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Konoshenko, Maria

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Maria Konoshenko*

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Abstract: This paper explores how grammatical tones (GTs) are organized into inflectional paradigms in a sample of 20 Mande languages (Niger-Congo), where tonal morphology plays a central role in the expression of TAMP meanings. Adopting the Canonical Typology approach, I assess the degree of canonicity in Mande GTs based on their formal and semantic properties. I show that verbal grammatical tones are mainly realized as replacive in Mande; they are independent from segmental morphemes and may be strongly influenced by surface phonology. Verbal GTs tend to be used in idiosyncratic sets of TAMP constructions and form phonologically determined inflectional classes in Mande, as in many other African languages. I argue that GTs attested in Perfective and Irrealis constructions in modern Mande languages are likely to be an old phenomenon already present in Proto Mande. The consistency of morphological tone assignment in Mande verbs suggests that GTs may be genetically quite stable morphological markers.

Keywords: inflectional classes; microtypology; Niger-Congo; syncretism; transformational exponence

Abstract in N'Ko:

[illegible]

1 Introduction

Grammatical tone (henceforth GT) is a cover term for "tonological operations that are not part of the general phonological system and are only licensed by specific

***Corresponding author: Maria Konoshenko**, University of Helsinki, Helsinki, Finland,
E-mail: eleiteria@gmail.com. https://orcid.org/0000-0002-4460-2148

grammatical conditions" (Rolle 2018: 2). For example, in Mwan [iso:moa], the verb **pɔ́** 'cut down' receives a grammatical Mid {M} tone in the Habitual form[1] as shown in (1):

(1) Mwan (Southern Mande; Perekhvalskaya 2017a: 731)

Ń̩	**yɔ̄**	**pɔ̄**	**á̰**	**zɔ̄**	**lé**
1SG	palm	cut_down\HAB	1SG	pickaxe	with

'I (usually) cut down a palm with my pickaxe'.

GTs, sometimes also labelled melodic or inflectional tones, are particularly common in languages of Sub-Saharan Africa and Southcentral Mexico (Welmers 1973; Palancar and Léonard 2016); cf. Rolle's (2018: 35–40) overview of areal patterns in GTs in world languages, see also Hyman (2011) and Konoshenko (2017a) for a more general discussion of the phenomenon. An overview of GTs in Bantu verbal morphology can be found in Odden and Bickmore (2014); for a study of GTs in the Dogon languages see McPherson (2014). Although GTs have been occasionnally discussed in the morphological literature (Baerman et al. 2017: 21–23; Hyman and Leben 2000; Trommer and Zimmermann 2015: 50–52, 58), their cross-linguistic patterning has been little studied to date, neither as an object of morphological theory, nor from the historical and comparative point of view. Rolle (2018) provides a systematic theoretically driven study of GT, but he only considers the phenomena that can be accounted for in terms of dominance effects and leaves aside many other crucial types of GT that cannot be easily incorporated into his model (Rolle 2018: 104–112), e.g., the tonal phenomena that he calls "construct tunes" and "paradigmatic tones", cf. Section 2.2 for details.

This paper studies how GTs function in the Mande language family (Niger-Congo, West Africa) by focussing on the paradigmatic patterning of GTs in Mande verb paradigms. In order to explore how formal and semantic properties of GTs vary in Mande, I adopt the so-called Canonical Typology approach (Bond 2018; Brown et al. 2013; Corbett 2005) while making the morphological model of canonical inflectional paradigms (Corbett 2009) meet the existing typology of GTs (Rolle 2018).

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1 I use the following conventions throughout this paper to indicate tone on a given tone bearing unit (TBU): Superhigh (SH) ő, High (H) ó, Mid (M) ō, Low (L) ò, and Superlow or Extralow (SL) ȍ. Any contours are shown as sequences of these diacritics. Underlying tones are shown in slash brackets //, replacive grammatical tones in curly brackets {}, and surface tones in square brackets [ ], wherever applicable. Floating tone is given in upper case: /L^{H}/. Downstep is marked by an arrow $^{↓}$. GTs having a single function are glossed by the morphosyntactic feature they mark, e.g., Mwan **pɔ̄** cut_down\HAB, cf. Section 4.1. Syncretic, i.e. multifunctional GTs are glossed with their phonological specification, e.g., Guinean Kpelle **kàà** see\L, cf. Section 4.2. By default, language examples are represented with morphophonological tones, i.e. reflecting lexical as well as grammatically assigned tones but not surface ones. I would like to thank two anonymous reviewers for their valuable questions and comments, as well as Ibrahima Sory 2 Condé for translating the abstract of my paper into Nko.

I demonstrate that Mande data generally support the claim made by Hyman (2011), and Lionnet and Hyman (2018) that GTs tend to be highly sensitive to surface phonological rules. I further show that, contrary to Rolle's (2018) view of GTs as mostly triggered by floating tones, Mande verbal GTs are not predictable from the input and they do not correlate with segmental morphemes. Mande verbal GTs display multiple instances of non-canonical morphological marking, involving tonal syncretism and inflectional tonal classes. This study also reveals that GT marking is quite diverse across Mande branches and even within specific groups. I attribute this variation to the general instability of TAMP systems, later phonological innovations and semantic change. Finally, contrary to Vydrin's (2012) claim that verbal GTs have recent segmental sources in Mande, I argue that a replacive {L} marking the verb in the Perfective and some Irrealis constructions may have already been present in Proto Mande.

This study is based on data from 20 languages from all the relevant Mande branches, cf. Appendix A. The sampling is based on whether a given language has GTs in its verbal morphology, hence only languages *displaying* verbal GTs are included. Most data analyzed in the paper were taken from "The Mande languages" volume (Vydrin et al. 2017) containing detailed grammar sketches of various Mande languages. Since it was published in Russian, the descriptions remain inaccessible to larger linguistic audience and an additional goal of this paper is to share some data from the volume with those who do not read Russian.

The paper is organized as follows. In Section 2, I present Corbett's (2005, 2009) model of canonical inflection and Rolle's (2018) typology of GTs, the two approaches combined in my study. In Section 3, I provide background information on Mande languages, their tone systems and grammatical profile. I then discuss how GTs may interact with surface phonology by presenting a specific case from Guinean Kpelle and summarizing the theoretical assumptions behind this study. Section 4 presents the synchronic morphological typology of GTs in Mande verb paradigms. Sections 5 discusses the diachronic development of GTs in Mande. Section 6 concludes the paper.

2 A Canonical approach to inflectional paradigms and grammatical tones

The Canonical Typology approach assumes that real linguistic data are compared with a predefined theoretical space containing a canonical ideal (Corbett 2005). A clear set of criteria can be applied to estimate how a given pattern diverges from the canon, cf. Corbett (2009), Brown et al. (2013), Baerman (2015), Bond (2018) and references therein. In this section, I define the two canonical concepts relevant for the present study: canonical inflection (Section 2.1) and canonical GT (Section 2.2).

2.1 Canonical inflection

A canonical inflection involves "a unique mapping from form to function, and from function to form" (Corbett 2009: 1), cf. also Baerman (2015: 141). As Corbett (2005: 33) argues, in the canonical inflection, every cell is filled with some inflectional material associated with a particular morphosyntactic meaning, each form is different, both the stem and the inflectional material are predictable and, crucially, the composition of forms and the inflectional material are the same across different lexemes of the same category. This is the case for Standard Italian adjectives as demonstrated in Table 1.

The deviations from the canonical situation outlined above are well-known in inflectional morphology (Baerman 2015, inter alia). Among those, two are of interest for the present study. *Syncretism* is posited when a single inflected form corresponds to more than one morphosyntactic meaning, i.e. the same form occurs in several cells of a paradigm (Baerman 2015; Baerman et al. 2005; Carstairs 1984). When inflectional material is different for different lexemes, we deal with *inflectional classes* (Corbett 2009; Stump 2015). Both syncretism and inflectional classes are illustrated for a subset of Russian nominal forms in Table 2.

Table 2 features two Russian nouns, **imam** 'imam' (a loanword from Arabic that has fully acquired Russian morphology) and **mama** 'mother'. In the paradigm of **mama**, the **mamy** form is syncretic, since it appears in Genitive Singular and in Nominative Plural. The two lexemes belong to different inflectional classes, since they have different sets of endings. Note that their endings only coincide in Nominative Plural, cf. **imam-y**$_{\text{NomPl}}$, **mam-y**$_{\text{NomPl}}$.

Table 1: Adjective forms in Standard Italian.

Lexeme	nuovo 'new'		bello 'beautiful'	
	Singular	Plural	Singular	Plural
Masculine	**nuov-o**	**nuov-i**	**bell-o**	**bell-i**
Feminine	**nuov-a**	**nuov-e**	**bell-a**	**bell-e**

Table 2: Syncretism and inflectional classes in Russian nouns.

Lexeme	imam 'imam'		mama 'mother'	
	Singular	Plural	Singular	Plural
Nominative	**imam**	**imam-y**	**mam-a**	**mam-y**
Genitive	**imam-a**	**imam-ov**	**mam-y**	**mam**

2.2 Canonical GT

In his typological study, Rolle (2018: 20) defines GT as "a tonological operation which is not general across the phonological grammar, and is restricted to the context of a specific morpheme or construction, or a natural class of morphemes or constructions". Rolle further classifies GT phenomena, with a high-level split in his typology based upon the appearance of morphological dominance effects, in the spirit of Inkelas (1998), versus the absence of such effects.

Dominant GT involves the morphologically-driven modification of underlying tone from some base (i.e., the target) in the presence of another (i.e., the trigger). There are two further subtypes of dominant GTs depending on how the tone of the target is modified: *replacive-dominant* GTs are realized via tonal replacement, while *subtractive-dominant* GTs involve deletion of the underlying tone. Crucially, Rolle (2018: 4) claims that most instances of replacive-dominant GT involve a floating tone or tone spreading, which is either associated to a given construction as shown in (2) for Igbo [iso:ig], or a specific morpheme labelled as the GT sponsor, cf. (3) from Kalabari [iso:ijn].

(2) a. Central Igbo (Igboid; Hyman and Schuh 1974: 98–99 via Rolle 2018: 22)
àgbà + Ⓗ + **èŋwè** → **àgbá èŋwè** 'jaw of monkey'
b. Aboh Igbo (Igboid)
ẹ̀gbà + Ⓗ + **èŋwè** → **ẹ̀gbà éŋwè** 'jaw of monkey'

In Igbo, an associative construction is marked by a floating ^{H} occurring between the nouns and docked to the first noun (2a) or the second one (2b) depending on the dialect.

(3) Kalabari (Ijoid; Harry and Hyman 2014: 6 via Rolle 2018: 21)

		/mí / 'this' (neut.)	/mí$^{\downarrow}$ná / 'these'
		[H **LH**]	[H$^{\downarrow}$H **LH**]
a.	HH / **námá** / 'meat'	**[mí nàmá]**	**[mí$^{\downarrow}$ná nàmá]**
b.	LL / **pùlò** / 'oil'	**[mí pùló]**	**[mí$^{\downarrow}$ná pùló]**
c.	HL / **bélè** / 'light'	**[mí bèlé]**	**[mí$^{\downarrow}$ná bèlé]**
d.	LH / **gàrí** / 'garri (food)'	**[mí gàrí]**	**[mí$^{\downarrow}$ná gàrí]**
e.	H$^{\downarrow}$H / **ɓá$^{\downarrow}$rá** / 'hand'	**[mí ɓàrá]**	**[mí$^{\downarrow}$ná ɓàrá]**

In Kalabari, demonstratives trigger replacive {LH} tones on the heads, hence the former, labelled GT sponsors, are analyzed as having an underlying ^{LH} floating tone realized on the GT hosts.

Although Rolle himself does not apply the term "canonical" to his definition of GT, he still implies the idea of canonicity by labelling other types of GT as non-

canonical. Overall, his approach to GT is based on the idea that a (canonical) GT involves a tonological operation with clearly identifiable components, i.e. "trigger"/ "sponsor" versus "target"/ "host", a consistent tone melody, or a "grammatical tune" in Rolle's terms, and those components are consistent across parallel grammatical contexts. He then mentions other types of GT that cannot be easily interpreted in terms of straight dominance effects and could be viewed as less canonical in this respect, or even constitute "the outer limits of grammatical tone" (Rolle 2018: 104). Of these non-canonical cases, *the construct tune* and *the paradigmatic tone* are most relevant for the present study.

The construct tunes involve grammatically induced tone changes on lexical roots, with some particular characteristics: (a) there is no clear segmental affixal trigger; (b) the construct tune is not fully predictable from the input; (c) it only affects the root and not other morphemes; (d) there is just one such form, regardless of the grammatical context, cf. Rolle (2018: 105–109) for further details. This may happen with nouns and verbs as well, a typical context for construct tune on nouns being with a modifier. In contrast, construct tunes on verbs are licensed in an idiosyncratic set of grammatical environments, I will illustrate this latter case here. Thus, in Ganza [iso:gza], an Omotic language, verbs can surface with an underlying or a construct tune, the choice between these options being idiosyncratic for particular constructions. For example, the verb is realized with its underlying tune in the Nominalized form and in Imperative, while the construct tune appears in the Future / Purpose as well as in Relative clauses (Smolders 2016 via Rolle 2018: 106–109).

The second relevant type of non-canonical GT are "paradigmatic tones" involving the alternation of root tone that shows inconsistencies across various grammatical features and lexemes belonging to the same category (Rolle 2018: 109), cf. Aronoff's (1994) notion of morphome. Rolle explicitly speaks of morphological inflectional classes based on sets of grammatical tonal changes across different lexemes, while drawing his approach on Palancar's (2016) typology of inflectional tone. Rolle (2018: 109–110) further cites a case from an Otomanguean language Yaitepec Chatino [iso:ctp] as discussed by Palancar (2016). In Yaitepec Chatino, there are 10 tonemes that express grammatical categories. Table 3 shows two subparadigms for the two verbal lexemes, **xnu** 'leave behind' and **swi** 'choose'.

In Table 3, the rows indicate aspect-mood values, and the columns represent person features of subject. In both verbs, the segmental shape of the verb form is consistent across different aspect values, i.e. **xnu** is realized as [nxnu] and **swi** as [nswi] in the Habitual. However, the tonal patterning is more complex: while tone covaries with person for **xnu**, there are several tone features in the first and third person forms of **swi**. Hence the two verbs belong to two different tonal inflectional classes.

To sum up, paradigmatic tone is directly modeled via morphological inflectional classes, as Rolle (2018) acknowledges himself, and I would also argue that Rolle's

Table 3: Paradigmatic tones in Yaitepec Chatino (Palancar 2016 via Rolle 2018: 110).

	xnu 'leave behind'			swi 'choose'		
	1st	2nd	3rd	1st	2nd	3rd
HAB	nxnu^{21}	nxnu^{31}	nxnu^{1}	nswi^{3}	nswi^{31}	nswi^{43}
POT	xnu^{21}	xnu^{31}	xnu^{1}	swi^{3}	swi^{31}	swi^{43}
CPL	nwxnu^{21}	nwxnu^{31}	nwxnu^{1}	nwswi^{3}	nwswi^{31}	nwswi^{1}
PROG	nxnu^{21}	nxnu^{31}	nxnu^{1}	nswi^{2}	nswi^{31}	nswi^{1}

construct tune discussed further above can be viewed as an instance of morphological syncretism, at least in verbal morphology. Thus both notions represent a deviation from the canon, which is a canonical inflection in morphology and a canonical GT in tonology. Still, it should be noted that the two corresponding canons are approached differently by Corbett (2005) and Rolle (2018), since Corbett's inflection is a very general notion, and Rolle's modelling of GTs is more technical and theoretically charged.

In the discussion below, I broadly classify the verb tones in Mande according to Corbett's (2005) approach as canonical, syncretic and paradigmatic, while bearing in mind how synretism and inflectional classes are reflected in Rolle's (2018) typology. In Section 4 below, I show that Mande languages have all the three types of GT markers.

3 Mande tonology: grammatical tones and phonological tone rules

In Section 3.1, I provide general background information on Mande languages and their tone systems including tonal morphology. In Section 3.2, I turn to a more specific case of Guinean Kpelle showing how GTs interact with phonological tone rules in this language, and how I approach such cases in this study.

3.1 Background on Mande

The Mande family comprises around 70 languages spoken in West Africa (Hammarström et al. 2020) extending from Senegal in the West up to Nigeria in the East. The internal classification of the family is fairly well established, with some controversies on the mid-taxa groupings (Kastenholz 1997; Vydrin 2009, 2016a). In this study, I follow Vydrin's (2009, 2016a) genetic classification as shown in Figure 1.

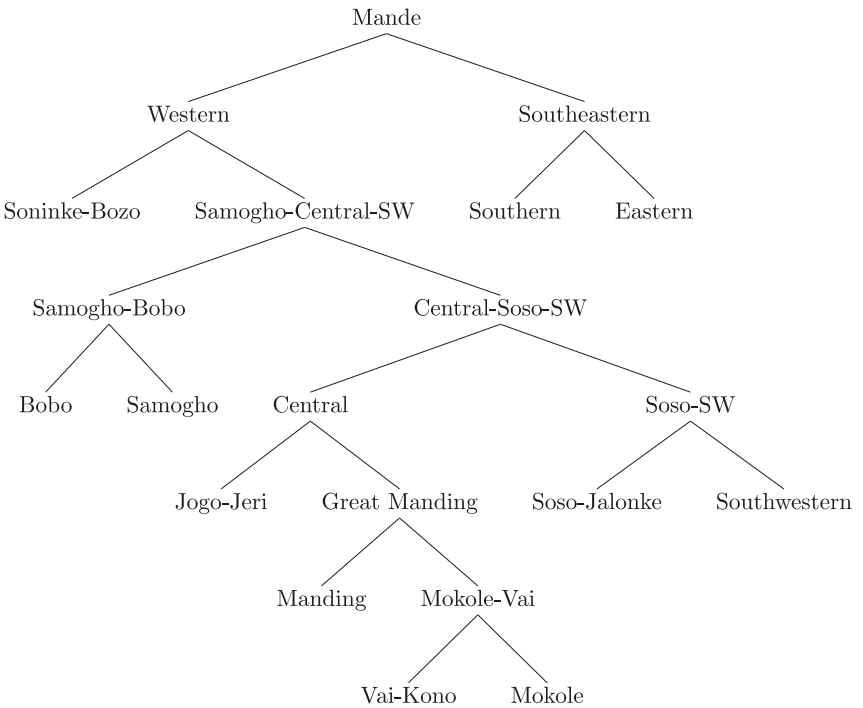

Figure 1: Mande internal family classification based on Vydrin (2009, 2016a).

All Mande have a rigid SAux(O)VX structure. TAMP meanings are typically encoded by specific "constructions" involving the Aux, or predicative, marker and the verb, which appears either in its base form, or bearing segmental and/or tonal markers. In various branches of Mande, subject person markers are fused with Aux markers, resulting in morphologically complex S/Aux markers (Konoshenko 2020), cf. (4ab) from Guinean Kpelle [iso:gkp].

(4) Guinean Kpelle (Southwestern Mande; Konoshenko 2017c: 305, 309)

a. **ŋă** **kpèlɛ̀ɛ̀-wòò** **ɓò**
1SG.HAB Kpelle-language\L speak\L
'I speak Kpelle'.

b. **vă** **kpèlɛ̀ɛ̀-wòò** **ɓò**
1SG.HAB.NEG Kpelle-language\L speak\L
'I don't speak Kpelle'.

Example (4a) shows the Affirmative Habitual construction involving a specific set of S/Aux markers and the verb **ɓó** 'speak' marked by a replacive grammatical {L} tone.

In (2b), the Negative Habitual construction employs a different S/Aux marker. Note that in the nominal compound **kpɛ̀lɛ̀ɛ̀wòò** 'the Kpelle language', the nominal head **wóó** 'language' is also marked by a replacive grammatical {L} marker, cf. Green and Konoshenko (2022) for an overview of such phenomena in Mande.

Mande languages have rather diverse tone systems including those that maintain only a privative H/L versus /Ø/ contrast, while other languages count from two up to five contrastive tone levels (Green and Konoshenko 2022; Konoshenko 2014b; Vydrin 2002). In Mande languages, tones usually function as fixed word level melodies, unlike more individualized tone markers attested in Bantu (Hyman 2016). Most Mande languages have abundant phonological tone rules, e.g., downdrift, downstep, High spread, and tonal absorption, often involving complex rules of prosodic phrasing, cf. Nikitina (2019) on McPherson (2019) on Seenku.

Various types of GTs have been reported for Mande, and indeed for other African tone languages, e.g., tonal affixation via prefixing or suffixing or full tonal replacement, tone sandhi occurring in grammatically specified contexts, as well as GTs emerging through clitic elision. Out of these, tonal affixation is the most frequently discussed GT type. In this study, I distinguish between two major structural types of GTs realized through tonal affixation: replacive markers, i.e. overwriting the lexical tone of the morpheme (McPherson 2014; Welmers 1973: 132–133) as in Mwan (1), and additive markers combining with the lexical tone either preceding or following it, e.g., -L suffix marking nominal referentiality in Bamana (Manding): **jɛ́gɛ́** 'fish' → **jɛ́gɛ́̀** fish\REF (Vydrin 2016b: 89–92). In case of Mande verbs, semi-replacive GTs can also be distinguished, only partly overwriting the lexical tone(s). For example, in Mwan, Imperative is marked by {-M} tone suffix linked to the second mora of bimoraic verb roots: **fá̰á̰** 'steal' (lexical /H/) → **fá̰ā̰** (Imperative), **wlɛ̰̀ɛ̰̀** 'lift' (lexical /L/) → **wlɛ̰̀ɛ̰̄** (Imperative, Perekhvalskaya 2017a: 735).[2]

As demonstrated by Konoshenko (2014), the number of tone contrasts correlates positively with richer tonal morphology in Mande. The clearest case is provided by Southern Mande languages counting from 3 to 5 contrastive tone levels and having a strong preference for GTs in verbal morphology. Another observation is that richer verb tonal morphology is attested in languages having historically fused S/Aux complexes (Konoshenko 2020). Such a connection is not unsurprising given that tone

2 As an anonymous reviewer notes, the difference between replacive and semi-replacive tones is usually described via different domains or "valuation windows" of GT (Rolle 2018: 29). To me, this is an equally possible way of modelling GT within one's theoretical model, but I prefer using a more transparent and framework-neutral terminology. The same reviewer further notes that the behaviour of semi-replacive tones is an argument for modelling GTs as floating tones in the spirit of Rolle (2018). However, semi-replacive GTs are rather uncommon in Mande verbs, as opposed to (fully) replacive ones, hence there is little or no independent evidence that would point to such floating tones.

contrasts, tone morphemes and S/Aux complexes appear as a result of phonetic fusion and ultimately the loss of segments, so these phenomena are quite likely to co-occur.

In this study, I focus on GTs that are relevant for the expression of TAMP meanings in Mande verbal morphology. A general property of Mande verb tones is that, typically, only one morphologically assigned tone appears on the verb in a given TAMP construction, unlike in many other Niger-Congo languages, where different GTs sometimes conflict within a single TAMP form (Hyman 2016). This property of verb paradigms in Mande can be attributed to a generally analytic grammar of these languages, where various TAMP meanings are encoded via Aux markers and clitics, and the verb has no more than one segmental affix and/or a single morphologically assigned tone.

A question relevant for this study is how to interpret tone rules that are phonological in nature but only occur in certain grammatical environments. I interpret such tone rules as instances of GT only when the application of those rules is governed by the TAMP value of the verb, as is the case for Seenku Irrealis verbs (McPherson 2020) as well as for Imperfective verbs in Gban (Fedotov 2017). For example, in Gban [iso:ggu], verbs retain their lexical tones in most TAMP constructions, e.g., the verb **bɛ́** 'take' keeps its lexical Superhigh /SH/ in the Imperative (5a) and the Perfective Hodiernal construction (5b). On the contrary, in the Imperfective construction, the verb loses its lexical tone and assimilates the tone of a preceding element. In (5c), the lexical /SH/ tone of the verb is deleted and the verb assimilates the H tone from the direct object **blé** 'bread'.

(5) Gban (Southern Mande; Fedotov 2017: 935, 937)

a. **bɛ̏ɛ́** **bò** bɛ́**!**
work head take
'Start working'!

b. **ī** **blé** bɛ́
1SG.PST bread take
'I took bread (today)'.

c. **ī** **blé** bɛ́
1SG bread take\IPFV
'I take bread'.

Hence, it is the tone assimilation that is the exponence of the Imperfective and makes this construction different from other TAMP constructions in Gban.[3] Since it is linked to a particular TAMP meaning, I view it as an instance of GT with phonologically variable exponence.

3 Similar tonal processes have been reported by Sapozhnikova (2020) for Jogo (Central, Ivory Coast/Ghana).

GTs on verbs are attested in most Mande branches, with the exception of Soso-Jalonke group and some lower groupings within Central Mande, e.g., Manding, cf. Figure 1. As noted in Section 1, this study is based on data from 20 languages, the sample only including languages that *do* have GTs in their verbal morphology. For example, out of Samogho languages, a minor branch within Western Mande, Seenku has been included in the sample, while Dzuun is not there, since Solomiac (2014) notes that there is no explicit GT in this language. To date, verb tones have not been investigated systematically in Mande, and this significant gap justifies the present study.

3.2 Grammatical tones and phonological rules: the case of Guinean Kpelle

Tonal morphology presents serious challenges for morphological theory, since it tends to obscure the boundaries between phonology, morphology and syntax (Hyman 2016: 15). As often claimed in literature on GT (Hyman 2011; Lionnet and Hyman 2018), tonal morphology tends to strongly interact with surface phonology. Mande languages provide evidence in favour of this generalization, a particularly striking case coming from Guinean Kpelle (Southwestern Mande).

In Guinean Kpelle, verbs have underlying lexical tone melodies /H/, /L^{H}/, /HL/ and /LHL/; the lexical melodies appear in various TAMP constructions. There is no lexical /L/ on verbs, but this melody appears as a grammatical replacive {L} tone.

Tone lowering on nouns and verbs in Guinean Kpelle has been discussed in detail by Green and Konoshenko (2022: 10–12). I will briefly show here how the surface realization of grammatical {L} on verbs depends on the phonological context in Guinean Kpelle. All glossed language examples presented here feature surface tones.

In Guinean Kpelle, the Perfect construction is composed of the Perfect S/Aux series and the verb with its lexical tone, cf. (6a), where the verb **yá** 'buy' faithfully surfaces with [H]. In yet another set of TAMP constructions, e.g., in the Past construction, verbs are marked with replacive {L} tone regardless of their lexical melody. This is the case in (6b), where the verb **yá** 'buy' surfaces with [L].

(6) Guinean Kpelle (Southwestern Mande; Konoshenko 2017c)

a. **ŋàá** **ɲààlèè** yá
1SG.PRF cat buy
'I have bought a cat (recently)'.

b. **ŋé** **ɲààlèè** yà
1SG.B cat buy\L
'I bought a cat (earlier)'.

In Guinean Kpelle, grammatical {L} marker is phonologically transparent after Low tone, which can be the S/Aux marker for intransitive verbs or the direct object for transitive ones (6b). However, if the preceding syntactic element ends with High tone, the {L} on the verb undergoes High spread (7).

(7) Guinean Kpelle (Southwestern Mande; Konoshenko 2017c)

a. **ŋé** **ɓɛ́lɑ́ɑ́** yâ
1SG.B sheep buy\L
'I bought a sheep'.

b. **ŋé** **ɓɛ́lɑ́ɑ́** héɣê
1SG.B sheep take\L
'I took a sheep'.

c. **ŋé** **ɓɛ́lɑ́ɑ́** kwɛ́lɛ́ **mà**
1SG.B sheep give\L 3SG.on
'I gave him a sheep'.

d. **é** **ɓɛ́lɑ́ɑ́** kwɛ́lɛ́ ↓**mîì**
2SG.B sheep give\L 1SG.on
'You gave me a sheep'.

In phrase-final position, the verb surfaces as [HL] after High: H_{DO} + $\{L\}_V$## → H_{DO}+HL_V##, cf. (7a). On bysillabic roots, [HL] always surfaces as H.HL (7b). If there are any post-verbal elements, e.g., postpositional phrases occuring with ditransitive verbs like **kwɛ́lɛ́** 'give', the falling contour of the verb surfaces as [H] after High and before Low. I assume that this result is due to High spread from the preceding element, and later tonal absorpion transforming HL to L before L: H_{DO} + $\{L\}_V$ + L_{PP} → H_{DO} + HL_V + L_{PP} → H_{DO} + H_V + L_{PP}, cf. (7c). If the following word bears initial High, it gets downstepped: H_{DO} + $\{L\}_V$ + H_{PP} → H_{DO} + HL_V + H_{PP} → H_{DO} + H_V + $^{\downarrow}H_{PP}$ (7d).

Example (7) suggests that, under specific circumstances, the verb tones undergo the so called Duke of York derivation (Pullum 1976) by getting and then losing the grammatical {L} specification on the surface. Starting out with /H/ in the lexicon, the verb is assigned grammatical {L} in the Past construction, which is realized as [HL] after H direct object. If there is any element following the verb, the falling [HL] contour on the verb is simplified (back) to [H], and the following item is downstepped if it bears High tone, otherwise it is faithfully realized with L.

Note that both grammatical tones and phonological tone rules are common in African tone languages, so they appear quite ordinary when viewed separately, i.e. from a strictly morphological or a phonological point of view. In practice, however, GTs are not always easy to tease apart from subsequent surface rules operating at various syntactic levels.

In this paper, I adopt an explicitly serial approach according to which all morphological phenomena precede phonological interpretation (and indeed, lexical phonology precedes post-lexical processes, although this later stage is not relevant for this study). This study is based on an assumption that "the input to the phonological grammar is a fully structured <…> object which contains, in addition to an underlying phonological representation, all details regarding the internal morphological make-up of the word form in question" (Hansson 2015: 162). According to this model, GTs as morphological phenomena may be sensitive to the lexical phonological properties of the stems – as is indeed the case in many Mande verb paradigms, cf. Section 4.3, but their morphological specification cannot be governed by the output structures. I also adopt a derivational rule-based approach to tonal phonology in the spirit of Hyman and Schuh (1974), Hyman (2007).

Alternative, non-modular aproaches to GT have been presented in Green (2018a) and Rolle (2018). In my view, different phenomena are often blended together in these studies making these approaches less insightful, especially in the historical-comparative perspective, cf. the discussion of Green's (2018a) typology in Konoshenko (2018) and Green (2018b). For example, as shown above, replacive {L} is strongly influenced by surface tone changes in Guinean Kpelle. If we do not abstract away these obscuring phenomena, we might lose the insight that Guinean Kpelle has the same underlying {L} as do some other languages, e.g., Beng (Southern Mande) and Vai (Vai-Kono), although there are less or no surface changes in the latter languages, cf. Section 4.2. In other words, the modular approach helps us demonstrate that, although the surface phonologies may vary across Mande, the morphological patterning of these languages is often quite similar. This insight points towards a historically stable GT marking in such cases, at least in the underlying representation.

In my typology of Mande verb tone paradigms (Section 4 below), I only consider morphologically assigned tones, abstracting from surface phonological modifications, which largely depend on the language's tonology.

4 Morphological types of GTs in Mande verb paradigms

In this section, I provide a morphological microtypology of GTs on Mande verbs. The typology is based on three major parameters:

(i) the formal type (replacive/semi-replacive/additive GT)
(ii) the paradigmatic type (canonical/syncretic/inflectional classes/mixed GT)
(iii) the ability of a GT to co-occur with a segmental affix

Some tendencies are immediately visible in the data. As for (i), GTs on verbs tend to be replacive rather than semi-replacive in Mande. All instances of semi-replacive GTs belong to the canonical morphological type, cf. discussion in Section 4.1. No additive GTs were attested in Mande verbs. With respect to (ii), different paradigmatic types of GTs are almost equally represented in the data; I describe them in Sections 4.1–4.4. Finally, (iii) GTs tend to be used as the only morphological material modifying the verb root in a given construction; cases where a GT co-occurs with segmental affixes are rather scarce in my data. I specifically address this issue in Section 4.5.

4.1 GT as a canonical inflection marker

GTs discussed in this subsection are labelled *canonical* in a sense of canonical inflection markers as represented by Corbett (2009), characterized by a consistent mapping between tone and a specific grammatical meaning or construction, cf. Section 2.1. A canonical GT marker is thus associated with just one TAMP construction, cf. also the term "morphosyntactic" tone in Palancar (2016).

GTs as canonical inflection markers are attested across various Mande branches. They are most widely represented in Southern Mande, this particular group having the richest GT morphology, cf. Appendix A. For example, in Eastern Dan [iso:dnj], Superlow {SL} replacive tone marks Neutral aspect in all verbs. This is shown for the verb **dɔ̄** 'build' in (8), cf. also a canonical GT marker in Mwan (1).

(8) Eastern Dan (Southern Mande; Vydrin 2017: 495)

Gbàtò	**yɤ̏**	**kɔ́**	dɔ̀
Gbato	3SG.EXI	house	build\NTR

'Gbato builds house'. (he is a builder)

Canonical replacive tones tend to be the only morphological markers modifying thr verb root in a given construction, as in (8). Still, sometimes canonical replacive tones are combined with a segmental suffix, this is further discussed in Section 4.5.

While most GTs on Mande verbs are replacive, i.e. they fully rewrite the melody on the verb, some languages have canonical semi-replacive tone markers that only partially replace lexical tones on the verb. Thus, in both Mwan and Eastern Dan mentioned above, replacive and semi-replacive GTs are attested. In Eastern Dan, the Infinitive form of the verbs is marked by Superlow tone suffix realized on the second mora of bimoraic verb roots:**slɔ̄ɔ̄** 'get'→**slɔ̄ɔ̀** (Vydrin 2017: 523–524); cf. also the discussion of Mwan in Section 1. Crucially, all semi-replacive tones are suffixing in Mande, which is not surprising given that segmental inflectional markers are also suffixing in this family, and tonal morphemes are generally known to originate from segmental ones (Hyman 2011). While replacive tones show various sorts of mature

and complex morphology in Mande as discussed in Sections 4.2–4.4 below, semi-replacive GTs never involve syncretism or inflectional classes. This asymmetry suggests that semi-replacive GTs have been grammaticalized more recently; hence Vydrin's (2017: 523) hypothesis that the Superlow Infinitive GT suffix can be traced back to the **ɓà** postposition in Eastern Dan, cf. Section 5.

4.2 Syncretic GT

Unlike canonical inflectional markers, *syncretic* GTs have several distinct functions. They appear in semantically heterogeneous TAMP constructions and combine with different segmental material. In Rolle's (2018) terms, syncretic GT can be viewed as a "construct tune", cf. Section 2.2.

For example, in Kla-Dan [iso:lda], a {SL} replacive GT marks Neutral aspect (9a), and Future (9b). Note that in the latter case it is combined with **-lə̰̀** suffix, which only occurs in the Future construction.

(9) Kla-Dan (Southern Mande; Makeeva 2017: 632–633)

a. **ŋ̀** kpɔ̃ **pɤ́** **lɤ̀** **lɛ̰̀**
1SG.EXI be.born\NTR village in FOC
'I was born in a village'.

b. **yɛ̀** **ɤ̀ɓà** **yúá** yɛ̃̀-lə̃̀
3SG.EXI 2SG.POSS illness end\NTR-FUT
'It (the medicine) will cure you'.

Syncretic GTs may appear in a greater number of constructions, with apparently unpredictable distribution. Consider the so-called "Low-tone" form in Beng [iso:nhb] whereby replacive {L} marker overwrites lexical tones of any verb (10):

(10) Beng (Southern Mande; Paperno 2014: 36)

Lexical form				Low-tone form	
/H/	**tá**	'go'	→	{L}	**tà**
/M/	**mḭ̄**	'drink'	→	{L}	**mḭ̀**
/LH/	**dă**	'jump'	→	{L}	**dà**
/MH/	**zrö**	'wash'	→	{L}	**zrò**
/LHL/	**jàtê**	'respect'	→	{L}	**jàtè**

Table 4 shows that the Low-tone form in Beng is used in four different TAMP constructions.

While {L} marks the verb in both Affirmative and Negative versions of Preterite and Habitual, it also appears in Conditional and Optative constructions, but only

Table 4: TAMP forms of verbs in Beng (Southern Mande; Paperno 2014).

Construction	Affirmative		Negative
Preterite		{L}	
Habitual		{L}	
Conditional	basic stem		{L}
Optative	basic stem		{L}
Future		basic stem	
Progressive		**-lɛlɔ́**	
Perfect	**-nā̰**		**-sà**
Stative		**-lɛ̀**	

when combined with Negative polarity. It may be considered a subtype of the verb stem with no specified morphosyntactic meaning. At the same time, segmental suffixes are associated with particular TAMP meanings in Beng: **-lɛ̀** (Stative), **-sà** (Negative Perfect), **-nā̰** (Positive Perfect), **-lɛlɔ́** (Progressive), cf. a similar difference between {SL} and the Future suffix in Kla-Dan (9). This asymmetry suggests that {L} GT is older than segmental suffixes in Beng, cf. Section 5.

Another example of verbal TAMP paradigm with syncretic replacive {L} marker comes from a Guinean language Kono [iso:knu], cf. Table 5.

Stem-like syncretic GTs are attested in different Mande branches, e.g., in Kpelle, Kono and Loko (Southwestern Mande), Beng (Southern Mande), Vai (Vai-Kono) and Soninke (Soninke-Bozo). Crucially, syncretic GT is realized through tone lowering in these languages. These branches are genetically and geographically rather distant, suggesting that a stem-like {L} marker may be an old and a diachronically stable tone morpheme in the family, cf. Section 5.

Table 5: TAMP forms of verbs in Kono (Southwestern Mande; Konoshenko 2017b).

Construction	Affirmative		Negative
Stative		basic stem	
Preterite		{L}	
Habitual	**-à / -nî**		**-à / -nî**
Resultative	basic stem		**-nî**
Progressive		**-nî**	
Future		basic stem	
Imperative	basic stem		{L}
Conjoint	{L}		–
Conditional	{L}		basic stem

4.3 Inflectional tonal classes

Inflectional classes are posited when different lexemes take non-identical inflection markers in the same form. In Southern Mande, verbs are sometimes marked with different GT tone markers in a certain TAMP construction resulting in what I call here *inflectional tonal classes (ITCs)*. In Rolle's (2018) terms, this is arguably the case of "paradigmatic" tones, since, unlike canonical and syncretic GTs discussed in Sections 4.1 and 4.2, there is no single GT exponence associated with a certain TAMP meaning.

In Mande verbs, ITCs tend to be influenced by various phonological parameters, mainly the lexical tone of the verb and its syllable structure. For example, a relatively simple system of ITC is attested in Kla-Dan. In Kla-Dan, the Conjoint form is marked by replacive tone lowering on the verb. Unlike syncretic tones, ITCs are typically linked to a particular TAMP form but with no single morphological exponent, hence a more abstract notion of "lowering". In Kla-Dan, the exact GT pattern depends on the lexical tone of the verb, cf. Table 6.

Eastern Dan also has ITCs in the Conjoint form, although its paradigm is much more complex. It counts 13 verbal inflectional classes based on lexical tone of the verb and its syllable structure, although some distinctions are still unpredictable, cf. Appendix B. Another Southern Mande language, Guro, presents a highly complex case with ITCs based on the lexical tone of the verb and the initial consonant type (Kuznetsova and Kuznetsova 2017: 834).

While in Eastern Dan a tone paradigm includes just one grammatical form, in a more complex case, ITCs are based on a set of forms. The latter case is exemplified below by Yaure [iso:yre], cf. Table 7.

ITCs are mainly attested in Southern Mande languages, especially those with multiple contrastive tone levels, as well as in Bobo (Samogho-Bobo). Since ITCs tend to be phonologically determined in Mande, they are likely to have appeared as a result of recent tonal restructuring processes and splits, cf. Section 5.

Table 6: ITCs in Kla-Dan (Southern Mande; Makeeva 2017: 656).

Lexical tone	Conjoint form	Example
/SH/	{L}	**bű** 'rot' → **bù**
/H/		**wú** 'break' → **wù**
/L/		**là** 'give birth' → **là**
/SL/	{SL}	**kpà** 'cook' → **kpà**
/L-SL/		**pìì** 'make blow' – **pìì** (optional)

Table 7: ITCs in Yaure (Southern Mande; Kushnir 2017: 893).

Lexical tone	Perfective	Imperfective	Syllable structure
/H/	{H}	{SH}	CV
/L/	{H}	{L}	
/SL/	{SL}	{L}	
/SH/	{L}	{SH}	CVV, CVLV
/L-SH/	{L-SH}	{L-SH}	
/L/	{L}	{L}	
/SL-H/	{L}	{SL}	

4.4 ITCs with syncretism

Syncretism and inflectional classes are logically independent from each other as morphological phenomena, since syncretism refers to multiple meanings, and inflectional classes involve multiple exponents. Hence, hybrid markers involving both syncretism and inflectional classes are also theoretically possible, and indeed they are attested in the world's languages, e.g., parallel cases of Dative/Ablative syncretism in Latin plural nouns of various declension types: **mensa** 'table' → **mensīs** (DAT~ABL.PL, 1st declension), **lupus** 'wolf' → **lupīs** (DAT~ABL.PL, 2nd declension), **dux** 'leader' → **ducibus** (DAT~ABL.PL, 3rd declension).

In Mande verbs, occasional instances of *syncretic tonal classes* have also been attested, i.e. cases when the same set of inflectional variants appears in different forms. This case can be illustrated by Goo [iso:gov]. In Goo, the ITC paradigm includes two distinct forms labelled "Contour tonal 1" and "Contour tonal 2" by Aplonova (2017). The distribution of verb lexemes is based on the lexical tone of the verb and its syllable structure. Crucially, each of these two forms is characterized by syncretism in that it appears in several TAMP constructions, combining with different segmental suffixes, cf. Table 8.

Examples (11a, b, c) show the use of the verb **lṹ** 'come' in three different forms (or stems): lexical form in Perfect (11a), Contour 1 in Aorist (11b) and Contour 2 in Prohibitive (11c). Since the verb **lṹ** 'come' belongs to CV type with lexical /SL/, the two tone forms are realized with {H} (11b, c):

(11) Goo (Southern Mande; Aplonova 2017)

a. **lùùtíí** **à** lṹ
chief 3SG.PRF come
'The chief has arrived'.

Table 8: ITCs in Goo (Southern Mande; Aplonova 2017: 7–8).

Syllable structure	Lexical form	Contour 1	Contour 2
CV	/H/	{H}	{SH}
CV	/SL/	{H}	{H}
CVV	/H/	{L}	{H}
CVV	/SH-H/	{L}	{SH}
CVV	/SL/	{L}	{L}
CVLV	/LH/	{LH}	{L-SH}
	Constructions	Habitual Aorist (+suffix **-á**)	Resultative (+suffix **-ẹ̀**) Future (+suffix **-ȁ**) Prohibitive (+suffix **-ȁ**) Progressive (+suffix **-lȁ**) Immediate (+suffix **-ȉ̋**)

b. **lȕȕtíí** **kɤ̋** lű-ấ
chief AUX come\T1-INF1
'The chief arrived'.

c. **kő** **wɛ̀ɛ̀** **ẹ̏** **gọ̋** lű-ȁ̏
1PL.EXI say\T1 3SG.NEG PROH come\T2-INF2
'We have prohibited him to come'.

Apart from Goo, syncretic ITCs are also attested in Toura [iso:neb], another language from the Dan-Mano-Toura branch of Southern Mande. The tonal patterns in Toura are very similar to Contour 1 in Goo (Idiatov and Aplonova 2017: 601) suggesting that these two cases have a common diachronic origin.

4.5 GTs and segmental markers

In his typology of GTs, Rolle (2018) assumes that replacive-dominant GTs are mostly triggered by floating tones or segmental sponsors, cf. Section 2.2. In contrast, GTs in Mande tend to be completely independent from segmental morphemes; this is also true for many other African languages, cf. Odden and Bickmore (2014) on Bantu.

The independent behaviour of Mande GTs manifests itself in the following properties or principles:

(i) the same GT can be used independently in one construction and with a segmental suffix in another;
(ii) the same GT can be used with different segmental suffixes;
(iii) the same segmental suffix can be used with different GTs;
(iv) GTs may sometimes overwrite the tones of the whole word including the root and the suffix.

An example of principle (i) is a replacive verbal {SL} in Kla-Dan, which marks Neutral aspect when used independently, and Future together with **-lą̀** suffix, cf. Section 4.2. Principle (ii) can be illustrated by Goo (Table 8, Section 4.4), where the so called Contour 2 encodes different TAMP meanings while co-occurring with different verbal suffixes.

An illustration of (iii) comes from Mano [iso:mev]. In this language, the Conditional form of the verb is marked by suffix **-á** accompanied by tone lowering with phonologically determined ITCs: **lɔ́** 'buy' → **lɔ̄-á** (Conditional form). The Irrealis form is marked by the same suffix **-á** with replacive {L}: **lɔ́** 'buy' → **lɔ̀-á** (Irrealis form). Thus in Mano, the same suffix **-á** is used with two different tone forms as suggested in (iii). Also, replacive {L} can be used without suffixes in the so called Conjoint form supporting (i), cf. (12):

(12) Mano (Southern Mande; Khachaturyan 2015: 62)

ō	**bàlà**	**sí**	**wáà**	lò	**zī**	**gbɛ̄ɛ̄**	**ká**
3PL.PRET	running	take	3PL.CONJ	go\L	road	other	with

'They ran by taking another road'.

An example of principle (iv) is provided by Kingi Soninke [iso:snk], where syncretic replacive {L} is used in Negative constructions, among other cases (13).

(13) Kingi Soninke (Soninke-Bozo; Creissels 2016: 66–67)

a. **ó** **dà** **Múúsá** qírí
1PL TR Musa call
'We called Musa'.

b. **ó** **má** **Múúsá** qìrì
1PL PFV.NEG Musa call\L
'We did not call Musa'.

c. **ń** **ŋá** **ké** **kónpé** séllà-ná
1SG IPFV DEM room sweep-GER
'I sweep this room'.

d. **ń** **ntá** **ké** **kónpé** sèllà-nà
1SG IPFV.NEG DEM room sweep-GER\L
'I don't sweep this room.'

In Affirmative Perfective, the verb comes with its lexical tone and no suffix (13a). In the corresponding Negative construction, the verb stem receives replacive {L} GT (13b). If the verb attaches a suffix in the Affirmative construction, e.g., in Imperfective (13c), then replacive {L} overwrites the tones of the whole verb form including the suffix in the corresponding Negative construction (13d).

In this section, I have shown that Mande GTs usually do not depend on segmental morphemes. Hence, the GT exemplars presented here are better analyzed as the non-canonical "construct tones" in Rolle's (2018) terminology, since they are not triggered by segmental morphemes and they are not predictable from the input.

I must note that at least some verbal GT markers attested in Mande only appear in combination with a particular segmental marker. For example, in Guinean Kpelle, position verbs have a Stative participle form. This form is marked by a **-nì**~**-nìŋ** suffix, and a {LH} replacive tone; sometimes the stem vowel is shortened as well: **láa** 'lie' – **làánì** (Stative participle); **hěe** 'sit' – **hèénì** ~ **hěnìŋ** (Stative participle). The {LH} replacive tone in this case can arguably be analyzed as triggered by the segmental suffix, so it behaves like a "canonical" GT marker in Rolle's sense, cf. Section 2.2. Still, such markers are remarkably scarce in my data.

5 The diachronic development of GTs in Mande

In Section 4, I have demonstrated that, first, GTs are synchronically well represented in Mande verbal morphology and, furthermore, GT exponents and their functions vary considerably across the family and even in particular branches. In the present section, which is intended primarily for Mandeists, I discuss some possible diachronic patterns of GT evolution in Mande. So far, Mande TAMP reconstruction literature has mainly focussed on the general development of SAuxOVX predicative constructions and the grammaticalization of auxiliaries from lexical verbs, postpositions and copulae (Claudi 1994; Creissels 1997; Tröbs 2003 inter alia). In contrast, much less is known about the diachronic development of Mande verbal morphology, and GTs in particular.

Valentin Vydrin (2016a: 117) tentatively claims that locative postpositions are a common diachronic source of Mande verbal suffixes which, in turn, often transform into tonal morphemes. He suggests the following diachronic path: postposition → suffix of a participle/converb/infinitive/supine → segmental verbal suffix → verbal GT → zero (Vydrin 2012, 2016a: 117). Still, out of those Mande branches displaying verbal GTs, the reconstruction of a low-level proto system has only been proposed for Proto Southern Mande (Vydrin 2012). Although lack of detailed reconstructions makes the task of tracing back the history of GTs in Mande quite challenging, some patterns are clearly visible; I discuss them in Sections 5.1–5.2 below.

5.1 GT markers with recent segmental sources

According to Vydrin's (2012) reconstruction of TAMP in Proto Southern Mande, GTs in Southern Mande often have segmental morphemes as their recent sources. However, Vydrin provides only one such recurrent pattern whereby historically non-finite verb forms developed a GT from a locative postposition. For example, the Superlow {SL-} infinitive suffixal tone in Eastern Dan (Dan-Mano-Toura branch of Southern Mande) corresponds to segmental suffixes **-à** / **-ā** / **-ɓà** in Mano and Toura. Vydrin (2012) thus suggests that the tonal suffix in Eastern Dan originates from the **ɓà** subessive postposition as do the cognate segmental suffixes in its sister languages. Vydrin (2012: 617) further claims that Kla-Dan, a closely related language, is likely to have lost the GT infinitive suffix finding itself at the end of GT grammaticalization path outlined above.

In some other Southern Mande languages, replacive GTs co-occur with segmental suffixes, e.g., Infinitive in Goo marked by Contour 2 and suffix **-ā** undoubtedly originating from the aforementioned subessive postposition, cf. Section 4.4. Such combinations suggest a cyclic development whereby a given postposition was transformed into a tone marker, and later the same segmental marker (or a different one?) evolved into a new suffix.

To date, there is not enough evidence to establish the segmental sources of most GTs in Southern Mande, let alone other less studied Mande branches with verbal GTs. Synchronic TAMP constructions attested in modern Mande are exremely diverse, suggesting that TAMP markers are very unstable in the family. On the other hand, syncretic stem-like tone markers are attested across various Mande branches (Section 4.2) suggesting that some verbal GTs may be an old and a relatively stable phenomenon. I further discuss this issue in Section 5.2 below.

5.2 Older GTs and Proto Mande

While describing Perfective construction in Proto Southern Mande (Vydrin 2012: 633), postulates a segmental verbal suffix ***-ɗa**. In fact, most Southern Mande languages have a GT on the verb in Perfective or the semantically close Preterite construction, cf. Appendix A, and Mwan is the only attested language with a suffix (**-là**). For this reason, Vydrin's (2012) reconstruction seems biased towards Mwan, and it is apparently inspired by the idea that GTs usually develop from segmental markers.

However, given the dominance of GT marking on the verb in modern Southern Mande branches, I would rather assume that Perfective could be marked by a verbal GT already in Proto Southern Mande. Moreover, I argue that this could also be the case for Proto Mande. My evidence comes from the functional distribution of syncretic GTs (Section 4.2) in languages of other Mande branches, as well as from the formal realization of Perfective GT via tone lowering, which is a recurrent pattern in Mande.

As discussed in Section 4.2, synrectic GTs are polyfunctional replacive tones used in various TAMP constructions of a particular language. This GT type is attested across various Mande branches including Beng (Southern), Soninke (Soninke-Bozo), Vai (Vai-Kono) and several Southwestern Mande languages, e.g., Kpelle and Kono. Crucially, syncretic GTs have common functional and formal properties attested in different branches. First, if there is a syncretic verbal GT in a given language, it tends to be used in Affirmative Perfective construction as well as in Irrealis forms including Conditional, Conjoint and/or Negative constructions, cf. Appendix A. Second, syncretic GTs are consistently realized via tone lowering across Mande branches. These two properties point to the fact that a single replacive {L} marker may have existed already in Proto Mande, used in Perfective and Irrealis constructions.

Proto Mande has been reconstructed as having a two-way contrast between High and Low tones (Vydrin 2016a), and syncretic {L} is synchronically attested in languages that have largely preserved this binary contrast, with an exception of Beng having /HML/ contrast. In Bobo (Bobo-Samogo), there is an unusual transitivity split in that only transitive verbs are marked by replacive {L} in Perfective construction, cf. **à zōn** 'he ate' versus **à yògō zòn** 'he ate some tô'[4] (Le Bris and Prost: 64). Despite the transitivity split, Perfective {L} in Bobo is likely to reflect an older proto marker. Similar tone lowering in Perfective constructions is attested on transitive verbs in Seenku (McPherson 2020: 98). The Manding group, probably the best documented in the Mande family, does not have verbal GTs at all. Note that this group is now commonly treated as having a simplified privative tonal contrast between one tone (whether H or L) and underlyingly /Ø/ or toneless TBUs (Creissels and Grégoire 1993; Vydrin 2016b). Hence, it is likely that the old {L} marker has been lost in Manding due to restructuring of their tone systems.

In contrast, Southern and Eastern Mande have innovated multiple tone levels, presumably as a result of prosodic compression of bisyllabic structures into simpler units (Vydrin 2016a: 115). Still, Perfective and some Irrealis forms tend to be marked by tone lowering in these languages, e.g., Superlow marking Perfective in Boko (Eastern) and Conditional in Toura (Southern). However, the formal realization of GT

4 Tô is a West African dish cooked from millet or sorghum flour.

markers is much more complex and variable in Southern Mande since GTs tend to form inflectional tonal classes in these languages (Sections 4.3–4.4). Crucially, in all the languages of the sample having ITCs, these ITCs are phonologically predictable suggesting that they might have appeared as a result of a recent phonological change, which is one of the main sources of morphological restructuring (Anderson 2015; Bowern 2015). In this case, a detailed morphological reconstruction will only be possible once historical phonology is established for Mande tone splits. The semantic reconstruction remains equally challenging due to late developments of TAMP systems in particular languages, e.g., the grammaticalization of Neutral aspect in Dan, presumably as a result of merged Imperfective and Preterite constructions (Vydrin 2012).

To sum up, modern Mande languages provide evidence that a replacive {L} marker may have already been used in Perfective and Irrealis constructions of Proto Mande, with no clear segmental source to be posited. A detailed reconstruction of formal and functional development of older GT marker(s) is a task for the future. Note that a similar morphologically assigned lowering is synchronically attested in Mande nominal compounds, and it has also been interpreted as an old phenomenon already present in Proto Mande, for details see Green and Konoshenko (2022).

6 Conclusions

In this paper, I have demonstrated that Mande GTs tend to be fully replacive markers that have the following properties: (i) they are not predictable from the input; (ii) they do not correlate with segmental morphemes; (iii) they often appear in several TAMP constructions, up to the point where it is impossible to analyze them as having a particular meaning, but rather as independent formal verb stems; (iv) in languages with multiple contrastive tone levels, e.g., in Southern and Eastern Mande, GTs tend to have variable and partly phonologically determined exponence. These properties make Mande GTs non-canonical in comparison with other GT types outlined by Rolle (2018, Section 2.2), hence they belong to the “construct” and “paradigmatic” types in Rolle’s typology.

From a morphological point of view, Mande GTs display rather well-known deviations from a canonical inflection model (Corbett 2009, Section 2.1, Section 4) in that GT paradigms often involve sycretism and inflectional classes. A striking property of GTs as opposed to segmental morphemes, however, is that the former tend to strongly interact with phonology: first, synchronically, since GTs tend to be obscured by surface phonological phenomena (Section 3) and second, in the diachronic perspective, since GT exponence can be influenced by sound change

resulting in the development of phonologically determined inflectional tonal classes (Section 4.3).

In this paper, I also discuss the diachrony of Mande GTs, and more specifically, whether they can all be traced back to segmental morphemes as suggested by Vydrin (2012). In Section 5, I show that a clear segmental source may have not existed for Perfective GTs in Mande, as well as GTs appearing in some Irrealis constructions, e.g., Conditionals. Such GTs are attested across different Mande branches with a similar lowering pattern; hence they are likely to be retained from a proto system, quite in parallel with abundant tone lowering in Mande nominal compounds (Green and Konoshenko 2022). The synchronic consistency of morphological tone assignment on nouns and verbs in Mande suggests that GTs may be genetically quite stable morphological markers. This generalization will be further tested once there are historical studies of Mande tone splits as well as grammatical reconstructions for various modern branches of Mande family.

Abbreviations

B	Basic series
CONJ	Conjoint
CPL	Completive
DEM	Demonstrative
EXI	Existential
FOC	Focus
FUT	Future
GER	Gerundive
GT	Grammatical tone
HAB	Habitual
INF	Infinitive
IPFV	Imperfective
ITC	Inflectional tonal classes
NEG	Negative
NTR	Neutral aspect
PL	Plural
POSS	Possessive
POT	Potential
PRET	Preterite
PRF	Perfect
PROG	Progressive
PROH	Prohibitive
PST	Past
SG	Singular
TAMP	Tense-Aspect-Mood-Polarity
TR	Transitive

Appendix A: Tonal morphemes in Mande verbs

Language	Group	Tone levels	GT	Formal type	TAMP meaning	Source	General type
Eastern Dan	Southern	5	superlow	replacive	Neutral aspect	Vydrin (2017: 495)	canonical
			superlow	semi-replacive (suffixing)	Infinitive	Vydrin (2017: 523–524)	canonical
			lowering	replacive	Conjoint	Vydrin (2017: 536)	inflectional classes
Kla-Dan	Southern	4	superlow	replacive	Neutral aspect, Future (+suffix **-lə̀**)	Makeeva (2017: 633)	syncretism
			superlow	semi-replacive (suffixing)	Supine	Makeeva (2017: 650)	canonical
			lowering	replacive	Conjoint	Makeeva (2017: 656)	inflectional classes
Mano	Southern	3	lowering	replacive	Imperfective	Khatschaturyan (2014: 69)	inflectional classes
			lowering	replacive	Conditional (+suffix **-á**)	Khatschaturyan (2014: 71)	inflectional classes
			low	replacive	Conjoint Irrealis (+suffix **-á**)	Khatschaturyan (2014: 69)	syncretism
Toura	Southern	4	superlow	replacive	Conditional (+final lengthening with H tone)	Idiatov and Aplonova (2017: 602)	canonical
			mixed	replacive	Habitual Punctive (+final lengthening with H tone)	Idiatov and Aplonova (2017: 601)	inflectional classes +syncretism
Goo	Southern	4	mixed	replacive	Habitual Resultative (+suffix **-á**)	Aplonova (2017)	inflectional classes +syncretism

(continued)

Language	Group	Tone levels	GT	Formal type	TAMP meaning	Source	General type
			raising	replacive	Infinitive (+suffix **-ǎ**) Progressive (+suffix **-lǎ**)	Aplonova (2017)	inflectional classes +syncretism
Guro	Southern	3	raising	replacive	Perfective	Kuznetsova and Kuznetsova (2017: 834)	inflectional classes
			lowering	replacive	Imperfective (+suffix)	Kuznetsova and Kuznetsova (2017: 831, 834)	inflectional classes
			lowering	replacive	Negative Imperfective +suffix, same segmental patterns as in Imperfective but different tones	Kuznetsova and Kuznetsova (2017: 834)	inflectional classes
Yaure	Southern	4	mixed	replacive	Perfective	Kushnir (2017: 893)	inflectional classes
			lowering	replacive	Imperfective +suffix **-à/-ɓa̰**	Kushnir (2017: 893)	inflectional classes
			low	replacive	Negative imperfective +suffix **-à/-ɓa̰** same suffix as in Imperfective but different tones	Kushnir (2017: 893)	canonical
Mwan	Southern	3	mid	replacive	Habitual	Perekhvalskaya (2017a: 731)	canonical
			mid	semi-replacive (second mora of CVV/CvLV)	Imperative Optative	Perekhvalskaya (2017a: 735)	canonical
Gban	Southern	4	superlow	replacive	Hesternal perfective	Fedotov (2017: 907, 967)	canonical
			superlow-high	replacive	Pre-hesternal perfective	Fedotov (2017: 907, 967)	canonical syncretism
			mobile	replacive			

(continued)

Language	Group	Tone levels	GT	Formal type	TAMP meaning	Source	General type
					Imperfective Neg Conjunctive	Fedotov (2017: 908, 966, 975)	
Beng	Southern	3	low	replacive	P&N Preterite, P&N Habitual Negative Conditional Negative Optative	Paperno (2014), Paperno and Maloletnyaya (2017: 1021)	syncretism
Wan	Southern	3	mid	semi-replacive (suffixing)	Past	Nikitina (2017: 1036)	canonical
Boko	Eastern	4	superlow	replacive	Perfective	Perekhvalskaya (2017b: 1061)	canonical
Guinean Kpelle	Southwestern	2	low	replacive	P&N Preterite P&N Habitual Prohibitive Conjoint Conditional	Konoshenko (2017c: 329)	syncretism
			low-high	replacive	Stative participle (+suffix **-nì**)	Konoshenko (2017c: 320–321)	canonical
Kono	Southwestern	2	low	replacive	P&N Preterite Prohibitive Conjoint Conditional	Konoshenko (2017b)	syncretism
Loko	Southwestern	2	low? (insuff. data)	replacive	Imperfective Neg Fut? Hab?	Vydrin and Morozova (2017: 431–433)	syncretism
Vai	Vai-Kono	2	low	replacive	P&N Stative Imperative	Welmers (1976: 2017)	syncretism

(continued)

Language	Group	Tone levels	GT	Formal type	TAMP meaning	Source	General type
					P&N Incompletive P&N Completive		
Jogo	Jogo-Jeri	3	low	replacive	Future (+suffix **-rà**)	Sapozhnikova (2017: 214)	canonical
			mixed	replacive	Transitive imperfective	Sapozhnikova (2020)	?
			mixed	replacive	Transitive perfective	Sapozhnikova (2020)	?
Soninke	Soninke-Bozo	2	low	replacive +suffix	Negation Focus Conditional also with suffixes	Creissels (2016: 258)	syncretism
Bobo	Bobo-Samogo	3	raising	replacive	Future	Le Bris and Prost (1981: 61, 63–64)	inflectional classes (phonology)
			low for transitive	replacive	“Parfait”	Le Bris and Prost (1981: 64)	canonical
			low-mid	replacive	Present	Le Bris and Prost (1981: 64)	canonical
Seenku	Bobo-Samogo	4	lowering	replacive	Perfective	McPherson (2020: 98)	canonical, only /SH/ verbs
			superhigh-superlow	(semi) replacive	Perfect	McPherson (2020: 98–99)	canonical

Appendix B: ITC in the Conjoint form in Eastern Dan (Southern Mande; Vydrin 2017: 536)

Class	Lexical form	Conjoint form	Example	Comments
I	SH	M	**ɗ̋ɪ́ɲ́ɲ́** → **ɗɪ̄ɲ̄ɲ̄** ‘mash’	
II	SH	L	**pɤ̋ɤ̋** → **pɤ̀ɤ̀** ‘boil’	CVŋ, CV_1V_1, CVVV
III	SH	SL	**bű** → **bù** ‘rot’	CV, CLV, CV_1V_2
IV	H	M	**ɗɔ́** → **ɗɔ̄** ‘buy’	CV
V	M	M	**gā** → **gā** ‘die’	CV, CV_1V_2
VI	M	L	**klōō** → **klòò** ‘thresh’	CLVV, CV_1V_1, CVŋ
VII	M	SL	**wɔ̄** → **wɔ̀** ‘lie down’	CV, CV_1V_2
VIII	L	L	**zìì** → **zìì** ‘tremble’	
IX	L	SL	**kɤ̀ɤ̀** → **kɤ̋ɤ̋** ‘belch’	
X	SL	SL	**gə̀** → **gə̀** ‘see’	
XI	H-SL	L	**gíì** → **gìì** ‘daub’	
XII	M-SH	L	**wlūű** → **wlùù** ‘get up’	
XIII	M-SL	L	**dlə̰̄ə̰̄** → **dlə̰̀ə̰̀** ‘learn’	CLV_1V_1

References

Anderson, Steven. 2015. Morphological change. In Claire Bowern & Bethwyn Evans (eds.), *The Routledge handbook of historical linguistics*, 264–285. London: Routledge.

Aplonova, Ekaterina. 2017. Morphologie verbale de la langue goo. *Mandenkan* 57. 3–24.

Aronoff, Mark. 1994. *Morphology by itself: Stems and inflectional classes*. Cambridge, MA: MIT Press.

Baerman, Matthew. 2015. Paradigmatic deviations. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 141–160. Oxford: Oxford University Press.

Baerman, Matthew, Dunstan Brown & Greville G. Corbett. 2005. *The syntax-morphology interface: A study of syncretism*. Cambridge: Cambridge University Press.

Baerman, Matthew, Dunstan Brown & Greville G. Corbett. 2017. *Morphological complexity*. Cambridge: Cambridge University Press.

Bond, Oliver. 2018. Canonical Typology. In Audring Jenny & Francesca Masini (eds.), *The Oxford handbook of morphological theory*, 409–431. Oxford: Oxford University Press.

Bowern, Claire. 2015. Diachrony. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 233–250. Oxford: Oxford University Press.

Brown, Dunstan, Marina Chumakina & Greville G. Corbett (eds.). 2013. *Canonical morphology and syntax*. Oxford: Oxford University Press.

Carstairs, Andrew. 1984. Outlines of a constraint on syncretism. *Folia Linguistica* 18. 73–85.

Corbett, Greville. 2005. The canonical approach in typology. In Zygmunt Frajzyngier, Adam Hodges & David S. Rood (eds.), *Linguistic diversity and language theories* (Studies in Language Companion Series 72), 25–49. Amsterdam: John Benjamins.

Corbett, Greville. 2009. Canonical inflectional classes. In Fabio Montermini, Gilles Boyé & Jesse Tseng (eds.), *Selected proceedings of the 6th Décembrettes: Morphology in Bordeaux*, 1–11. Somerville, MA:

Cascadilla Proceedings Project. Online. Available at: www.lingref.com/cpp/decemb/6/abstract2231.html.
Claudi, Ulrike. 1994. Word order change as category change: The Mande case. In William Pagliuca (ed.), *Perspectives on grammaticalization*, 191–231. Amsterdam-Philadelphia: John Benjamins.
Creissels, Denis. 1997. Postpositions as a possible origin of certain predicative markers in Mande. *Afrikanistische Arbeitspapiere* 50. 5–17.
Creissels, Denis. 2016. Phonologie segmentale et tonale du soninké (parler du Kingi). *Mandenkan* 55. 3–174.
Creissels, Denis & Claire Grégoire. 1993. La notion de ton marqué dans l'analyse d'une opposition tonale binaire: Le cas du mandingue. *Journal of African Languages and Linguistics* 14. 107–154.
Fedotov, Maxim. 2017. Gban jazyk [The Gban language]. In Vydrin et al. (2017), 902–1000.
Green, Christopher R. 2018a. A survey of word-level replacive tonal patterns in Western Mande. *Mandenkan* 59. 67–108.
Green, Christopher R. 2018b. Moving ahead with replacive tone in Mande: A brief response to Konoshenko in Mandenkan n° 59. *Mandenkan* 59. 121–129.
Green, Christopher R. & Maria Konoshenko. 2022. Tonal head marking in Mande compounds: Endpoint neutralization and outliers. *Mandenkan* 67. 3–44.
Hammarström, Harald, Robert Forkel, Martin Haspelmat & Sebastian Bank. 2020. *Glottolog 4.3*. Jena: Max Planck Institute for the Science of Human History. http://glottolog.org (accessed 26 October 2020).
Hansson, Gunnar Ó. 2015. Phonology. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 161–196. Oxford: OUP.
Harry, Otelemate & Larry M. Hyman. 2014. Phrasal construction tonology: The case of Kalabari. *Studies in Language* 38. 649–689.
Hyman, Larry M. 2007. Universals of tone rules: 30 years later. In Tomas Riad & Carlos Gussenhoven (eds.), *Tones and tunes: Studies in word and sentence prosody*, 1–34. Berlin: De Gruyter.
Hyman, Larry M. 2011. Tone: Is it different? In John A. Goldsmith, Jason Riggle & Alan Yu (eds.), *The handbook of phonological theory*, 2nd edn. 197–239. Oxford: Blackwell.
Hyman, Larry M. 2016. Morphological tonal assignments in conflict: Who wins? In Enrique L. Palancar & Jean Léo Léonard (eds.), *Tone and inflection. New facts and perspectives*, 109–139. Berlin: De Gruyter.
Hyman, Larry M. & Russel G. Schuh. 1974. Universals of tone rules: Evidence from West Africa. *Linguistic Inquiry* 5. 81–115.
Hyman, Larry M. & William Leben. 2000. Suprasegmental processes. In Geert E. Booij, Christian Lehmann, Joachim Mugdan & Wolfgang Kesselheim (eds.), *Morphology: An international handbook on inflection and word formation*, 587–594. Berlin and New York: Walter de Gruyter.
Idiatov, Dmitry & Ekaterina Aplonova. 2017. Тура язык [The Tura language]. In Vydrin et al. (2017), 583–616.
Inkelas, Sharon. 1998. The theoretical status of morphologically conditioned phonology: A case study of dominance effects. In Geert Booij & Jaap van Marle (eds.), *Yearbook of morphology 1997*, 121–155. Philadelphia: Kluwer.
Kastenholz, Raimund. 1997. *Sprachgeschichte im West-Mande. Methoden unde Rekonstruktionen*. Köln: Rüdiger Köppe.
Khachaturyan, Maria. 2015. Grammaire du mano. *Mandenkan* 54. 1–252.
Konoshenko, Maria. 2014a. The syntax of tone in Guinean Kpelle. Proceedings of the fortieth annual meeting of the Berkeley linguistics society. February 7–9, 233–252.
Konoshenko, Maria. 2014b. Studying tonal complexity, with a special reference to Mande languages. *Language Documentation & Conservation* 8. 563–586.

Konoshenko, Maria. 2017a. Tone in grammar: What we already know and what we still don't. *Voprosy jazykoznanija* 4. 101–114.
Konoshenko, Maria. 2017b. Field notes on Kono, a Southwestern Mande lect of Forest Guinea. *Mandenkan* 57. 77–107.
Konoshenko, Maria. 2017c. Kpelle jazyk [The Kpelle language]. In Vydrin et al. (2017), 284–342.
Konoshenko, Maria. 2018. Word-level replacive tonal patterns in Mande nominal constructions: On Christopher Green's Binary Typology. *Mandenkan* 59. 109–120.
Konoshenko, Maria. 2020. Phonetics pushing syntax: S/Aux fusion and the rise of subject cross-reference in Mande. *Language in Africa* 2020(1). 7–33.
Kuznetsova, Natalia & Olga Kuznetsova. 2017. Guro yazyk [The Guro language]. In Vydrin et al. (2017), 766–876.
Kushnir, Elizaveta. 2017. Yaure jazyk [The Yaure language]. In Vydrin et al. (2017), 877–901.
Le Bris, Pierre & André Prost. 1981. *Dictionnaire bobo-français, précédé d'une introduction grammaticale et suivi d'un lexique français–bobo*. Paris: SELAF.
Lionnet, Florian & Larry M. Hyman. 2018. Current issues in African phonology. In Tom Güldemann (ed.), *The Languages and Linguistics of Africa. The World of Linguistics Series* (Hans Henrich Hock ed.), vol. 11, 602–708. Berlin: De Gruyter.
Makeeva, Nadezhda. 2017. Kla-Dan jazyk [The Kla Dan language]. In Vydrin et al. (2017), 617–679.
McPherson, Laura E. 2014. *Replacive grammatical tone in the Dogon languages*. Los Angeles: University of California dissertation.
McPherson, Laura E. 2019. Seenku argument-head tone sandhi: Allomorph selection in a cyclic grammar. *Glossa: A Journal of General Linguistics* 4(1). 22.
McPherson, Laura E. 2020. *A grammar of Seenku*. Berlin, Boston: De Gruyter.
Nikitina, Tatiana. 2017. Wan jazyk [The Wan language]. In Vydrin et al. (2017), 1032–1051.
Nikitina, Tatiana. 2019. Verb phrase external arguments in Mande: New evidence for obligatory extraposition. *Natural Language & Linguistic Theory* 37(2). 693–734.
Odden, David Arnold & Lee Bickmore. 2014. Melodic tone in Bantu: Overview. *Africana Linguistica* 20. 3–13.
Palancar, Enrique. 2016. A typology of tone and inflection: A view from the Oto-Manguean languages of Mexico. In Enrique L. Palancar & Jean Léo Léonard (eds.), *Tone and inflection. New facts and perspectives*, 109–139. Berlin: De Gruyter.
Palancar, Enrique L. & Jean Léo Léonard. 2016. *Tone and inflection. New facts and perspectives*. Berlin: De Gruyter.
Paperno, Denis. 2014. Grammatical sketch of Beng. *Mandenkan* 51. 1–130.
Paperno, Denis & Anna Maloletnyaya. 2017. Ben jazyk [The Beng language]. In Vydrin et al. (2017), 1001–1031.
Perekhvalskaya, Elena. 2017a. Mwan jazyk [The Mwan language]. In Vydrin et al. (2017), 718–765.
Perekhvalskaya, Elena. 2017b. Boko jazyk [The Boko language]. In Vydrin et al. (2017), 1052–1093.
Pullum, Geoffrey K. 1976. The Duke of York gambit. *Journal of Linguistics* 12. 83–102.
Rolle, Nicholas R. 2018. *Grammatical tone: Typology and theory*. Berkeley: University of California dissertation.
Sapozhnikova, Maria. 2017. Jogo jazyk [The Jogo language]. In Vydrin et al. (2017), 213–220.
Sapozhnikova, Maria. 2020. *Tonal alternations in verbal constructions in Jogo language* (Ton dialect). Moscow: Higher School of Economics. [Unpublished manuscript].
Smolders, Joshua. 2016. A phonology of Ganza (Gwàmì Nánà). *Linguistic Discovery* 14(1). 86–144.
Solomiac, Paul. 2014. *Phonologie et morphosyntaxe du dzùùngoo de Samogohiri* (Mande Languages and Linguistics / Langues et Linguistique Mandé 10). Köln: Rüdiger Köppe Verlag.

Stump, Gregory. 2015. Inflection classes. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 113–140. Oxford: Oxford University Press.
Tröbs, Holger. 2003. On the origin of some predicative markers in imperfective constructions in Manding. *Mandenkan* 38. 1–14.
Trommer, Jochen & Eva Zimmermann. 2015. Inflectional exponence. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 47–86. Oxford: Oxford University Press.
Vydrin, Valentin. 2002. Some hasty notes on the ways of the evolution of Mande tonal system. In Robert Nicolai & Petr Zima (eds.), *Lexical and Structural Diffusion*. Publications de la Faculté des Lettres, Arts et Sciences Humaines, Université de Nice et de la Faculté des Etudes Humaines, Université Charles de Prague, 243–264. Série: Corpus, Les cahiers 1.
Vydrin, Valentin. 2009. On the problem of the Proto-Mande homeland. *Вопросы языкового родства—Journal of Language Relationship* 1. 107–142.
Vydrin, Valentin. 2012. Aspektual'nye sistemy južnyx mande v diaxroničeskoj perspektive [Aspectual systems of Southern Mande in diachronic perspective]. *Acta Linguistica Petropolitana* 8(2). 566–647.
Vydrin, Valentin. 2016a. Toward a Proto-Mande reconstruction and an etymological dictionary. *Faits de Langues* 47. 109–123.
Vydrin, Valentin. 2016b. Tonal inflection in Mande languages: The cases of Bamana and Dan-Gwɛɛtaa. In Enrique L. Palancar & Jean Léo Léonard (eds.), *Tone and inflection. New facts and perspectives*, 83–108. Berlin: De Gruyter.
Vydrin, Valentin. 2017. Dan jazyk [The Dan language]. In Vydrin et al. (2017), 469–583.
Vydrin, Valentin & Maria Morozova. 2017. Loko jazyk [The Loko language]. In Vydrin et al. (2017), 414–456.
Vydrin, Valentin, Julia Mazurova, Andrej Kibrik & Elena Markus. (eds.). 2017. *Jazyki mira: Jazyki mande* [Languages of the world. The Mande languages]. Saint-Petersburg: Nestor-Istorija.
Welmers, William E. 1973. *African language structures*. Berkeley: University of California Press.
Welmers, William E. 1976. *A grammar of Vai*. Berkeley: University of California Press.