sheng & Zhu 2009; Zhengzhang 2014).

5. Object markers based on speech act verbs

A construction which has received much attention in the literature is the so-called 'disposal construction', known in Chinese as 处置式 *chǔzhìshì* or, also, as "把" 字句 "*bǎ*" *zì jù*, lit. '*bǎ*-word construction'. In a nutshell, in the disposal construction, an object[13] is placed in the preverbal position, and is introduced by a dedicated object marker: indeed, the conventional label "把" 字句 "*bǎ*" *zì jù* originates from the object marker which is most often used in the disposal construction in Standard Chinese, namely 把 *bǎ*. Compare the following examples (Li 2006: 377):

(14)a. 我忘了要钥匙了。
wǒ wàng-le *yàoshi le*
1SG forget-PFV key CRS
b. 我把钥匙忘了。

[13] For the sake of simplicity, here we use the term 'object' to refer to the constituent in the preverbal position marked by the object marker in the disposal construction. From the syntactic point of view, however, the constituent involved is not necessarily an object; as pointed out by Chappell, it is rather an "affected patient, either the direct object argument of a transitive verb, the intransitive subject of an unaccusative verb, or even the subject of an unergative verb, provided this has a reflexive effect" (Chappell 2006: 446).

wǒ bǎ yàoshi wàng-le
1SG OBJ key forget-PFV
'I forgot the keys'

While in (14a) the object 钥匙 *yàoshi* is in the postverbal position, in (14b) it is placed in the preverbal position, and introduced by 把 *bǎ*. Note that the disposal construction is not obligatorily used every time an object is not found in the postverbal position; indeed, unmarked OV constructions are easily found in Sinitic (Chappell 2006). Compare (adapted from Li 2017):

(15)a. 他把菜炒烂了。
tā bǎ cài chǎo-làn-le
3SG.M OM vegetables fry-mushy-PFV/CRS
'He stir-fried the vegetables mushy'
b. 菜他炒烂了。
cài tā chǎo-làn-le
vegetables 3SG.M fry-mushy-PFV/CRS
'The vegetables, he stir-fried [them] mushy'

Indeed, not all objects, and not all types of predicates, are compatible with the disposal construction. Here we cannot discuss in detail the semantic, pragmatic, and aspectual requirements of the disposal construction (for an overview on Standard Chinese, see Li 2006; 2017). We shall limit ourselves to pointing out that the object in the disposal construction should be 'affected' by the process described by the verb (Li & Thompson 1981; Chappell 2006, 2013 a.o.), and, from the point of view of information structure, is generally identifiable (Iemmolo & Arcodia 2014). However, as pointed out by Chappell (2006), we should not take for granted that the features of the disposal construction found in standard Mandarin are necessarily identical to those of the corresponding constructions in other dialects.

As stated in the Introduction, our main concern here is the origin of the object marker, rather than the whole construction. The Standard Chinese object marker 把 *bǎ* derives from a verb meaning 'take'; it grammaticalized in a serial verb construction of the form (NP_0[SUBJECT]) – V_1[TAKE] – NP_1 – V_2 – (NP_2), in which other verbs in the semantic area of 'take' could be found (as e.g. 将 *jiāng*, 取 *qǔ*, and 捉 *zhuō*; Chappell & Peyraube 2011). See the following Early Medieval Chinese example (from a 4th century sutra; Chappell & Peyraube 2011):

(16)取一大海水澆灌其身
qǔ yī dà hǎi-shuǐ jiāoguàn qí shēn
take one big sea-water pour 3SG body
'[He] took a large amount of seawater to pour over his body'

Later on, when NP_1 and NP_2 were coreferential, the object of V_2 could be omitted. According to Chappell & Peyraube's (2011) account, this was instrumental in the grammaticalization of the 'take' verbs into prepositions marking the object. In the following example (from a 6th century sutra; Chappell & Peyraube 2011), 将 *jiāng* can no longer be interpreted as a verb meaning 'take':

(17)時諸比丘將此拜佛

shí *zhū* *bǐqiū* *jiāng* *cǐ* *bǎi* *Fó*
at.that.time PL monk OBJ this tell Buddha
'At that time, the monks narrated this to Buddha'

This is obviously a very simplified account of the development of the disposal construction (for a detailed discussion, also including different hypotheses, see Peyraube 1996; Sun 2015). Moreover, it focuses only on the 'mainstream' Chinese construction based on 'take' verbs. However, there are many more sources of object markers in Sinitic. The most common source concepts for object markers are (Chappell 2006, 2013, 2015b; Li & Chappell 2013a-b):

a. 'Take/hold' verbs, as e.g. the above-mentioned 把 *bǎ*, or Shanghainese 拿 *nɔ*^{53}. These are dominant in Northern China (including some Northern Wu dialects), but are found also in some Yue, Hakka, and Pinghua dialects (albeit not fully grammaticalized)
b. 'Help' verbs, as e.g. 幫 *paɯ*^{44} in Chenxi (Xiang group), and c. 'Give' verbs, e.g. 分 *fã*^{11} in Qimen (Hui group). These are found in the Central Transitional Area (Xiang, Gan, Hui, Southern Wu, and Zhongyuan and Jiang-Huai Mandarin)
d. Comitative prepositions, e.g. Taiwanese (Southern Min) 共 *kā*. These are found in Southeastern China, especially in the Min group, but also in Hakka, Eastern Wu, Xianghua, and in some Jiang-Huai and Southwestern Mandarin dialects

'Help' and 'give' verbs are lumped together by Chappell, despite having quite different meanings, because they seem to follow a similar diachronic development (Chappell 2015b: 21, Fn. 6). Below are the proposed pathways of grammaticalization for the above-mentioned types of object markers (Chappell 2006, 2013):

'Take/hold' > instrumental > object marker
'Give/help' > beneficiary > object marker
(Verb) > comitative > oblique (addressee, beneficiary, ablative) > object marker[14]

However, there are many other possible sources for object markers, though nowhere as common as those seen above (Chappell 2015b). Based on their analysis of a sample of more than 650 dialects, Li & Chappell (2013a) list as many as 113 object markers. Among those, four more 'micro-areas' can be found which make use of object markers with a common origin (Chappell 2013, 2015b):

e. Allative directionals, e.g. 到 DAO in Linjin (Jin; Li & Chappell 2013a); mostly found in Shanxi
f. 'Connect' verbs, e.g. 連 *lian*^{51} in Anyang (Jin; Wang & Feng 2015); mostly found in Hebei and Shandong
g. 'Get' verbs, e.g. 得 DE in Linfen (Mandarin; Li & Chappell 2013a); attested in Shanxi, Hunan, Zhejiang, and Fujian
h. Speech act verbs, e.g. 叫 *tɕiau*^{312} in Yexian (Mandarin; Zhang 2005); mostly found in Henan, Shandong, Shanxi, and Hubei

[14] Note that, for oblique markers, it is their beneficiary meaning that further develops into an object marker. They thus share the last step of their pathway of development with 'give/help' verbs (Chappell 2013).

Here we focus on the latter source, with some caveats. Since, as mentioned earlier, most Chinese dialects have little or no written tradition, scholars who write descriptions have to make choices as to the characters to use to write a dialectal morpheme/word. We thus looked for object markers written with the character 叫, used for the verb *jiào* 'call' in Standard Chinese, with the assumption that the morpheme at issue is actually cognate to this speech act verb. Nevertheless, as pointed out also by Li & Chappell (2013a), the choice of a certain character in dialect description is no guarantee that the morpheme/word at issue has the same etymon as the morpheme/word written with that character in Standard Chinese. While in most cases this is indeed true, it is not necessarily always so. However, when working with a large sample, it is simply unpractical (and often impossible) to find out the correct etymon for each object marker in each dialect. On the other hand, some descriptions offer the form of the verb meaning 'call' for comparison (e.g. Zhang 2005), which may provide support for the proposed etymon.

Also, similarly to what we saw in §4 for reduced/nonconcatenative morphology, sometimes object markers also have other related functions. For instance, in the above-mentioned Yexian dialect of Henan, 叫 *tɕiau*^{312} is used as a verb meaning 'to call', as an object marker (18), as a passive marker (19), and as a causative marker (20), sometimes with an ambiguous meaning (Zhang 2005: 301, 304):

(18)风叫树刮倒了
fəŋ^{24} *tɕiau*^{312} *ʂu*^{312} *kua*^{24}-*tau*^{55} *lə*
wind OBJ tree blow-topple PFV/CRS
'the wind toppled the tree'

(19)灯叫关了
təŋ^{24} *tɕiau*^{312} *kuæn*^{24} *lə*
lamp PASS close PFV/CRS
'the lamp was turned off'

(20)他叫他妈气晕了
t'a^{24} *tɕiau*^{312} *t'a*^{24} *ma*^{24} *tɕi*^{312}-*YUN* *lə*
3SG.M CAUS/OBJ 3SG.M mum anger-dizzy PFV/CRS
'He angered his mother (to dizziness)'

Example (18) is structurally identical to the Standard Chinese sentence in (15a), the only difference being the use of an object marker with a different etymon; the very same marker, 叫 *tɕiau*^{312}, is used also as a passive and causative marker. Interestingly, since the constructions in which these markers are found may be identical, ambiguity may arise: in (20), 叫 *tɕiau*^{312} may be interpreted both as a causative marker and as an object marker; according to Zhang (2005), it could also be interpreted in a passive sense ('he was angered to dizziness by his mother'). This type of ambiguity is far from an exception, and has been reported for several varieties with a disposal construction based on 叫 *jiào* (e.g. in Tancheng, a Mandarin dialect of Shandong; Yan & Xu 2005). Note, also, that Standard Chinese 叫 *jiào* is indeed used both as a causative and as a passive marker, but not as an object marker.

Lastly, as said earlier (§3), just as one morpheme may be used as an object marker as well as for other functions, more than one morpheme may be used as an object marker in a single dialect. We already mentioned the two object markers of the Datong dialect; another case in

point is Xunxian, in which there are as many as four different object markers, used in different constructions, and only one of which appears to be based on a speech act verb. Indeed, the most common aspect markers are 在 ZAI and 弄 NONG, while 叫 JIAO is reportedly used only as an object marker in constructions with a strong causative meaning (Li & Chappell 2013a: 30; compare Xin 2006). In our survey, we count languages as Xunxian among those which have an object marker based on a speech act verb, even though it may be less common than other competing markers, or even just a minor pattern.

We already pointed out that Li & Chappell (2013a) provide (few) examples of object markers (arguably) derived from speech act verbs in dialects of Henan, Shandong, Shanxi, and Hubei; Shi & Wang (2009) and Chappell (2013) mention only attestations in Henan and Shandong dialects. In our own survey, we found an object marker based on a verb (apparently) cognate to 叫 *jiào* in 25 varieties: as many as 14 are Henan dialects, three are in Anhui, three in Shanxi, two in Shandong, two in Hubei, and only one in Hebei. Object markers with this origin do not seem to be found anywhere outside these provinces, and their distribution within this area is clearly skewed towards Henan. As to the affiliation of these dialects, it is worth remarking here that 20 of those 26 dialects belong to the Central Plains subgroup of Mandarin, two belong to the Southwestern Mandarin subgroup, one to the Ji-Lu Mandarin subgroup, and three are Jin dialects. The apparent genetic bias towards Central Plains Mandarin might however be explained by the fact that the overwhelming majority of Henan dialects belong to this subgroup, and it could thus be an areal bias, rather than a genetic bias. Note, however, that all of the Anhui and Shandong dialects with this type of object marker in our sample belong to the Central Plains Mandarin subgroup, which is not dominant in these two provinces. Indeed, those Anhui and Shandong Central Plains Mandarin dialects are all spoken in areas not far from the border with Henan, suggesting continuity. Also, the two dialects with this type of object marker in our sample belonging to the Southwestern Mandarin subgroup, namely Xiangfan and Danjiangkou, are both spoken in an area of Hubei very close to the border with Henan, which is again suggestive of some degree of continuity of an areal pattern.

While, as mentioned earlier, the dialects at issue here have almost no written tradition, some hints on the history of object markers cognate to 叫 *jiào* may be actually found in 'mainstream' Chinese literature. Interestingly, some attestations of 叫 *jiào* used as an object marker in the 18th century novel 歧路灯 *Qí Lù Dēng*, which was written by a Henan-born author, Li Lüyuan (Fu 2007; Wang H. 2012): this can be interpreted as a reflection of the fact that this use was attested in spoken varieties of Henan already three centuries ago. Note, however, that 把 *bǎ* is the usual object marker in this novel, while 叫 *jiào* as an object marker is very uncommon: among 1,773 occurrences of 叫 *jiào* in the novel, only 8 are instances of the disposal construction (Fu 2007: 123). Actually, scattered attestations of this construction may also be found in other vernacular novels as e.g. The Plum in the Golden Vase (17th century) or the Dream of the Red Chamber (18th century); however, the number of occurrences is extremely low (no more than three in The Plum in the Golden Vase and five in the Dream of the Red Chamber; Liu 2016: 37), and part of them could be interpreted as instances of causative marking, rather than object marking.

We saw above that, according to Chappell's (2013) account, 'take/hold' verbs developed into object markers through an instrumental stage, and both 'give/help' verbs and comitative prepositions developed into object makers through a beneficiary stage. Shi & Wang (2009: 51) propose that object markers based on cognates of 叫 *jiào* developed within the construction NP_1[SUBJECT] – 叫 *jiào* – NP_2 – VP, according to the following pathway:

'call' > cause, allow > passive, object marker

Specifically, Shi & Wang (2009) suggest that when NP_2 is the agent of the verb, 叫 *jiào* can shift from an 'allow' meaning towards a passive meaning (allow something to happen > have something done to oneself); on the other hand, when NP_2 is the patient of the verb, 叫 *jiào* can evolve into an object marker.

The idea that the causative stage is a necessary precondition for the object marker stage in the evolution of speech act verbs is shared also by others (see Zhang 2005; Liu 2016). Indeed, Xu (2006) points out that the Standard Chinese object marker 把 ***bǎ*** also contains a causative element. 把 ***bǎ*** is found in the same position of 叫 jiào in an analogous construction (NP_1[SUBJECT] – 把 ***bǎ*** – NP_2 – VP): as Xu (2006: 139) puts it,

> [i]n ***bǎ*** constructions, the NP_1 causes the NP_2 to be changed, while in causatives with ***ràng/jiào***, the NP_1 causes NP_2 to do something. In other words, in ***bǎ*** constructions, the change of NP_2 constitutes the focus, while in causatives, the change of NP_2 is not important

Compare the pathway of evolution for Standard Chinese 叫 *jiào* proposed by Xu (2006: 132):

'order' > make (someone) do > permit > let (someone) do / concede > suffer from

This continuum is based on the volitionality of the first NP in the construction, i.e. the 'subject', which decreases from left to right. However, in the disposal construction the subject actually has the highest degree of volitionality and control over the object/patient. Arcodia & Iemmolo (2019) propose thus a 'double pathway' of grammaticalization for object markers based on speech act verbs:

'call' > order > cause > allow > passive
'call' > order > cause > object marker

According to their analysis, the differentiation between the passive meaning and the object marking function is related to the semantic features of the NPs in the NP_1[SUBJECT] – 叫 *jiào* – NP_2 – V construction. When both NP_1 and NP_2 are semantically plausible agents, cognates of 叫 *jiào* may grammaticalize into causative and passive markers (see Yan & Xu 2005; Hu 2009). See the following Mengcheng example (a Mandarin dialect of Anhui; Hu 2009: 39):

(21)老张叫老王给支派走喽。

LAO-ZHANG	JIAO	LAO-WANG	GEI	ZHIPAI	ZOU	LOU
old-Zhang	CAUS/PASS/OBJ	old-Wang	CAUS?	send	off	SFP

'Old Zhang had Old Wang send (someone) off'
'Old Zhang was sent off by Old Wang'
'Old Zhang sent off Old Wang'

Similarly to (20), all three readings of 叫 JIAO here are available, depending on the context. If however, only NP_1 is a semantically plausible agent and/or NP_2 is a more plausible patient (due

to a low degree of control on the process described by the verb), evolution towards object marking may occur. Compare the following Tancheng examples (Yan & Xu 2005: 86):

(22)俺叫书包给拿走了

AN JIAO	SHUBAO	GEI	NA-ZOU LE
1SG OBJ	satchel	CAUS?	take-go PFV/CRS

'I took my satchel with me'

(23)衣裳叫雨淋湿了

YISHANG	JIAO	YU	LIN-SHI	LE
clothes	PASS	rain	drench-wet	PFV/CRS

'The clothes were drenched with rain'

In both cases, there is only one possible interpretation: in (22), 叫 JIAO is an object marker, and NP_2 (书包 SHUBAO 'satchel') is an object/patient of the verb; in (23), NP_1 is a patient, and NP_2 (雨 YU 'rain') is a 'force', i.e. a non-volitional causer. The reason behind the 'closed' interpretation for (22) is intuitively clear: the NP_1 designates a human referent, while the NP_2 designates an inanimate object, and the action described by the verb makes sense only if the NP_2 is a patient; it cannot be constructed as having a causative or a passive reading. As for (23), while both NPs designate inanimate, non-volitional entities, the process described by the verb, again, can only be interpreted as having NP_1 as a patient and NP_2 as a causer. Thus, the function of 叫 JIAO emerges not only from the semantic characteristics of the NPs in the construction, but also from the meaning of the verb, i.e. from the whole construction (on the role of constructions in grammaticalization, see e.g. Traugott 2003; Gisborne & Patten 2011).[15]

Due to space constraints, we shall not discuss any further here the possible pathways of semantic and functional development of speech act verbs. We shall limit ourselves to pointing out that verbs cognate to 叫 *jiào* have the potential to become object markers, arguably through a causative stage: this happened in a number of dialects, but apparently not in Standard Chinese. The fact that some occurrences of 叫 *jiào* apparently used as an object marker also in 'mainstream' written Chinese already in the 17th century, as mentioned above, is again suggestive of a possible development which, however, did not reach completion in the standard language, as well as in most Chinese dialects. The unusual concentration of object markers cognate to 叫 *jiào* in dialects of Henan and in neighboring dialects of Shandong and Anhui belonging to the Central Plains Mandarin subgroup, as well as in Southwestern Mandarin dialects spoken at the border between Hubei and Henan, is suggestive of an areal bias, possibly combined with a genetic bias.

6. Structural particles with an *l*-initial

A common feature of Sinitic languages is the use of a single particle for all types of adnominal modification (see e.g. Xu & Matthews 2011; Lu 2013). In Standard Chinese, 的 *de* is generally used as the marker of adnominal modification, be it modification by a noun in a possessive

[15] Note that, according to Fu (2007), in some Henan dialects morphemes cognate to 叫 *jiào* have a tone value when they are used as causative and object markers, and another tone value when they mean 'allow' and passive voice. This provides indirect support for Arcodia & Iemmolo's (2019) hypothesis of the two parallel pathways of grammaticalization.

relation (24) or an 'associative'[16] relation with the NP (25), modification by an adjective (26), or modification by a relative clause (27; constructed examples):

(24)福瑞的书
Fúruì de shū
Furui GEN book
'Furui's book'

(25)中国的学生
Zhōngguó de xuésheng
China ASSOC student
'Chinese student(s)'

(26)聪明的孩子
cōngming de háizi
clever MOD child
'clever child(ren)'

(27)说日语的孩子
shuō Rìyǔ de háizi
speak Japanese REL child
'child(ren) who speak(s) Japanese'

In the Chinese literature, it is customary to refer to all constructions modifying the NP as 定语 *dìngyǔ* or 修饰语 *xiūshìyǔ* (see Liu 2005: 3), lit. 'modifiers', and to the markers of modification, as the above-mentioned 的 *de*, as 结构助词 *jiégòu zhùcí* 'structural particles'.

There are two more constructions in which structural particles are used, as shown in the following Standard Chinese examples: adverbial modification (28) and in the "complex stative construction" in Li & Thompson (1981: 623; constructed examples):[17]

(28)我成功地爬上了山顶
wǒ chénggōng de pá-shàng-le shān-dǐng

[16] The term 'associative' is used in Yap & Matthews (2008) and in Xu & Matthews (2011) to label a subtype of adnominal relation, but its meaning is never made explicit. In Li & Thompson (1981: 113), "associative phrases" are defined as "a type of modification where two noun phrases [...] are linked by the particle -de"; they also add that "the precise meaning of the association or connection is determined entirely by the meanings of the two noun phrases involved," hence giving a very broad definition of 'associative'.

[17] Note that the complex stative construction, as defined in Li & Thompson (1981), does not cover all the functions of postverbal 得 *de* in Standard Chinese. The complex stative construction corresponds to what are often termed 'manner complements' (as in Ex. 29) and 'extent/degree complements' (i.e. when "[...] the event of the first clause is done to such an extent that the result is the state expressed by the stative clause or verb phrase"; Li & Thompson 1981: 626). There is however a third type of complement introduced by postverbal 得 *de*: namely, the 'potential complement', which expresses the possibility of reaching a certain result. The latter is clearly distinct from the complex stative construction in the modern language, but they likely share a common origin (for an overview, see Lamarre 2004).

1SG success ADV climb-up-PFV mountain-top
'I succesfully climbed to the summit of the mountain'

(29)李杰跑得很快
Lǐ Jié pǎo de hěn kuài
Li Jie run COMP very fast
'Li Jie runs very fast'

As may be seen from (28) and (29), in Standard Chinese the structural markers in adverbial modification and in the complex stative construction have the same phonological form as the marker of adnominal modification 的 *de* (/tə/), but are customarily written with different characters (respectively, 地 and 得), at least in the current written standard. Thus, the difference between the three structural particles of Standard Chinese has sometimes been seen as a mere graphic distinction, and indeed the character 的 could be used for all these functions in the past (Wiedenhof 2017). However, through the analysis of the diachronic evolution of these items it has been shown that they have different origins (Ōta 1987[1958]; Sun 1996), which are somehow reflected in the characters used to write them. Indeed, both 地 and 得 are the earliest written forms for the markers of adverbial modification and of the complex stative construction: the use of the character 的 to write both particles emerged only after the Song Dynasty (960-1279; Ōta 1987[1958]; Sun 1996; see Jiang 1999 and Feng 2004 on the relationship between 的 and 地), and the character 底 dǐ was originally used for the marker of adnominal modification (Ōta 1987[1958]; we will get back to this later). Moreover, the markers of adnominal modification, adverbial modification, and of the complex stative construction are clearly distinct in several dialects: for instance, in Cantonese, adnominal modification is marked by 嘅 *ge* (or by a classifier), adverbial modification is marked by 咁 *gám*, and the markers 得 *dāk* (cognate to 得 *de*) and 到 *dou* are used in the complex stative construction (Matthews & Yip 2011).

For the sake of simplicity, in our survey we focus on the structural particles used in adnominal modification; however, we will occasionally refer also to other constructions when appropriate. Note, also, that the markers of adnominal modification of Sinitic (and of many other Sino-Tibetan languages) are generally used as nominalizers too (Xu & Matthews 2011): again, we shall not consider those uses here, in order to narrow the focus of our survey. Take, for instance, the case of Haimen, a Wu dialect of Jiangsu. In Haimen, there are as many as four distinct markers for the functions discussed above:

Function	Marker
Adnominal modification	个 *goʔ*^{02}
Adverbial modification	叫 *tɕiɔ*^{02}
Modification in the complex stative construction	来 *lɛ*^{053}
Nominalisation	个 *goʔ*^{04}

Table 2. Markers of modification and nominalization in Haimen (data from Wang H. 2011)

As can be seen in Table 2, only the marker of modification in the complex stative construction has an *l*-initial. The distribution of forms and functions in Haimen is strikingly similar to that of Shanghainese, another Wu dialect (Huang 1996; Zhu 2006), which however makes use also of other particles (including the compound form 得来 *teqlae*; Zhu 2006: 150) and a particle 来 *lɛ* is found in the complex stative construction in yet another Wu dialect, namely Tongyuan (Huang 1996: 549). This is likely to be a Wu feature which does not seem to be related with what we see in the area we focus on in this paper.[18] Hence, we shall not consider varieties as Haimen, Shanghainese, or Tongyuan for the purposes of the present study.

Generally speaking, markers of adnominal modification in Sinitic mainly belong to two macro-types, the distribution of which is related to the North-South divide (Arcodia 2017; see above, § 2):

a. The 的 *de-type*, i.e. markers cognates to Mandarin 的 *de*, identified by their dental initial ([t]), the 'Northern' type.
b. The 个 *gè-type*, typically having a velar stop (mostly, [k]) as their initial, found in Central and Southern China, as e.g. the above-mentioned Cantonese 嘅 *ge* and Haimen 个 *go?*^{02} (Table 2).

There are several competing hypotheses on the origin of 的 *de* and related particles (for an overview, see Wu 2005: 267-268, Lu 2013: 128-129), including:

a. From the (now obsolete) marker of modification 之 ***zhī***,
b. From the nominalizer (and marker of modification; see Ōta 1987[1958]: 322) 者 ***zhě***,
c. From both 之 ***zhī*** and 者 ***zhě***
d. From the locative 底 ***dǐ*** 'bottom, in' and/or 地 ***dì*** 'place', which inherited the genitive function from locative nouns as 所 ***suǒ*** and 许 ***xǔ*** via structural analogy
e. From the demonstrative use of 底 ***dǐ*** 'this'
f. From the noun 底 ***dǐ*** 'bottom, base, foundation' via a pronominal stage, under the influence of 之 ***zhī*** and 者 ***zhě***

On the other hand, there is much less debate on the origin of the 个 *gè-type* markers of adnominal modification: they are generally understood as deriving from a generic classifier, cognate to Mandarin 个 *gè*, which in turn derives from an Archaic Chinese classifier for bamboo, 箇 *gè* (Shi & Li 2002, Lu 2013; Mei 2016). Thus, for instance, Cantonese 嘅 *ge* is said to derive from the classifier 個 *go* (Yap & Matthews 2008). Shi & Li (2002: 7) point out that, between the 11th and the 17th century, 个/箇 *gè* was used as a marker of adnominal modification also in 'mainstream' Chinese, competing with 的 *de* in this function and, also, as a demonstrative. Indeed, (near-)homophony of a demonstrative, a generic classifier, and a marker of adnominal modification is attested in a number of Wu and Gan dialects, further suggesting a close connection between these three functions: it has been proposed that generic classifiers grammaticalize into structural particles through a demonstrative stage (Mei 2016).

A third, less common type of markers for adnominal modification are those with a nasal ([n]) initial, which probably derive from a distal demonstrative: for instance, compare the Kunming

[18] On the possible origins of *l*-initial markers of adverbial modification in Wu dialects, see Lamarre (2004).

(Southwestern Mandarin) marker *nə*^{44} and the distal demonstrative *nə*^{212} 'that' (Gui 2000). These are found mostly in Southwestern Mandarin (Lu 2013), as e.g. in the Chengdu dialect (Chen Z. 2013). However, instances may be found also in Northern China, as e.g. in Wanrong (呐 *nai*; Shi 2003), a Jin dialect of Shanxi; we will get back to this below). Also, interestingly, both 'ordinary' demonstratives and classifiers may be used as marker of modification in Modern Sinitic languages: while the former are typically used in Northern dialects, the latter are typically used in some Central and Southern dialects (again, mostly Wu and Yue; Arcodia 2017). See the following Standard Chinese (30; Liu 2005: 4) and Cantonese (31; Matthews & Yip 2004: 275) examples:

(30)张作霖应该到达这天 [...]
Zhāng Zuòlín yīnggāi dàodá zhè tiān […]
Zhang Zuolin should arrive this day
'The day on which Zhang Zuolin should have arrived […]'

(31) 我寫咗(嗰)封信好長嘅
ngóh sé-zó (*gó*) *fūng* *seun* *hóu* *chèuhng* *ge*
1SG write-PFV that CLF letter very long SFP
'the letter I wrote is long'

In fact, both a demonstrative and a classifier can be used together in the same function; however, we do have a distinction between languages in which only the demonstrative is needed (like Standard Chinese), and those in which only a classifier is needed (like Cantonese).

A fourth type of markers of adnominal modification are those with an *l*-initial, which are the focus of the present study. See, for instance, the following example of the use of the particle 哩 *lei*^{31} in Heshun (a Jin dialect of Shanxi; Liu 2013: 158):

(32)这是我哩文具盒
ZHE SHI WO *lei*^{31} WENJU-HE
this COP 1SG GEN stationery-box
'This is my pencil case'

These markers have been claimed to be particularly widespread in Henan (see e.g. Chen A. 2013). While they share the same initial consonant, the rhyme of the syllable varies: the most common forms for this marker are [li], [liɛ], [lɛ], [lei], [lai], [lə], sometimes subject to further coarticulation with the modifier they combine with. Their spelling also varies: the characters used to write these particles include 的 *de*, i.e. the current grapheme for the Standard Chinese structural particle, 哩 *li* (a character used to write some particles, especially in non-standard varieties), 咧 *lie* (used to write modal particles), 嘞 *lei* (another modal particle), 奈 *nài*, and 那 *nà* (the grapheme for the distal demonstrative in Standard Chinese). Sometimes, the sources we consulted do not provide any transcription for the marker at issue (see e.g. Li 1998 on the Yuzhou dialect), and hence we can only rely on the assumption that the use of a character used

for a Standard Chinese word with an *l*-initial (e.g. 哩 *li*) indicates that the dialectal morpheme also shares that initial.[19]

In our sample, we found 31 varieties which have a marker of adnominal modification with an *l*-initial: among those, as many as 13 are Henan dialects, 7 are located in Shanxi, 6 in Shandong, 3 in Hebei, and two in Anhui; more than half of them (18) belong to the Central Plains subgroup. Of the two Anhui dialects with an *l*-initial in our sample, Yingdong belongs to the Central Plains subgroup (Jiao 2019), which may suggest continuity with Henan (just as seen in § 5 for object markers based on speech act verbs); Susong, however, is a Gan dialect (Huang 2014). This is somewhat unexpected, as all the other dialects which contain at least one of the three features at issue here belong either to the Mandarin or to the Jin group; actually, not even all subgroups of Mandarin are represented in our sample. Also, this feature seems to be absent from Shaanxi dialects, again just as seen above for object markers cognate to 叫 *jiào*. Interestingly, several occurrences of a *l*-initial marker of adnominal modification may be found in the novel 歧路灯 *Qí Lù Dēng*, which, as already mentioned, was written by a Henan author (Feng 2004; we will get back to this below). Also, in Xu's (2007) survey of modern Chinese authors, *l*-initial structural particles are found almost exclusively in Henan writers' works, with the notable exception of a few occurrences in the novel 畸人 *Jīrén* by Shaanxi-born author Lao Cun.

Differently from the object markers discussed in § 5, the characters used to write *l*-initial structural particles in descriptions do not tell us much about the possible origin(s) of this pattern. Just as seen above for 的 *de*, there are competing hypotheses as to the possible pathway of evolution of this class of structural particles (see Xiang 2001; Shi 2003; Feng 2004; Chen A. 2013), including:

a. From a distal demonstrative, with a change in the initial ([n] > [l])
b. From the same etymon as 的 *de*, with a change in the initial ([t] > [l])
c. From a localizer cognate to Standard Chinese 里 *lǐ*
d. From different sources, depending on the function, with subsequent formal merge

Thus, we see considerable overlap between the proposed pathways for the grammaticalization of 的 *de* (and related markers) and of *l*-initial structural particles, on the other hand. Specifically, for both types of markers it has been proposed that they could derive from a demonstrative, or from a localizer, or just that they may be the evolution of 的 *de*. The origin of *l*-initial markers of adnominal modification may be relevant for the assessment of their areal distribution. If we understand them as the evolution of distal demonstratives, cognate to Standard Chinese 那 *nà* 'that', then they would be the local manifestation of a more widespread phenomenon, albeit with a change in the initial from [n] to [l]. The same goes for the other proposed etymon, namely 的 *de* (with [t] > [l]). However, if we see them as the product of the reanalysis of localizers, then it would look like more a development specific to this area.

A possible connection with demonstratives has been highlighted also for 个 *gè-type* structural particles, as mentioned earlier, and we already saw that ordinary demonstratives may indeed be used as markers of modification (30). Xiang (2001) and Shi (2003) both suggest that *l*-initial

[19] Note, for instance, that Chen A. (2013) lists the above-mentioned Chengdu dialect among those with an *l*-initial structural particle. This is arguably because the character 嘞 *lei* is sometimes used to write it (e.g. in Chen Z. 2013). However, the phonological form of this particle is actually [ni^{55}] or [nɛ^{55}] (Chen Z. 2013: 222).

structural particles derive from an *n*-initial distal demonstrative, just as seen above for Southwestern Mandarin. Xiang (2001: 3) discusses data from Yiyuan, a Mandarin dialect of Shandong, in which we find the distal demonstrative 那 *nA*^{53}, the markers of adnominal modification 那 *lə* and 的 *lə* / *li*, and the nominalizer 那 *nə*. He argues that 那 *lə* evolved from 那 *nA*^{53} via an intermediate stage, *nə*, which is still reflected in its use as a nominalizer; 的 *lə* / li, on the other hand, evolved from *ti, just as Standard Chinese 的 *de*. Shi (2003) uses data from Linyi, Wanrong (see above) and other Mandarin and Jin dialects of Shanxi, showing that there seems to be some degree of overlap between the distal demonstrative and the markers of adnominal modification, independently from the initial consonant. See the data in Table 3:

Variety	Demonstrative	Marker of adnominal modification
Linyi	奈 *lai*^{44}	奈 *lai*
Wanrong	奈 *nai*^{33}	呐 *nai*
Qiji village		哩 *li*

Table 3. Distal demonstratives, markers of modification and nominalization in the Linyi area (data from Shi 2003)

Thus, Shi concludes that markers of adnominal modification derive from the use of demonstratives in that function, as shown in (30) for Standard Chinese. In her view, the demonstratives and structural particles with an *l*-initial are but the product of sound change ([n] > [l]), which occurred only in some dialects, and which can affect the distal demonstrative too (as in Linyi).

A diachronic connection between place words/localizers and structural particles has been proposed by Jiang (1999; see above). In her study of structural particles in Henan dialects, Chen A. (2013: 45) shows examples from the Song literature (11th-12th century) in which an *l*-initial localizer is apparently used to mark adnominal modification (ex. from the 三朝北盟会编 *Sān Cháo Běi Ménghuì Biān*):

(33)我国里军人厮杀八九年 [...]
wǒ guó lǐ jūnrén sī-shā bā-jiǔ nián
1sg country LOC/ASSOC soldier each.other-kill eight-nine year
'The soldiers in/of our country have been killing each other for eight, nine years [...]'

Liu (2017) also proposes that this type of structural particles derive from an *l*-initial localizer. She provides abundant examples of uses of the localizer 里 *lǐ* in 'mainstream' Chinese literary works, convincingly arguing that the use of this function word in the NP_1 - 里 *lǐ* - NP_2 construction to mark adnominal modification was already fully developed in the late Song period (i.e. 12th-13th century). This is proven by the fact that the NP_1 in the construction could be a personal pronoun, thus ruling out a locative interpretation; also, the possessee (NP_2) could be an abstract noun (Chen Y. 2007; Liu 2017). See the following example from the 大宋宣和遗事 *Dà Sòng Xuānhé Yíshì* (12th century; Liu 2017: 67):

(34)[...] 我里姓名
wǒ *lǐ* *xìng-míng*
1SG GEN surname-name
'[...] my full name'

In this construction, we see a reanalysis from predicating the existence of NP_2 in the location identified by NP_1, to predicating a possession relationship (NP_1's NP_2), according to Liu's (2017) account. Examples as (33), on the other hand, may be seen as 'bridging contexts', in which both the locative and the possessive reading are arguably available, due to the fact that NP_1 is a place word, and NP_2 is a concrete noun. The connection between the domains of 'existence' and 'possession' is indeed a common one, as shown by the many cases in which the same construction is used to express both (e.g. Standard Chinese 有 *yǒu* 'exist; have'; Chen Y. 2007). Liu also highlights that, in the Ming period (1368-1644) literature, we also find instances of 里 *lǐ* as a marker of adverbial modification, i.e. the function of Standard Chinese 地 ***de***; she points out that both uses of 里 *lǐ* as a structural particle survived only in some modern dialects.

Feng (2004) analyzes the use of 哩 *li* in the 歧路灯 *Qí Lù Dēng*, showing that it covers all the functions of Standard Chinese 的 *de*, 地 *de*, and 得 *de*. Interestingly, while in the earlier vernacular sources mentioned by Chen A. (2013) and Liu (2017), 哩 *li* is used only to mark a specific relation of adnominal modification, namely possession, as said above, in the 歧路灯 *Qí Lù Dēng* we also find instances of modification by an adjective or a verb, showing the full range of functions within adnominal modification (Chen Y. 2007; see above, Ex. 24-27). Feng believes that these uses of 哩 *li* do not derive from the localizer 里 *lǐ*, mainly because the complex stative construction (i.e. that of Standard Chinese 得 de) is too different from the NP_1 - 里 *lǐ* - NP_2 construction in which 哩 *li* should have grammaticalized. He thus suggests that 哩 *li* derives from a [t] > [l] sound change of all the three de particles, which, by the time this novel was written, were already homophonous ([*ti]).

However, Chen A. (2013) highlights that a complete formal merger of the three particles in 'mainstream' Chinese probably occurred after the Yuan period (1279 – 1368), while instances of 里 *lǐ* as a marker of adnominal modification are already attested in Song times, as seen above (33-34). Since this use for 里 *lǐ* apparently predates the merger of the three structural particles, Feng's (2004) hypothesis could be flawed. As to the fact that the marker 哩 *li* in many dialects is used also as a marker of adverbial modification and in the complex stative construction, Chen A. (2013) believes that these functions do not derive from the same source as its use as a marker of adnominal modification: while the latter does derive from the localiser 里 *lǐ*, its other two functions derive from the particles 地 *de* and 得 *de*, with sound change. Jiang (1999) notes that the marker of adnominal modification 底 *dǐ* (i.e. present-day 的 *de*) and the marked of adverbial modification 地 *de* are sometimes used in the opposite way (i.e. 底 *dǐ* for adverbial modification, 地 *dì* for adnominal modification) in the 朱子语类 *Zhūzǐ Yǔlèi*, a late Song text. This suggests that these two functions, which are found in similar constructions and are indeed similar (they both mark modification of a constituent), could be somehow 'merged'. Besides, a locative origin has been proposed also for 地 de (i.e. 地 *dì* 'place'), as said above. Indeed, we already mentioned the fact that the use of 里 *lǐ* as a marker of adverbial modification is attested in Ming period works. Thus, it could be hypothesized that the particle 哩 *li* which we find in the 歧路灯 *Qí Lù Dēng* and in the dialects considered here derives from a localizer 里 *lǐ*, at least in its function as a marker of adnominal modification. It could have then acquired by analogy the

function of a marker of adverbial modification, due to the many common features these two functions share. This could also be extended to its function in the complex stative construction, although in this case the construction involved is significantly different.

In the absence of sufficient historical documents, which anyway mostly do not provide unequivocal indications as to the actual pronunciation of those elements (due to the nature of the Chinese script and to the aforementioned practices in dialect writing), it is hard to come up with a definite answer to this question. Given that, as shown above, both demonstratives and localizers have been used in the history of Sinitic languages in constructions compatible with those of markers of adnominal modifications, with the same functions, it could also be the case that both sources are involved, depending on the dialect. As to the plausibility of a [n] > [l] sound shift for these particles, this is not unheard of in Zhongyuan Mandarin and Jin (see the Linyi data in Table 3). If we compare this to the data from Southwestern Mandarin, in which we have n-initial structural particles, which are seen as deriving from distal demonstratives, in many of those varieties, including Chengdu, the initials /n/ and /l/ mostly merged into /n/ (Yuan et al. 2001), and hence there is no point in looking for sound change. However, this distinction is retained in Kunming (Gui 2000), and here the structural particle has an *n*-initial, just as the distal demonstrative. In fact, Chen Y. (2007: 73) suggest that the structural particles in Southwestern Mandarin dialects as Chengdu or Guiyang could derive from localizers. She points out that the Chengdu structural particle *ni*^{55} is very close to the localiser *ni*^{53}, and that in Guiyang we find a structural particle *lə*^{53} and a localizer *li*^{53}; a structural particle *li*^{44} may also be found in the Chongqing dialect. However, again, we are dealing with dialects in which the /n/ vs. /l/ distinction has been mostly lost, so the significance of these data is limited.

All in all, the (limited) available evidence seems to suggest that, at least for most dialects of the area considered here, the hypothesis that markers of adnominal modification derive from a *l*-initial localizer is the most plausible, especially since distal demonstratives usually have an *n*-initial in those dialects. This may be seen, again, as an areal phenomenon, with a skewed distribution. Also, our findings provide further validation for the claim that Henan is the area in which this feature is found most often.

7. Areal convergence

After having presented the results of our survey, we may now discuss the possible reasons behind the skewed distribution of the three features considered here. Let us start from a summary of our findings. In Table 4, we show how many dialects in each province possess each feature, and also the percentage of the total number of varieties with each feature; in Table 5, we show the distribution across dialect (sub-)groups.

Feature	Number of dialects in each province and % of total							
	Henan	Shaanxi	Shanxi	Hebei	Shandong	Anhui	Hubei	Total
Reduced morphology	25 49%	4 7.8%	5 9.8%	5 9.8%	11 21.6%	0 0%	1 2%	51
OMs based on 叫 *jiào*	14 56%	0 0%	3 12%	1 4%	2 8%	3 12%	2 8%	25

L-initial structural particles	13 42%	0 0%	7 22.5%	3 9.7%	6 19.3%	2 6.5%	0 0%	31

Table 4. Distribution of the features in each province

Feature	Central Plains Mandarin	Jiaoliao Mandarin	Ji-Lu Mandarin	SW Mandarin	Jin	Gan	Total
Reduced morphology	21 41.2%	8 15.7%	6 11.7%	1 2%	15 29.4%	0 0%	51
OMs based on 叫 *jiào*	19 76%	0 0%	1 4%	2 8%	3 12%	0 0%	25
L-initial structural particles	18 58.1%	1 3.2%	3 9.7%	0 0%	8 25.8%	1 3.2%	31

Table 5. Distribution of the features in each (sub-)group

Generally speaking, our findings seem to confirm the proposed areal bias(es): there are very few instances of the features at issue outside the region comprising Henan, Shanxi, Hebei, and Shandong. The main exceptions are object markers cognate to 叫 *jiào*, which are attested in a number of Anhui and Hubei dialects (5) almost equivalent to that of Shanxi, Hebei, and Shandong (6) with this feature. Also, apart from a single instance of an *l*-initial marker of adnominal modification in a Gan dialect, and three instances of the first two features in Southwestern Mandarin dialects, the three features considered here seem to be attested only in Central Plains, Ji-Lu, and Jiaoliao Mandarin, as well as in Jin dialects. What seems to emerge from our data is that areal biases cross-cut genetic subgroupings: this is most evident for reduced/nonconcatenative morphology, which, as mentioned earlier (§ 4), is arranged in four main clusters with common features, with Jin dialects being clearly distinct depending on the cluster (i.e. Shanxi vs. Henan and Hebei Jin dialects). While the proportion varies depending on the feature at issue, it clearly appears that the distribution is strongly skewed towards Henan and the Central Plains Mandarin subgroup. An association between Henan and this subgroup is not surprising, given that the overwhelming majority of Henan dialects belong to the Central Plains subgroup. However, we may also note that the genetic bias towards Central Plains Mandarin appears to be stronger than the areal bias towards Henan for object markers based on speech act verbs (and, to a lesser extent, for *l*-initial markers of adnominal modification). In the case of object markers, we already pointed out (§ 5) that the Central Plains Mandarin dialects of Anhui and Shandong with this feature are spoken not far from the border with Henan, and the same goes for the two Southwestern Mandarin dialects of Hubei: this could be also interpreted as a continuous areal pattern.

There are also other aspects of the distribution of these features which suggest an areal bias. The only feature which is found in Shaanxi dialects is reduced/nonconcatenative morphology (the most common feature in our sample), and only in four of them. Now, Central Plains Mandarin is the dominant dialect subgroup in most of Shaanxi: nevertheless, we could not find occurrences of object markers based on speech act verbs or of *l*-initial markers of adnominal modification in this province, despite the fact that these two features (especially, object markers) could be seen as typical of Central Plains Mandarin, based on the figures in Table 5. Also, if we look at the dialects of Shandong with any of the features considered here, we may see that they belong to all the major Mandarin subgroups found in this province (i.e. Ji-Lu, Jiaoliao and Central Plains Mandarin). A similar situation applies to Hebei and Henan: the former is split (mostly) between Ji-Lu Mandarin and Jin, while the latter is split between Central Plains Mandarin and Jin (with Mandarin being dominant), but the features at issue here are found in dialects belonging to all of these groups.

Lastly, it is important to stress the fact that the three features considered here seem to be absent from much of Northern Sinitic. Not a single occurrence has been found in dialects belonging to the Northeastern, Beijing, or Lan-Yin Mandarin subgroups, and/or in dialects of the Xinjiang, Qinghai, Gansu, Ningxia, Inner Mongolia, Liaoning, Jilin, or Heilongjiang provinces, which are part of Northern Sinitic too. Note that Central Plains Mandarin is dominant also in Xinjiang, in part of Ningxia and Gansu, and Central Plains dialects are found also in Qinghai: despite the genetic connection, here we do not find even the feature(s) most biased towards this subgroup of Mandarin. Thus, with regard to these features, the area at issue here seems to stand out typologically from the rest of Northern China.

How did these features come into being, and how did they spread in the area at issue? To the best of our knowledge, the only issue which has been dealt with in the literature is the skewed distribution of reduced/nonconcatenative morphology (Arcodia 2013; 2015; Lamarre 2015; see Arcodia 2020 for an overview). As mentioned earlier (§ 4), these patterns of morphology are not typical of EMSEA languages, but we know that Northern Sinitic languages are the furthest from the EMSEA type. Ansaldo & Lim (2004) point out that in Southern varieties such as Cantonese and Hokkien, grammaticalized items may actually show signs of phonetic erosion, which is expressed in terms of shorter duration and changes in vowel quality: however, stronger reduction does not seem to occur, due to due the discreteness of syllable boundaries. Cantonese and Hokkien are syllable-timed languages which have more than one tonal register (high, mid, and low), and lack the neutral tone option: thus, according to Ansaldo & Lim, a reduction in pitch height may be misinterpreted as, for instance, a mid level tone becoming a low tone, rather than as a sign of erosion. This, however, does not apply to Northern Chinese dialects, which have neutral tone syllables, and grammaticalized items often have the neutral tone; also, they are dominated by stress. Indeed, even in Standard Chinese we may find a few items which underwent segmental reduction, as the perfective marker 了 *-le* (perfective, < 了 *liǎo* ‘finish’) and the durative marker 着 *-zhe* (< 着 *zhuó* ‘touch’; see Bisang 2008).

So, in Northern Sinitic there appear to be prosodic prerequisites for further reduction which are not usually found in Southern Sinitic: this, however, does not explain why reduced/nonconcatenative morphology has a very limited distribution in Mandarin and Jin. Also, as said earlier (§ 4, Ex. 13), some reduced/nonconcatenative morphology may be found even in a very typical syllable-timed language with no lexical stress as Cantonese, as well as in other Yue dialects. The significance of the latter arguably should not be overstated, especially since, as already mentioned, the occurrence of reduced/nonconcatenative morphology in Southern

(and Central; see Lamarre 2015) Sinitic is generally limited to tone change due to contraction, and it is mostly used for derivational functions.

The other factor which has been invoked to explain the skewed distribution of reduced/nonconcatenative morphology is language contact. Lamarre (2015) mentions that contact with (Khitano-)Mongolic, Tungusic, and Tibetic languages may have played a role in creating the phonetic and prosodic preconditions for the erosion of grammatical morphemes mentioned above (especially, as far as stress is concerned). Arcodia (2015) highlights that in the descriptions of many dialects with reduced/nonconcatenative morphology, it is mentioned that the areas where those dialects are currently spoken were populated by masses of immigrants from (present-day) Shanxi. For instance, LaPolla (2001: 228) points out that mass eastward migration from (present-day) Shanxi started as early as the end of the third century CE, when about two-thirds of the local population relocated to Hebei. Zhang (2011), in her description of the Nanhe dialect of Hebei, mentions that the area received a huge influx of immigrants from Shanxi during the Yongle period (1403-1425) of the Ming dynasty; in Xin's (2006) grammar of Xunxian (Henan), it is said that the area lost a significant share of its population due to conflicts and natural disasters in the 14th century, and received a considerable number of settlers from Shanxi between 1375 and 1405. Immigration from Shanxi is mentioned also e.g. in Ai's (2012) grammar of the Shandong Changshan dialect, and in Wu & Han's (2016) description of the Qishan dialect of Shaanxi. The influence of Shanxi phonology on dialects to the East, all the way to Shandong, has been highlighted by Qiao (2008). Xin & Zhuang (2019) discuss, again, immigration from Shanxi during Ming times, and mention destinations in Hebei, Henan, Shandong, and Anhui.

Actually, both Wang (1999) and Xin (2006) explicitly claim that reduced morphology originated in Shanxi and then spread eastwards with the dialects spoken by those immigrants. However, here they refer to derivational sound change, rather than inflectional/grammatical reduced morphology: indeed, as we already pointed out, inflectional/grammatical sound change is almost absent from Shanxi dialects. Also, mass immigration from Shanxi is reported in the descriptions of dialects which have no inflectional/grammatical sound change, but do have derivational sound change, as e.g. Heyang (Shaanxi; Xing & Cai 2010) and Wubao (Shaanxi; Xing & Wang 2014). Arcodia (2015) suggests that reduction of derivational formatives in fast/casual speech (if already existing at the times of early contact between Shanxi varieties and their eastern neighbors) could have provided a 'blueprint' on which other grammatical morphs could be reduced and fused.

However, Xin & Zhuang (2019) cast doubts on some aspects of the widespread narrative concerning the linguistic consequences of eastward migration from Shanxi. Based on historical population figures and on migration records, they show that towards the end of the Yuan dynasty there actually was migration in considerable numbers in the opposite direction, i.e. from Henan, Hebei, Shaanxi, and Shandong into Shanxi: many of the Ming period immigrants from Shanxi into those provinces were actually part of a process of (state-sponsored) return migration. Since then, due to the need to flee from natural disasters and armed conflicts, people kept moving from Henan into Shanxi and back at least until the 1930s. Moreover, according to Xin & Zhuang (2019), the different patterns of derivational sound change in Henan, Shanxi, and Hebei may be interpreted as being at a different stage of evolution, and the typical Henan pattern seems to be more 'mature', and thus older, than the Shanxi pattern; the presence of inflectional/grammatical sound change in Henan, but not in Shanxi is interpreted, again, as suggestive of a Henan origin for these morphological patterns. Xin & Zhuang also point out that derivational sound change is mostly absent from the interior of Shanxi province, and the phenomenon is not found in many areas of Shanxi from which migrants moved eastwards.

Indeed, in their survey, Xin & Zhuang (2019) list as many as 36 Henan dialects with derivational sound change, but only 18 Shanxi dialects. If Xin & Zhuang's hypothesis is correct, then reduced/nonconcatenative morphology (especially with inflectional/grammatical meanings) could have originated in Central Plains dialects, the main subgroup represented in Henan.

On the other hand, Lamarre (2015: 300) argues that contact did not play a significant role in the establishment of reduced/nonconcatenative morphology. She believes that "morphologization of verbal suffixes is rather to be linked with Northern Mandarin as an innovative area", and that the distribution of this type of exponents "is consistent with the distribution of other innovations that appeared in the same area". Arcodia (2015) suggests that the four clusters of reduced/nonconcatenative morphology seen above (§ 4) are the product of more limited areal patterns of convergence, again connected with the innovative profile of Northern Sinitic (especially, Northern Mandarin). In this respect, Henan and Southern Hebei stand out in having the highest concentration of inflectional/grammatical segmental ablaut: differently from tonal morphology, this pattern is clearly concentrated in this (sub-)area. What all of the hypotheses sketched here have in common is that they do not attribute the development of reduced morphology to contact with non-Sinitic languages (with the exception of the possible influence of 'Altaic' and Tibetic phonology), but rather to internal developments and, possibly, language contact within Sinitic.

As to object markers deriving from speech act verbs, we already pointed out that their distribution is strongly skewed towards Henan and towards Central Plains dialects. *L*-initial markers of adnominal modification are also most often found in Henan dialects and in Central Plains dialects, but they are also found in significant numbers in Shanxi and Shandong. Interestingly, among the languages in our sample, *l*-initial structural particles are found in Jin dialects of Henan, Shanxi, and Hebei, and in many Central Plains dialects of Shanxi: thus, this feature seems to follow an areal pattern, rather than a genetic pattern. However, the dominance of Central Plains dialects is evident both for object markers cognate to 叫 *jiào* and for *l*-initial structural particles. Lastly, the published analyses of the 18th century novel 歧路灯 *Qí Lù Dēng* point towards the existence of the latter two features in Henan dialects at least since the early Qing period; also, Xin & Zhuang (2019) show that derivational rhyme change may have been present in some Henan variety already in Song and Yuan times, based on the characters used to write some colloquial words in poetry.

Let us now have a look at the patterns of cooccurrence of the three features at issue. In Table 6, we list the dialects with at least two features, together with the province where they are spoken and the (sub-)group they belong to.

Dialect	Province	(Sub-)group	Reduced morphology	OMs based on 叫 *jiào*	*L*-initial structural particles
Anyang	Henan	Jin			
Dongming	Shandong	Central Plains Mandarin			
Fugou	Henan	Central Plains Mandarin			
Heshun	Shanxi	Jin			
Huojia	Henan	Jin			
Laiyang	Shandong	Jiaoliao Mandarin			
Linyi	Shanxi	Central Plains Mandarin (transitional to Jin)			
Luoyang	Henan	Central Plains Mandarin			
Nanhe	Hebei	Jin			
Nanyang	Henan	Central Plains Mandarin			
Neihuang	Henan	Central Plains Mandarin			
Pingdingshan	Henan	Central Plains Mandarin			
Pinglu	Shanxi	Jin			
Wuyang	Henan	Central Plains Mandarin			
Xiangcheng	Henan	Central Plains Mandarin			
Xunxian	Henan	Central Plains Mandarin			

Yancheng	Henan	Central Plains Mandarin			
Yexian	Henan	Central Plains Mandarin			
Yingdong	Anhui	Central Plains Mandarin			
Yuzhou	Henan	Central Plains Mandarin			
Zhengzhou	Henan	Central Plains Mandarin			

Table 6. Dialects with more than one feature in our sample

Thus, only 21 out of the 96 varieties in our sample have two or three features, suggesting a low degree of overlap. However, as pointed out earlier (§ 3), this might well be an artifact of the data. If we look at Table 6, we may notice that almost all (with only one exception) of those dialects belong either to the Central Plains Mandarin subgroup or to the Jin group: Central Plains Mandarin is dominant, with 15 varieties. Also, 14 out of 21 dialects are located in Henan, three in Shanxi, two in Shandong, and one each in Hebei and Anhui. The combination of reduced/nonconcatenative morphology and object markers based on speech act verbs and the combination of object markers based on speech act verbs and */*-initial structural particles are found only in Central Plains dialects, nearly all of which are in Henan, while the combination of reduced/nonconcatenative morphology and */*-initial structural particles is found also in Jin dialects of Shanxi, Hebei, and Henan (as well as in the only Jiaoliao dialect with two features). The only two dialects with all the three features (i.e. Fugou and Xunxian) are both Central Plains dialects of Henan. In Figure 2, we show the geographic distribution of the languages of our sample: the colors of the symbols indicate their genetic affiliation, and the shapes indicate the features they possess.

Figure 2. Distribution of the dialects of our sample[20]

Providing a unified treatment for the diffusion of all the three features at issue appears challenging for two reasons. Firstly, because reduced/nonconcatenative morphology takes different forms, and there is considerable diversity within the area (and local subpatterns of convergence). Secondly, because there are differences in the distribution of each feature. However, based on the results of our survey, we may provide a tentative hypothesis on the spread of the features considered here.

What seems to emerge from the analysis of the data is that Henan, and the Central Plains dialects, are those in which the features at issue are more common, and cooccur most often. In the above-mentioned areal typology of Sinitic (§ 2), Chappell (2015b: 47), points out that some Jiaoliao and Ji-Lu Mandarin dialects of the eastern peninsula area of Shandong with conservative features may be seen as relic zones, "manifesting features that reflect earlier periods in the development of Mandarin, where these syntactic changes have not yet reached". This is in line with the *Wellentheorie* or 'wave model' of language change, according to which an innovation radiates from a 'focal area' (where, often, a variety with social prestige is spoken): the change proceeds to a 'transitional area', in which it may show different degrees of completion; beyond that, we find 'relic zones', i.e. areas which have not been reached by the

[20] For an interactive version of the map, see https://tinyurl.com/h9us485d.

innovation (Wolfram & Schilling-Estes 2003).[21] In the case of the three features considered here, Henan appears to be, in a sense, the focal area where those features are most concentrated and, arguably, spread towards the neighboring provinces. Indeed, all of the provinces where these features are found share a border with Henan, which is located at the center of this area. While each of the three innovations spread in a somewhat different way, as discussed above, the general pattern appears to be in line with this hypothesis; also, the historical analysis provided by Xin & Zhuang (2019) provides further support.

Note, also, that we seem to have some indications that (derivational) sound change and *l*-initial markers of adnominal modification were already attested during Song and Yuan times, as mentioned earlier (§§ 4 and 6). While our knowledge of the spoken languages during that period is indeed limited, we do know that the language of the so-called 中州 ***Zhōngzhōu*** area, which largely overlaps with present-day Henan, held considerable prestige at least until the early Ming dynasty. The fact that the two features mentioned above were recorded in writing means that they had gained some degree of acceptance: thus, the relative prestige of 中州 ***Zhōngzhōu*** varieties could have favored the diffusion of these innovations. A factor which might have prevented the further spread of these features in Northern Sinitic is the rise of the Jiang-Huai Mandarin dialect of Nanjing as the basis for the prestige spoken variety during Ming times.

Note, however, that, as far as reduced/nonconcatenative morphology is concerned, this scenario may account for the diffusion of ablaut-type sound change from Henan into Hebei and, to a lesser extent, into Shanxi and Shaanxi. It is much less clear whether this may be applied also to the Centra*l*-Eastern Shandong cluster, especially given that (derivational) rhotacisation and tone change are found also elsewhere in China, as mentioned earlier. In this specific case, it may well be the case that this is an independent development.

Let us now briefly discuss the phenomena at issue here from a broader contact linguistics perspective. The features which were diffused from the Central Plains dialects of Henan to the surrounding area, if our hypothesis is correct, involve morphological patterns, both derivational and inflectional/grammatical, and function words. As pointed out by Heine & Kuteva (2005: 2), language contact may involve different kinds of linguistic transfer, including:

a. form (sounds or combinations of sounds)
b. meanings (including grammatical meanings) or combinations of meanings
c. form-meaning units or combinations of form-meaning units
d. syntactic relations (i.e. the order of meaningful elements)
e. any combination of the above

Heine & Kuteva distinguish between 'borrowing', which involves either a. or c., and 'replication', which involves either b. or d. (i.e. transfer that does not involve phonetic substance): in replication, "speakers create a new grammatical meaning or structure in language R on the model of language M by using the linguistic resources available in R" (Heine & Kuteva 2010: 86). Grammatical replication is further divided into two subtypes, namely 'contact-induced grammaticalization' and 'restructuring', i.e. grammatical replication "due to processes other than grammaticalization" (Heine & Kuteva 2005: 38).

How do the categories involved in our study fit in this classification? In the case of reduced morphology, what seems to be shared is not a specific form or form-meaning pairing, but rather

[21] Needless to say, the 'status' of being a focal or a spread area is relative to the innovation at issue: an area may be designated as a relic area for a specific change, but can also be the focal area for another innovation (Wolfram & Schilling-Estes 2003).

a set of marking patterns (patterns of exponence): it is highly likely that the morphemes which got reduced share the same etyma in the dialects involved, no new grammatical meaning was developed due to contact, and apparently no specific form was borrowed (the phonetic shape of reduced morphology varies considerably; see e.g. Table 1 in Xin & Zhuang 2019: 515). Hence, it could be claimed that, in this case, what was 'borrowed' are 'abstract accommodation patterns' (Gardani 2020), with some (greater or smaller, depending on the specific instance) degree of formal overlap.

As to the use of object markers based on cognates of 叫 *jiào*, we see that a verb with (arguably) the same etymon grammaticalized into a functional element in genetically related languages. This could be interpreted either as a case of contact-induced grammaticalization, leading to a "grammaticalization area", or as a "gram family", i.e. a shared grammaticalization pattern among related languages which is at least partly due to genetic inheritance (as e.g. the grammaticalization in many Romance languages of "a pattern consisting of an auxiliary 'have' plus an infinitival main verb to an obligative and eventually to a future tense category", ultimately originating from Latin; Heine & Kuteva 2005: 184). Given that the development at issue seems to be absent from other Chinese dialects, it is quite likely that it qualifies as a grammaticalization area: this hypothesis is supported also by the fact that there are very few occurrences of 叫 jiào as an object marker in (non-Henan) written sources, and even those few instances are actually ambiguous, as mentioned above (Section 5).

Lastly, the use of *l*-initial markers of adnominal modification could be either interpreted as a plain case of borrowing of a function word (c.), or as a shared pattern of grammaticalization. In the latter case, once again, there are two possibilities, namely a gram family and a grammaticalization area, depending on whether the evolution of these formatives began before or after the separation of these dialects. This type of assessment, however, depends on which source we believe to be the correct one for this class of structural particles. If we assume that *l*-initial markers of adnominal modification derive from a localizer (里 *li*), then the hypothesis that these particles are part of a gram family seems plausible, given that this usage is attested in the mainstream Chinese literature at least since the 12th century, as said earlier (Section 6). Also, in the absence of more historical data, and in the almost complete lack of data on spoken varieties, we cannot rule out that multiple processes were involved: some dialects might have simply carried on a grammaticalization process which had already begun before the separation of different subgroups of Mandarin had been completed (i.e. the gram family scenario); in some others, contact-induced grammaticalization might have occurred; and yet others might have just borrowed a function word.

8. Summary and concluding remarks

In this paper, we discussed the distribution of three typological features which appear to have a skewed distribution within Sinitic. Through the analysis of our sample, we showed that there are clear areal biases in the diffusion of these three features: despite the fact that each of them has a somewhat different distribution, they all seem to be significantly more frequent in Henan, and in Central Plains Mandarin dialects. Also, while the three features at issue cooccur only in a limited number of varieties in our sample (21 out of 96, with only two varieties with all the three features), the dialects with more than one feature are mostly located in Henan as well, again showing a clear trend. Besides Henan, the features considered here are found in a non-trivial number of Shanxi, Hebei, and Shandong dialects, belonging to the Jin group or to the Central Plains, Ji-Lu, and Jiaoliao subgroups of Mandarin. We also found scattered attestations

in Shaanxi, Anhui, and Hubei, as well as in Southwestern Mandarin dialects (and in one Gan dialect). No attestations were found in the rest of Northern China, or elsewhere in Central and Southern China (with the notable exception of tonal morphology e.g. in Yue dialects).

We discussed the possible reasons behind this skewed distribution, taking into account both diachronic and synchronic data. Contact with non-Sinitic languages does not seem to have played a strong role in the development of those three features, with the (possible) exception of the creation of the prosodic preconditions (mainly, stress) for the reduction of morphemes, arguably favored by contact with (Khitano-)Mongolic, Tungusic, and Tibetic languages. On the other hand, we believe we should consider the possibility that these phenomena originated in the Central Plains dialects of Henan and then spread outwards, albeit with differences depending on the specific feature. In a wave model scenario, Henan could have been the focal area from which these features were diffused: indeed, they are attested only in its neighboring provinces, despite the fact that the overwhelmingly dominant subgroup of Mandarin in Henan, i.e. Central Plains Mandarin, is found also elsewhere. We may hypothesize that these features began to be spread at a time when 中州 ***Zhōngzhōu*** varieties enjoyed considerable prestige, but failed to gain a broader diffusion.

Lastly, we hope to have shown that the languages of Northern China are more diverse than what is usually claimed in the literature. If our hypothesis is correct, this would be another instance of contact-induced change in Sinitic in which non-Sinitic languages do not seem to play a role. Also, the features discussed here appear to be innovations, in line with the profile of Mandarin dialects (especially, Central Plain Mandarin).

Unfortunately, there are some inevitable shortcomings in the research presented in this paper. The main issue concerns the quality and coverage of the data. As already pointed out (§ 3), we would need complete grammars, text samples or first-hand data from each variety to provide a reliable assessment of the presence or absence of a feature. The fact that a feature is not mentioned in the sources we consulted does not necessarily entail that it is not attested; it might just be unreported. Also, we cannot exclude that, given that the features at issue are claimed to be concentrated in specific areas of China, this might have led to a bias in research (i.e. not looking for them elsewhere due to negative expectations). Thus, future research might show that the features considered here have a wider distribution.

Appendix 1. List of languages in our sample with the indication of the features they possess[22]

Language	**Province**	**(Sub-)group**	**Reduced morphology**	**OMs based on 叫 *jiào***	***L*-initial structural particles**
Anqiu	Shandong	Jiaoliao Mandarin	Y		
Anyang	Henan	Jin	Y	N	Y
Baihe	Shaanxi	Central Plains Mandarin	N	N	N
Boshan	Shandong	Ji-Lu Mandarin	Y	N	
Changge	Henan	Central Plains Mandarin	Y		

[22] In Appendix 1, 'Y' means that we have evidence that the feature is present, 'N' means that we have evidence that the feature is absent. For all those cases in which we lacked (enough) data to assess whether a given feature is present or not, we left a blank cell.

Changli	Hebei	Ji-Lu Mandarin	N	N	N
Changshan	Shandong	Ji-Lu Mandarin	Y	N	
Changzhi	Jin	Shanxi	N	N	N
Danjiangkou	Hubei	Southwestern Mandarin		Y	
Datong	Shanxi	Jin	N	Y	N
Dongming	Shandong	Central Plains Mandarin	Y		Y
Fangcheng	Henan	Central Plains Mandarin		Y	
Fengqiu	Henan	Central Plains Mandarin	Y		
Fengxiang	Shaanxi	Central Plains Mandarin	Y		N
Fugou	Henan	Central Plains Mandarin	Y	Y	Y
Guangling	Shanxi	Central Plains Mandarin		N	N
Gucheng	Hebei	Ji-Lu Mandarin		Y	
Gushi	Henan	Central Plains Mandarin		Y	
Haiyang	Shandong	Jiaoliao Mandarin	Y		
Hebi	Henan	Jin	Y		
Heshun	Shanxi	Jin	Y		Y
Heyang	Shaanxi	Central Plains Mandarin	N	N	N
Huaxian	Henan	Central Plains Mandarin	Y	N	
Huixian	Henan	Jin	Y		
Huojia	Henan	Jin	Y	N	Y
Huolu	Hebei	Jin	N		Y
Jiaocheng	Shanxi	Jin	N	N	N
Jinxiang	Shandong	Central Plains Mandarin	N		Y
Jiyuan	Henan	Jin	Y		
Jizhou	Hebei	Ji-Lu Mandarin	Y		
Juxian	Shandong	Jiaoliao Mandarin	Y		
Kaifeng	Henan	Central Plains Mandarin	Y	N	
Laiyang	Shandong	Jiaoliao Mandarin	Y		Y
Linfen	Shanxi	Central Plains Mandarin (transitional to Jin)	N	N	N

Linxian	Shanxi	Jin		N	N
Linyi	Shanxi	Central Plains Mandarin (transitional to Jin)	Y		Y
Linzhou	Henan	Jin	Y		
Luoyang	Henan	Central Plains Mandarin	Y	N	Y
Lushan	Henan	Central Plains Mandarin		Y	
Mengcheng	Anhui	Central Plains Mandarin		Y	
Muping	Shandong	Jiaoliao Mandarin	Y		
Nanhe	Hebei	Jin	Y	X	Y
Nanyang	Henan	Central Plains Mandarin	N	Y	Y
Neihuang	Henan	Central Plains Mandarin	Y		Y
Pingdingshan	Henan	Central Plains Mandarin	Y	N	Y
Pingli	Shaanxi	Southwestern - Jianghuai Mandarin hybrid	N	N	N
Pinglu	Shanxi	Jin	Y		Y
Puyang	Henan	Central Plains Mandarin	Y		
Qingdao	Shandong	Jiaoliao Mandarin	Y	N	
Qishan	Shaanxi	Central Plains Mandarin	Y	N	N
Qixia	Shandong	Jiaoliao Mandarin	Y		
Qixian (淇县)	Henan	Jin	Y		
Qixian (祁县)	Shanxi	Jin	Y		
Queshan	Henan	Central Plains Mandarin		Y	
Quwo	Shanxi	Central Plains Mandarin	N		Y
Shangxian	Shaanxi	Central Plains Mandarin	Y		
Shenmu	Shaanxi	Jin	N	N	N
Shuochengqu	Shanxi	Jin			Y
Suixi	Anhui	Central Plains Mandarin		Y	
Susong	Anhui	Gan			Y
Taiyuan	Shanxi	Jin	N	Y	N
Tancheng	Shandong	Central Plains Mandarin		Y	
Tangyin	Henan	Jin	Y		

Tianzhen	Shanxi	Jin		N	Y
Wanrong	Shanxi	Jin	N	N	N
Weihui	Henan	Jin	Y		
Wubao	Shaanxi	Jin	N	N	N
Wuyang	Henan	Central Plains Mandarin	Y	Y	
Wuyi	Hebei	Ji-Lu Mandarin	Y		
Xi'an	Shaanxi	Central Plains Mandarin	Y	N	N
Xiangcheng (项城)	Henan	Central Plains Mandarin		Y	Y
Xiangcheng (襄城)	Henan	Central Plains Mandarin		Y	
Xiangfan	Hubei	Southwestern Mandarin		Y	
Xichong	Sichuan	Southwestern Mandarin	N	N	N
Xingtai	Hebei	Ji-Lu Mandarin	Y		
Xingyang	Henan	Central Plains Mandarin	Y		
Xinji	Hebei	Ji-Lu Mandarin			Y
Xintai	Shandong	Ji-Lu Mandarin			Y
Xinxiang	Henan	Jin	Y		
Xinyang	Henan	Central Plains Mandarin		Y	
Xinzhou	Shanxi	Jin		N	N
Xiping	Henan	Central Plains Mandarin		Y	
Xunxian	Henan	Central Plains Mandarin	Y	Y	Y
Yancheng	Henan	Central Plains Mandarin	Y		Y
Yanggu	Shandong	Central Plains Mandarin			Y
Yanjin	Henan	Jin	Y		
Yexian	Henan	Central Plains Mandarin		Y	Y
Yicheng	Hubei	Southwestern Mandarin	Y		
Yingdong	Anhui	Central Plains Mandarin		Y	Y
Yiyuan	Shandong	Ji-Lu Mandarin			Y
Yuncheng	Shanxi	Central Plains Mandarin	Y	N	N

Yuzhou	Henan	Central Plains Mandarin		Y	Y
Zaozhuang	Shandong	Central Plains Mandarin		Y	
Zhaoxian	Hebei	Ji-Lu Mandarin	Y		
Zhengzhou	Henan	Central Plains Mandarin	Y	N	Y
Zhifu (Yantai)	Shandong	Jiaoliao Mandarin	Y		

Appendix 2. List of languages in our sample with the indication of the sources consulted

Language	**Article(s) or mention in book**	**Grammar(s)**
Anqiu	Li (2018)	
Anyang	Huang (1996); Xin (2006)	
Baihe		Ke (2013)
Boshan	Chen (2006)	
Changge	Zhao (1998)	
Changli		Committee (1984)
Changshan	Ai (2012)	
Changzhi	Hou & Wen (1993); Li & Chappell (2013a)	
Danjiangkou	Li & Chappell (2013a)	
Datong	Hou & Wen (1993); Li & Chappell (2013a)	Ma & Liang (1986)
Dongming	Huang (1996)	
Fangcheng	Liu (2016)	
Fengqiu	Zhang (2010)	
Fengxiang	Wang J. (2012)	
Fugou	Cao (2008); Liu (2016)	
Guangling	Hou & Wen (1993)	
Gucheng	Xu (2016)	
Gushi	Zhang (2016)	
Haiyang	Huang (1996)	
Hebi	Xin (2006)	

Heshun	Liu (2013)	
Heyang		Xing & Cai (2010)
Huaxian	Xin (2006); Hu & Gan (2015)	
Huixian	Wu (2020)	
Huojia		He (1989)
Huolu		Chen (1990)
Jiaocheng	Shi & Wang (2009); Li & Chappell (2013a)	
Jinxiang		Ma (2000)
Jiyuan	Liu (2006)	
Jizhou	Lamarre (2009)	
Juxian	Li & Ai (2008)	
Kaifeng	Wang Z. (2011); Li & Chappell (2013a)	
Laiyang	Zhang & Li (2007)	
Linfen	Hou & Wen (1993); Li & Chappell (2013a)	
Linxian	Hou & Wen (1993); Li & Chappell (2013a)	
Linyi	Shi (2003); Xin & Zhuang (2019)	
Linzhou	Chen Pengfei (2005, 2007); Xin & Zhuang (2019)	
Luoyang		He (1993)
Lushan	Zhang (2005)	
Mengcheng	Hu (2009)	
Muping	Huang (1996)	
Nanhe	Zhang (2011)	
Nanyang	Wang (2003); Fan (2010)	
Neihuang	Xin (2006); Li (2016)	
Pingdingshan	Yang (2014); Xin & Zhuang (2019)	
Pingli		Zhou (2009)
Pinglu	Gao (2014); Zhao (2016)	
Puyang	Xin (2006)	
Qingdao	Sun (2016)	

Qishan	Wu & Han (2016)	
Qixia	Liu & Shi (2004), Zhang & Li (2007)	
Qixian (淇县)	Xin (2006)	
Qixian (祁县)	Wang (1992)	
Queshan	Cao (2008)	
Quwo	Hou & Wen (1993); Li (2014)	
Shangxian	Huang (1996)	
Shenmu		Xing (2002)
Shuochengqu	Jiang (1991)	
Suixi	Cao (2008)	
Susong	Huang (2014)	
Taiyuan	Hou & Wen (1993); Li & Chappell (2013a)	
Tancheng	Yan & Xu (2005)	
Tangyin	Xin (2006)	
Tianzhen		Xie (1990)
Wanrong	Hou & Wen (1993); Cao (2008)	Wu (2002)
Weihui	Xin (2006); Wu (2020)	
Wubao		Xing & Wang (2015)
Wuyang	Zhang (2005); Li (2017)	
Wuyi	Zhang (2019)	
Xi'an		Sun (2007); Lan (2011)
Xiangcheng (项城)	Wang H. (2012)	
Xiangcheng (襄城)	Shi & Wang (2009)	
Xiangfan	Wei (2004)	
Xichong		Wang C. (2011)
Xingtai	Li (2019a-b)	
Xingyang	Wang (1998)	
Xinji	Jiao (2013)	

Xintai	Cui et al. (2020)	
Xinxiang	Liu (2006); Wu (2020)	
Xinyang	Liu (2016)	
Xinzhou	Hou & Wen (1993)	Wen (1985)
Xiping	Cao (2008)	
Xunxian	Xin (2006a-b); Li & Chappell (2013a)	Xin (2006)
Yancheng	Zhang & Pan (2013)	
Yanggu	Wang (2010)	
Yanjin	Xin (2006)	
Yexian	Zhang (2005)	
Yicheng	Hu & Liu (2020)	
Yingdong	Jiao (2019)	
Yiyuan	Xiang (2001)	
Yuncheng	Hou & Wen (1993); Li & Chappell (2013a)	
Yuzhou	Li (1998); Cao (2008)	
Zaozhuang	Li & Chappell (2013)	
Zhaoxian	Li (2013)	
Zhengzhou	Zhou (1987); Lu & Guo (1998)	Lu (1992)
Zhifu (Yantai)	Liu (2013)	

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