Understanding the Internal Variation of Interactive Grammar: The Phonetics of Onomatopoeias in Teŋukan (Dogon)

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This article is dedicated to Teŋukan Dogon onomatopoeias and the extent of their phonetic distinctiveness within the class of interactives. After analyzing the phonetic properties of 168 onomatopoeias collected during fieldwork activities in Dourou in Mali and contrasting them with what is known about another interactive category in Teŋukan, namely, conative animal calls (CACs), the authors conclude the following: while in certain aspects, the phonetic profiles of onomatopoeias and CACs are comparable, in several others, the phonetics of both categories differ substantially. Overall, onomatopoeias seem to be less extreme in their extra-systematicity than CACs. It is hypothesized that the partially different phonetic profiles of onomatopoeias and CACs have their origin in the distinct functions of these two categories (referential vs. directive), their dissimilar communicative goals (depicting vs. influencing) and contexts of use (narrative vs. direct speech), as well as their radically disparate addressees (human vs. non-human).

Keywords: *Dogon languages, Teŋukan, interactives, onomatopoeias, phonetics*

1 Introduction

The present article is dedicated to onomatopoeias in Teŋukan (also referred to as Teŋuso). Teŋukan is classified with the glottocode [teng1266] and constitutes one of the dialectal variants of Togo-Teŋu Kan (or Teŋu-Togo Kan). Togo-Teŋu Kan, catalogued with the glottocode [tene1248] and ISO 639-3 code [dtk], is, in turn, one of the (Western Plains) Dogon languages. Togo-Teŋu Kan has approximately 130 000 speakers who live in the central part of Mali; specifically, in the south-east of the Dogon region, in the areas adjacent to the Bandiagara escarpment, mostly south and south-west from it (Prost 1969; Sagara 1983; Hochstetler, Durieux & Durieux-Boon 2004: 11-13; Heath 2015: 4; Guindo 2021: 198; Sagara & Andrason 2023).

Our study focuses on the extent of the phonetic individuality of onomatopoeias within interactive grammar (cf. Heine, Kuteva & Kaltenböck 2014; Heine, Kuteva & Long 2020; Heine et al. 2021; Heine 2023) – or their formal distinctiveness. To be exact, we describe the phonetic properties of 168 onomatopoeias collected during our fieldwork activities and contrast them with what we observed previously in another interactive category in Teŋukan, namely conative animal calls (CACs) (Andrason & Sagara 2024). We thus aim to answer the following research question(s): Do onomatopoeias differ phonetically from CACs, and if so, what is the degree of this dissimilarity and, ultimately, the reason thereof.

The paper is structured in the following way: In Section 2, we provide the background of our study and explain its motivation. In section 3, we discuss the theoretical aspects of our research

– i.e., its conceptual framework and methodology – and locate it within the context of previous studies on onomatopoeias and CACs in Dogon languages. In Section 4, we introduce original data, describe the phonetics of Teŋukan onomatopoeias, and contrast them with those of CACs. In Section 5, we evaluate the results of this contrastive analysis and answer the research question(s). In Section 6, we conclude our article and suggest possible avenues for future research activities.

2 Background

(A) language consists of two main domains: sentence grammar and interactive grammar (Heine, Kuteva & Kaltenböck 2014; Heine, Kuteva & Long 2020; Heine et al. 2021; Heine 2023). These two types of grammars differ from semiotic, computational, psychological, neurological, and discursive perspectives. Sentence grammar (also referred to as 'prosaic language' or 'propositional language') has an analytic dimension: it is rule driven, processed in a sequential, compositional, and/or additive manner, generates novel speech (units), and is "organized in terms of propositional concepts and clauses and their combination". In contrast, interactive grammar has an expressive dimension: it is processed holistically, automatically, and intuitively, and exploits formulaic speech and theticals, i.e., "units whose functions are determined by the situation of discourse" (Heine 2023: 345, 360; see also Heine et al. 2021). As a result, interactive grammar distinguishes itself from sentence grammar functionally (the meaning of an element of interactive grammar is extra-sentential and metatextual) and formally (an element of interactive grammar is prosodically marked, it does not enjoy the status of a constituent, and its syntactic position is flexible; Heine, Kuteva & Long 2020; Heine 2023: 236).[1]

Sentence grammar includes the lexical classes of verbs, nouns, pronouns, adjectives, adverbs, numerals, adpositions, and connectors (e.g., conjunctions and complementizers). Interactive grammar includes attention signals, directives, discourse markers, evaluatives, interjections, response elicitors, response signals, social formulae, vocatives, conative animal calls, and ideophones – and, within ideophones, the topic of the present article, onomatopoeias (Heine 2023: 10). The above-mentioned interactive categories – or interactives in short – are operationally defined as "(a) invariable deictic forms that (b) [are] set off from the surrounding text semantically, syntactically and prosodically, […] (c) can neither be negated nor questioned" and (d) "provide insights into how speakers conceive themselves in the world of social communication" (Heine 2023: 7). While this definition applies to all interactives and distinguishes them *en bloc* from the categories of sentence grammar, interactives differ one from another. This also holds true of onomatopoeias.

According to their operational definition, onomatopoeias are lexicalized constructions that mimic sounds existing in the real world and can be used holophrastically, i.e., as autonomous and non-elliptical utterances, apart from entertaining a lexemic status of words (Johansson et al. 2020; Körtvélyessy 2020; 2024; Körtvélyessy & Štekauer 2020; 2024a; Andrason, Phiri & Fehn 2023; Heine 2023). As mentioned above, onomatopoeias are a subclass of ideophones. They occupy the

[1] Of course, the two types of grammars are connected (both conceptually and diachronically) and sometimes the borderline between them is fuzzy. The above distinctions are thought of as referring to the prototypes of both grammar domains.

lowest position on the hierarchy of ideophones which ascends from auditory sensations (i.e., onomatopoeias) to visual sensations and next to psychological and cognitive states (Dingemanse 2012: 663; 2018; Lahti, Barrett & Webster 2014; Johansson et al. 2020; Andrason, Phiri & Fehn 2021: 4; Heine 2023: 149). Ideophones themselves are defined as the interactives that are "used for a vivid depiction of sensory imagery of a state, event, object, or quality" (Heine 2023: 148; see also Voeltz & Kilian-Hatz 2001; Dingemanse 2012; 2018; Lahti, Barrett & Webster 2014; Meinard 2015; Ibarretxe-Antuñano 2017; Andrason 2020; Andrason & Heine 2023).

It is widely recognized that onomatopoeias differ from the other categories of the interactive domain by their semantic and syntactic properties. With regard to semantics, onomatopoeias are "descriptive" (Ameka 1992: 113, 2006: 743) or, more accurately, "fulfill [a] referential function" (Meinard 2015: 517, 167; Stange 2016: 17). That is, they "inform us about reality [and] point at a referent" (Andrason, Phiri & Fen 2023: 354) and "focus on an object of conceptualization" (Meinard 2015: 517-518). Indeed, while "the functions of [most] interactives are procedural", implying that an interactive is "used by the speaker to guide the hearer on how to interpret or frame some specific part of the discourse", onomatopoeias, as is true of all ideophones, have "rich conceptual contents" (Heine 2023: 181). Therefore, onomatopoeias not only depict the sounds made in nature (see *puk-puk* depicting a sound of knocking in Polish) but also often denote the actions that are associated with such sounds and/or lead to their production (see the use of *puk-puk* in *a on puk-puk do drzwi* 'and he knocked on the door').[2] With regard to syntax, apart from being used holophrastically as is true of interactives in general, onomatopoeias can be employed syntagmatically as clausal constituents. Like all ideophones, onomatopoeias can act as predicates or form parts of complex predicative nuclei – in the latter case being headed by *verba dicendi* and *facendi*. They may also function as modifiers, both ad-verbal/clausal (similar to adverbs) and ad-nominal (similar to adjectives) (Heine 2023; Andrason & Heine 2023; Körtvélyessy 2024). In their predicative uses, as is again common of ideophones, onomatopoeias exhibit a specific argument structure. On the one hand, in the traditional nomenclature of valency, ideophones, including onomatopoeias, can be intransitive, transitive, and doubly transitive (Andrason 2021: 6-8; see also Doke 1955; Fivaz 1963; Du Plessis 2010). On the other hand, in Heine's terminology and in consonance with their rich conceptual content explained above, ideophones and onomatopoeias "focus on a theme (T) rather than on the speaker or the hearer […] with the T argument […] refer[ing] to […] a 'state, event, object, or quality" (Heine 2023: 149).[3] Furthermore, as far as their syntax is concerned, while several types of interactives (e.g., interjections, conative animals calls, and vocatives) tend to "precede the sentence", onomatopoeic and ideophonic constructions usually "follow the sentence" (Heine 2023: 164). Because of the above properties, ideophones and thus onomatopoeias exhibit different grammaticalization tendencies than is the case of many other interactive categories. For instance, whereas interjections undergo interjectionalization (whereby non-interjective sources, e.g., nouns and verbs, develop into interjections) or "participate in

[2] Following Bańko (2008), we separate the formative parts of replicative onomatopoeias in Polish with a hyphen. This is in line with our own notation of replicative onomatopoeias in Teŋukan.

[3] In Heine's model of argument structure, the T argument is not limited to onomatopoeias/ideophones but also features in a few other types of interactives, i.e., attention signals, discourse markers, evaluatives, response elicitors, and response signals. However, these interactive categories make additional room for S (i.e., speaker) and H (i.e., hearer) arguments (Heine 2023: 181).

grammaticalization processes within the category of interactives" (whereby they are transferred from one interactive class to a different one), ideophones including onomatopoeias grammaticalize in the opposite direction, i.e., towards sentence grammar, specifically verbs, adverbs, adjectives, and even nouns (Heine 2023: 164; Andrason & Heine 2023; Körtvélyessy 2024).

While the semantic and syntactic distinctiveness of onomatopoeias within interactive grammar described above is virtually uncontroversial, little is known about phonetic features distinguishing onomatopoeias from the other interactive categories. Since interactive grammar is not arbitrary but in large part motivated, with onomatopoeias constituting a case in point, the different interactive categories should *reflect the world* by means of different structural material. To be fair, some phonetic differences between onomatopoeias and interactives, especially interjections, have been noted (Meinard 2015; Heine 2023; Andrason, Phiri & Fehn 2023). For instance, in Tjwao – a Khoe(-Kwadi) language spoken in Zimbabwe – onomatopoeias exhibit a greater extent of extra-systematicity than interjections, as far as both sounds and sound combinations are concerned. This means that onomatopoeias host a larger varieties of extra-systematic root structures (Andrason, Phiri & Fehn 2023: 377). Onomatopoeias also make more pronounced use of vocalic and/or consonantal harmony than is the case of interjections (ibid.). In contrast, onomatopoeias avoid forms consisting of clicks only, which is possible and relatively common in interjections (Heine 2023: 164). Both onomatopoeias and interjections make use of replicative structures which – as is true of interactives in general – constitute a phonetic/expressive device rather than a morphological/derivative strategy (see Körtvélyessy 2024 for onomatopoeias and Andrason, Harvey & Griscom 2023 for interjections). However, the presence of replications is more ubiquitous in onomatopoeias than interjections. This transpires through a larger number of replicative onomatopoeias than interjections and the fact that onomatopoeias tolerate longer, virtually unlimited, sequences than is the case of interjections (Heine 2023: 164; Körtvélyessy 2024). Moreover, in onomatopoeias, reduplication seems to be the most common replicative strategy, while no such tendency can be observed in interjections (compare the behavior of onomatopoeias in Tjwao [Andrason, Phiri & Fehn 2023] and Xhosa [Andrason 2020] with that of interjections in Hadza [Andrason, Harvey & Griscom 2023]).

The present article contributes to the study of the phonetic distinctiveness of onomatopoeias within interactives: We examine onomatopoeias by contrasting them with another interactive category, namely conative animal calls, i.e., directive holophrastic constructions used to influence the behavior of animals (Bynon 1976; Amha 2013; Aikhenvald 2010; Andrason & Karani 2021; Heine 2023; see section 2). The reason for choosing CACs as a contrastive type of interactives is twofold. First, we wanted to compare onomatopoeias with an interactive category with which they have not been contrasted before; especially to expand the scope of analysis beyond a comparison with interjections. CACs remain the most under-researched type of interactives and only for a few languages both onomatopoeias and CACs have been analyzed in detail. As Teŋukan CACs have recently been examined quite comprehensively (see section 3), the comparison of Teŋukan onomatopoeias with that particular category seemed almost natural to us. Second, perhaps more importantly, although CACs are a related category to onomatopoeias, both belonging to the interactive domain of grammar, CACs and onomatopoeias are also radically distinct from a functional perspective. While onomatopoeias are referential, depicting, and oriented towards human-addressees, CACs are directives, influence behaviors, and have non-human animals as their

addressees (see sections 3 and 5). Given these stark functional differences, one could expect that the phonetics of both categories will differ as well. Similarly, to expand the study of onomatopoeias and interactives beyond hegemonic languages spoken in the Global North, we have chosen an under-researched variety originating in the Global South as the language in which onomatopoeias will be studied. Consequently, by embarking on the present study, we wanted to simultaneously accomplish two goals: on the one hand, advance the theory of interactives, onomatopoeias in particular, and on the other hand, contribute to the documentation of Teŋukan and the Dogon linguistic family.

3 Conceptual framework, methodology, and research context

The determination of the phonetic distinctiveness of onomatopoeias from CACs will be guided by a prototype approach to interactives (Andrason & Dlali 2020; Andrason, Phiri & Fehn 2023; Heine 2023) and linguistic categorization more broadly (Croft 2003; Taylor 2003; Croft & Cruse 2004; Evans & Green 2006; Janda 2015). This implies two things. First, we understand a linguistic category – whether onomatopoeias, CACs, or other types of words and constructions – in terms of a network of similar yet different exemplars. Their similarity stems not from a shared feature (or a set of them) – some type of an invariant property or common denominator – but from their family resemblance (cf. Rosch 1973; 1975; 1977; 1978; Rosch & Mervis 1975). Despite lacking such an essentialist foundation, exemplars do not form a chaotic cloud. To the contrary, exemplars are organized systematically around an idealized representative of the category – the prototype – which they may match to a larger or (much) lesser degree. This means that the category becomes flexible and fuzzy at its borders. It includes not only members that comply with the prototype (these members are referred to as canonical) but also those that do so partially (semi-canonical) and minimally (non-canonical). While these non-canonical members are gradually more remote from the categorial nucleus epitomized by the prototype, they exhibit increasing affinities with other related (both conceptually and diachronically) categories. Second, our grammatical description of onomatopoeias and their comparison with CACs are guided by the features associated with the prototypes of these two categories. Since, as explained above, a prototype organizes the category, we harness it to provide a structure to our article as well. Accordingly, in our study, we will primarily assess the presence or absence of phonetic features regarded by scholars as prototypical in the onomatopoeic and CAC categorial networks.

The prototype of an onomatopoeia exhibits the following phonetic traits. Onomatopoeias attest to "articulatory simplicity" being built around monosyllabic or, albeit less typically, disyllabic segments that exhibit a CV or CVC structure (Körtvélyessy 2024: 1093). Onomatopoeias exhibit a range of extra-systematic features. First, onomatopoeias may contain phones that are absent or rare in the sentence-grammar system of a hosting language (Körtvélyessy 2024: 1087; Körtvélyessy & Štekauer 2024a: 6). These include sounds that extend beyond the International Phonetic Alphabet (IPA) (Andrason, Phiri & Fehn 2023: 354). Second, onomatopoeias tolerate aberrant phonotactic properties: sound combinations, distributions of phones, and degrees of (vocalic and consonantal) length, which can overall be nearly "unlimited" (Körtvélyessy 2024: 1088-1090). Third, onomatopoeias exhibit atypical suprasegmental traits,

especially with regard to tonal patterns, stress, phonation, and so-called modulations (e.g., stream intensity, loudness or whispering, and melody; ibid. 1093). In addition to their extra-systematicity, onomatopoeias favor "harmonious patterns […] and rhymes" (Andrason, Phiri & Fehn 2023: 354; see further below). This is related to the fact that onomatopoeias extensively draw on replications (Körtvélyessy 2024: 1096-1098). Although reduplicated patters are the most common, all types of multiplicative sequences seem possible (ibid. 1096) – their length only being "pragmatically limited" (ibid. 1098). Four types of replications are attested: full replicas (e.g., *gul-gul*), "replicas with vowel [and consonant] alternation" (e.g., *pif-paf*), related to the former type, "rhyming combinations" (e.g., *stuk-puk*; the three above examples are from Polish), and replicas with "linking elements" (e.g., *ding-a-ling* in English) (Andrason, Phiri & Fehn 2023: 354 drawing on Reay 2006). Importantly, as we explained in the previous section, replications found in onomatopoeias do not constitute a genuine derivative device – whereby a longer series would be derived from a shorter one and ultimately from a "singleton" (Andrason, Phiri & Fehn 2023: 354). Rather, onomatopoeic replications are viewed as expressive phonetic strategies (ibid; Körtvélyessy 2024: 1098) (for a detailed discussion of the onomatopoeic prototype consult Meinard 2015; Andrason, Phiri & Fehn 2023: 354; Körtvélyessy 2024: 1087-1098, Körtvélyessy and Štekauer 2024a: 6, and the references therein).

Mentions to onomatopoeias are sparse in the studies of Dogon languages. A few cursory references to this class of interactives may be found in works dedicated to Jamsay (Heath 2008a), Beni / Ben Tey (Heath 2010), Najamba-Kindige / Bondu-So (Heath 2009), Tabi-Sarinyere / Toro Tegu (Heath 2008b) and Yorno So (Heath 2017) as well as Togo Kan (Heath 2015) – the variety that is most closely related to Teŋukan among all Dogon languages. More prominent is the treatment of onomatopoeias in the grammar of Tommo So, which lists 32 onomatopoeic constructions (McPherson 2013).[4] The following phonetic observations emerge from all the above studies: onomatopoeias may exhibit a range extra-systematic features. These are related to both phones, phones' combinations, and their suprasegmental properties. For instance, in Dogon varieties in the prosaic system of which nasalized vocalic phonemes are rare or absent, these types of sounds may feature in onomatopoeias (Heath 2009: 23; 2008a: 25; 2010: 19; 2017: 19). Similarly, onomatopoeias attest to aberrant or rare syllabic structures: CV:y and CV:w in Beni (Heath 2010: 54), intervocalic *p* in Togo Kan (Heath 2015: 15), and syllable-final obstruents (e.g. *k*), geminated clusters in a stem-medial position, and extralong consonants (e.g., *gɔ̀rrr*) in Yorno So (Heath 2017: 13, 16). Onomatopoeias also tolerate aberrant tonal patterns, e.g., x̄-x̀-x̄ in Jamsay (Heath 2008b: 155; see also Heath 2009: 97 for Najamba-Kindige). Furthermore, Dogon onomatopoeias may be both punctual and replicated. Replications may be "bi- or tripartite" (Heath 2009: 97; 2015: 164; McPherson 2013: 208-209), as well as longer, e.g., CvCv-CvCv(-CvCv) (Heath 2015: 164).

Seemingly, the phonetic properties associated with the prototype of a CAC are similar to the prototypical features of onomatopoeias. CACs tend to be monosyllabic or draw on monosyllabic segments; exhibit a consonantal nature; tolerate extra-systematic sounds (both IPA and non-IPA, especially whistles and "kisses") and sound combinations; make extensive use of the so-called extensions: prolongations (resulting in the exaggerated degrees of length) and

[4] McPherson (2013) offers a much more detailed and compelling discussion of ideophones, the only that we are aware of in Dogon scholarship.

replications (which as in onomatopoeias constitute a phonetic rather than a derivative device); and carry marked modulations, e.g., high volume, intense/aggressive air stream, fast rate of delivery, and melody (Andrason & Karani 2021: 24-34; Andrason 2023).

Studies on CACs in Dogon are even scarcer than those dedicated to onomatopoeias. Indeed, these types of interactives do not feature in any grammar including the ones that we mentioned above. The only article that deals with CACs in Dogon is our own study dedicated specifically to CACs in Teŋukan (Andrason & Sagara 2024). In this article, we analyzed the meaning (semantics and pragmatics) and form (phonetics, morphology, and syntax) of CACs, as well as their ecolinguistic properties. After reviewing 57 CACs, we concluded that Teŋukan CACs reveal a number of phonetic characteristics which fully comply with the prototype of a CAC. CACs are simplicia: they are monosyllabic or consist of identical monosyllabic segments (see below). CACs draw on vocalic and consonantal material, but their consonantal nature is more "fundamental" (Andrason & Sagara 2024: 70). CACs may contain extra-systematic sounds, both absent and rare in the language. The former class involves both IPA phones, especially consonants (for instance, a voiceless labial nasal, clicks, and glottalized clusters), as well as sounds that are not included in the IPA (especially whistles and kisses). The latter class of sounds includes the glottal stop [ʔ], glottal approximant [h], and a variety of "*r*-type phones", i.e., [r, ʀ, ʁ, ɹ] (ibid.). CACs may also exhibit extra-systematic phonotactics: "non-vocalic nuclei and words, aberrant structures of syllables, and broader spectrum of closed syllables and consonant clusters" than is the case of sentence grammar (ibid.). CACs may be punctual and replicated. As far as replication is concerned, CACs attest to chains composed of two, three, four, and even five segments. Lastly, CACs tend to be realized with suprasegmental modulations which may involve "intensity, loudness, articulatory speed, and marked phonation" (ibid.).

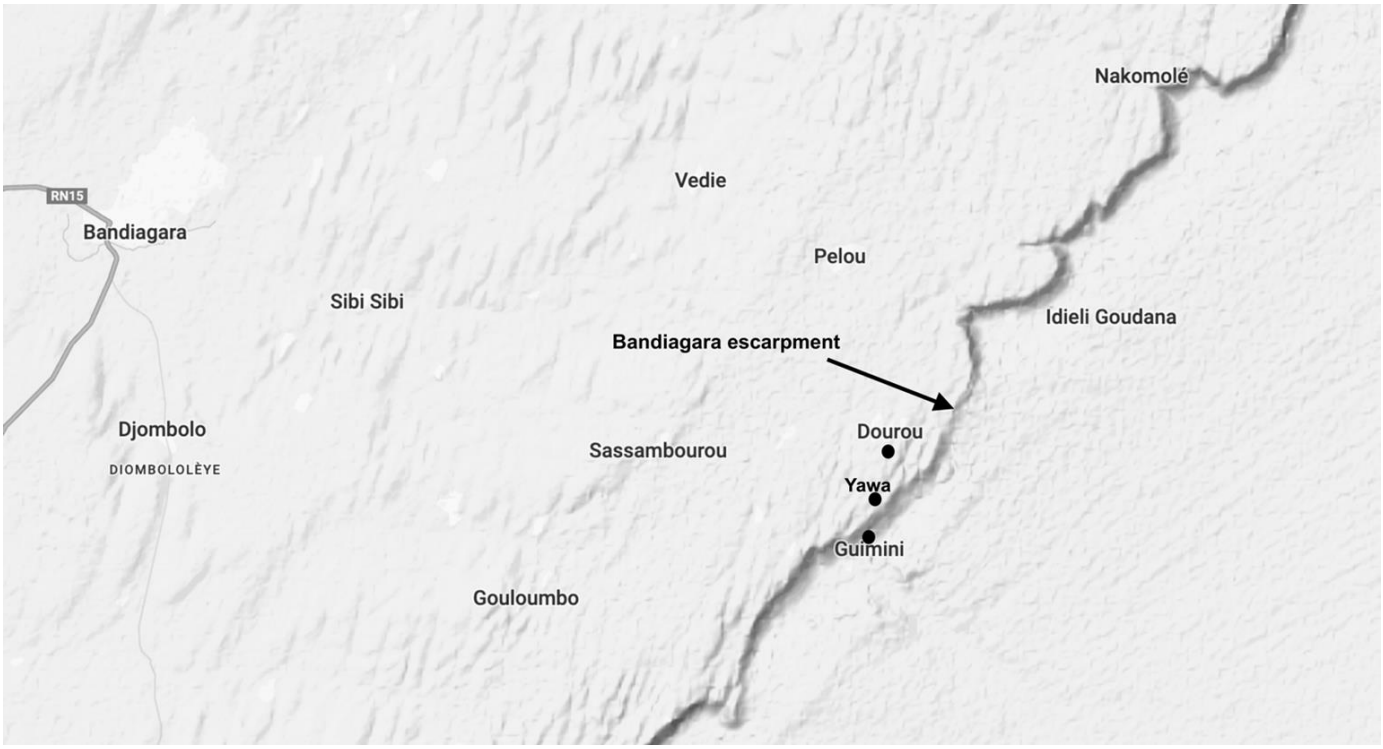
The examination of the phonetic distinctiveness of Teŋukan onomatopoeias draws on the original data that were collected during the fieldwork activities conducted in September and November 2023 in the villages of Dourou, Guimini, and Yawa. The three villages are located in the Dourou community, some 20 km from the city of Bandiagara and 700 km from the capital of Mali, Bamako.[5] Two km separate Dourou from Yawa, which is, in turn, two km away from Guimini. The total distance between Dourou and Guimini is four km on foot, although, because of the landscape's shape and the Bandiagara cliff, the trip by motorbike is 12 km long.

We started our fieldwork in Yawa. We invited 12 native speakers of Teŋukan, 5 women and 7 men to participate in our study. Their age ranged between 22 and 65. Onomatopoeias were collected in two semi-structured focus-group interviews. To elicit onomatopoeic lexemes, we used the operationalized definition of onomatopoeias provided in section 2 although framed in non-academic jargon; as well as the semantic guidelines borrowed from Körtvélyessy & Štekauer (2024a; 2024b) which we had carefully adapted to the reality of Dourou. These guidelines enumerated the most likely sources of sounds imitated by onomatopoeias, organized into seven domains: water, fire, air, artifact, instrument, human body, and other. The participants were asked to determine whether a given sound was present in their language and should this be the case, to pronounce it on its own and in context. We also invited the speakers to share with us any comments

[5] According to tradition, the three villages were founded by the same father and mother, Naturu and Baturu. It is believed that their oldest son, Badji stayed in Guimini; the second son, Antimé settled in Dourou; and the third son, Antanou went to Yawa.

related to the meaning and usage of the lexemes they produced. As one of us is a native Teŋukan speaker, the interviews were conducted in the Teŋukan language. From Yawa, we moved to Guimini where we interviewed 6 speakers, 2 women and 4 men, whose age varied between 30 and 50. In Guimini, each speaker was interviewed separately. In these individualized meetings, we followed the approach from Yawa. In cases where we noted some differences with the material collected in Yawa, we discussed such discrepancies with the participants. For instance, we asked the speaker whether they were familiar with a particular lexeme or some realizations of it. This allowed us to verify the panlectal status of all the onomatopoeias collected in Yawa and expand them by a few additional tokens. After Guimini, we travelled to Dourou where we spent the rest of our field visit. In Dourou, we interviewed 35 speakers, 12 women and 23 men, aged between 18 and 80. These interviews were the most comprehensive and detailed. We were able to converse with the speakers on a daily basis, not only during interviews but also in informal settings, e.g., during meals and while drinking tea. This allowed us to observe the spontaneous usage of onomatopoeias in natural conversations. The onomatopoeias and their examples of use were recorded on cell phones and extracted as MP4 files. Most recordings were done in Guimini and Dourou. When we returned to Bamako and started analyzing our data, certain clarifications were necessary. These follow-up interviews were conducted by phone. Overall, our data reflect the linguistic competence of 54 Teŋukan speakers: 53 participants and one of the authors of this article.

Map 1: The three sites of our fieldwork (Dourou, Guimini, and Yawa) in the Dourou Community



To properly evaluate our data, a description of the Teŋukan language system seems necessary. Given the space constraints, we refer the reader to our grammar sketch (Sagara and Andrason 2023), which is freely available online. Here, we only mention the most critical phonetic and morphological features. The standard phonetic inventory of Teŋukan contains the following consonants and approximants: [p, b, t, d, k, g, c, n, m, ɲ, ŋ, ɾ, l, d͡ʒ, j, w, s, h, ʔ, ɥ]. In this set, [c, h, ɥ] are rare, while [f] and [z] are limited to loanwords. The vocalic inventory of Teŋukan consists of [i, u, e, ɛ, o, ɔ, a] that can be oral and nasal, as well as short and long. There are three tones: high [ˊ], low [ˋ], and mid [ˉ]. They play both a lexical and grammatical function. Teŋukan exploits analytical, agglutinating, and synthetic strategies and thus "morphemes may appear as both separate words and more or less transparent affixes; and lexical and grammatical concepts can be expressed both morphologically and through syntactic periphrases" (ibid. 5)

4 Evidence: Phonetics of onomatopoeias in Teŋukan

Our fieldwork activities allowed us to identify a set of 168 onomatopoeias. The lexemes included in our database seem to be well entrenched in the Dourou community and have a panlectal rather than an idiolectal status. All these onomatopoeias are listed alphabetically in the Appendix, following standard Dogon spelling. The only divergence from this orthographic convention is the manner in which we render consonants and vowels realized with an exaggerated degree of length (see section 4.7). To represent this pronunciation, we make use of three identical graphemes (e.g. *sssup* and *siii*). The Appendix also provides the IPA transcription of each onomatopoeic form, including its tonal pattern.

The large number of onomatopoeias that are available to Teŋukan speakers, clearly contrasts with the number of CACs, which according to our data (Andrason & Sagara 2024) ascend to some fifty constructions. Nevertheless, the size of the onomatopoeic category in Teŋukan is not particularly impressive from a crosslinguistic perspective. That is, regardless of the genetic filiation of the language in which onomatopoeias are used, the geographic location of that language, and the number of its speakers, onomatopoeic categories tend to be robust. For instance, there are more than a hundred onomatopoeias in Tjwao (Andrason, Phiri & Fehn 2023), Polish (Bańko 2008), Japanese (Nagano 2024), varieties of Modern Chinese (Yun 2016), and many more languages (see Körtvélyessy and Štekauer 2024b for more cases). This crosslinguistic robustness of onomatopoeic categories stems from the productivity of onomatopoeias, i.e., the fact that the ability of "form[ing] new onomatopoeic words is an inherent property of each language" (Körtvélyessy 2024: 1107).[6]

4.1 *Simplicity*

[6] This robustness of the onomatopoeic category in Teŋukan is related to (both stems from and yields) the remarkable semantic specificity of some onomatopoeias. Compare *tɔi-tai-tɔi* with *toi-tai-toi*, which imitate the sound made by cereals being roasted, peanuts and corn respectively. The significant number of onomatopoeias in Teŋukan and other languages further transpires in the fact that the category of ideophones, which contains onomatopoeias as its subsets, may be even larger. For example, there are some 2,600 ideophones in Zulu (Doke 1955; Fivaz 1963) and nearly 2000 in Xhosa (Andrason 2020).

The vast majority of onomatopoeias collected by us as are structurally simple. 100 tokens (60%) are monosyllabic 'in nature'. One class of these onomatopoeias (50 tokens) is truly monosyllabic, e.g. *sɔb* and *kan*. The other class (also 50 tokens) includes lexemes that consist of monosyllabic segments replicated in series, i.e., [σ.σ] (34x; e.g., *pɔɔn-pɔɔn*), [σ.σ.σ] (15x; e.g., *cup-cap-cup*), and [σ.σ.σ.σ] (1x; *pɛpɛpɛpɛ*) (regarding the phenomenon of replication, see section 4.9). Onomatopoeias that exploit disyllabic structures are less common – 45 tokens (27%). As the previous type, they may be truly disyllabic (14x), e.g., *gulla*, or form chains of disyllabic segments (32x), i.e., [$\sigma_1.\sigma_2.\sigma_1.\sigma_2$] (23x; e.g., *bɛnhin-bɛnhin*), [$\sigma_1.\sigma_2.\sigma_1.\sigma_2.\sigma_1.\sigma_2$] (3x; e.g., *koru-karu-koru*). This latter class also includes the onomatopoeias exhibiting the following structures: [$\sigma_1.\sigma_1.\sigma_2$] (1x; *sinsine*), [$\sigma_1.\sigma_2.\sigma_2(.\sigma_2)$] (5x; *sɛbɛbɛbɛ*), and [$\sigma_1.\sigma_s.\sigma_1$] (1x; *vuuu-ga-vu*). Additionally, 8 onomatopoeias allow for an interpretation in terms of both mono- and disyllabicity, whether replicative or non-replicative (see, *hɛhi-hɛhi* and *leli-leli*). This in total increases the number of onomatopoeias that draw on one or two syllables to 155 tokens (92%). Onomatopoeias that exploit trisyllabic structures are much fewer (10x/6%). Three tokens are strictly trisyllabic (e.g., *kɛguru*). Seven others make use of replications: [$\sigma_1.\sigma_2.\sigma_3.\sigma_1.\sigma_2.\sigma_3$] (3x; e.g., *kegere-kegere*), [$\sigma_1.\sigma_2.\sigma_3.\sigma_1.\sigma_2.\sigma_3.\sigma_1.\sigma_2.\sigma_3$] (*gondoro-gandara-gondoro*), [$\sigma_1.\sigma_2.\sigma_3.\sigma_1$] (*sɔgɔrɔ-sɔg*), [$\sigma_1.\sigma_2.\sigma_3.\sigma_3$] (*surududu*), and [$\sigma_1.\sigma_2.\sigma_3.\sigma_1.\sigma_1$] (*sɛgɛrɛ-sɛg-sɛg*) (the latter three types each occur once). Lastly, quadrisyllabicity – the longest pattern attested in our data – is the least common (5x, i.e., 3%). Most such forms attest to strict quadrisyllabicity (4x; e.g., *aralanhin*)[7] while one token additionally draws on replication [$\sigma_1.\sigma_2.\sigma_3.\sigma_4.\sigma_4$] (*gundorololo*).

Although the behavior of onomatopoeias described above is similar to that exhibited by CACs, it is not identical. In primary CACs in Teŋukan, monosyllabicity is significantly more pronounced. Monosyllabic primary CACs are three times more common – not only twice, as is the case of onomatopoeias – than disyllabic ones. The longest primary CAC is trisyllabic (compare with quadrisyllabic onomatopoeias) and, furthermore, there is only one such primary CAC that is built of three syllables (Andrason & Sagara 2024). Furthermore, from a crosslinguistic perspective, the dispersal subclass of the CACs exhibits an even more marked tendency towards monosyllabicity. Monosyllabic structures constitute 77.5% of a sample from 79 languages and 247 constructions; disyllabic dispersals constitute 22%; and trisyllabic dispersals amount to less than 0.5% (Andrason 2023). In Teŋukan, this tendency associated with dispersals is, however, less patent and the ratio between monosyllabic and disyllabic dispersals less uneven.

4.2 *Consonantality and/or vocalicity*

Teŋukan onomatopoeias draw on vocalic and consonantal material to a comparable extent. First, nearly all onomatopoeic lexemes (specifically, 160 tokens or 95%) consist of both vowels and genuine consonants. Second, no lexeme consists of vowels or, alternatively, consonants only. The only exceptions to this evenly vocalic and consonantal nature are 8 onomatopoeias (5%) that contain approximants in addition to vowels. The most common approximant found in such cases is [w]: *wuu*, *wuu-waa*, *wui-wui*, *wɔ-wa-wɔ*, and *wow*. This group also includes the lexemes built

[7] Some of these forms may, however, also be interpreted as trisyllabic with replication of the first syllable, e.g., *koi-kondoro*. This would decrease the number of quadruplicated onomatopoeias.

around vowels and [h] – see *hi-hi*, *hɛhi-hɛhi*, and *hɔɔnhin* – which in several approaches to phonetics is treated as an approximant rather than a proper fricative (Hall 2007; Ladefoged & Maddieson 1996; Backley 2011). The absence of genuine consonants in all these lexemes may be interpreted as the indication that their vocalicity is, at least minimally, more pronounced than their consonantality.

Although like onomatopoeias, Teŋukan primary CACs exploit both consonants and vowels, the relevance of the consonantal material is greater, especially in primary CACs. This consonantal nature of CACs is patent through the following phenomena: several CACs are entirely built around consonants (e.g., *kss* [kṣː(ː)], *kh'* [kχ'], and *!* [!]); CACs favor consonantal onsets and conversely disprefer onset drawing on approximants and, especially, the so-called zero-onsets; and a CVC syllable structure is more common in CACs than in sentence grammar. This consonantality is also pervasive across languages and, as we mentioned in section 3, constitutes one of the features associated with the prototype of a CAC (cf. Andrason & Karani 2021). For dispersals, this consonantal nature is particularly evident: non-vocalic syllables constitute nearly 20% of all syllable types and C(C)VC(C), i.e., a syllable with consonants in both an onset and coda position, is the most common syllabic structure (Andrason 2023).[8]

4.3 *Consonants*

As far as their consonantal material is concerned, onomatopoeias make use of all the consonants that are available to Teŋukan speakers, expanding them by a few other sounds absent or rare in this language (see section 4.6 below). Stops – i.e., [p, b, t, d, k, g] – are the most common consonants in onomatopoeias, featuring 144 times in total. Among them, the velars, i.e., [k] and [g], are found in the largest number of lexemes: 40 and 31 respectively. The rhotic [ɾ] and the fricative [s] are also common, being attested in 25 onomatopoeias each. The rhotic class itself is even more visible with all rhotic consonants featuring 43 times in total (see the additional 18 cases of [r]). With the lateral [l] present in 10 lexemes, the class of liquids is attested 53 times. Fricatives, envisaged as a category, are not very frequent appearing 27 times. Indeed, apart from [s] mentioned above, the other fricative phones, i.e., [ʃ] and [v], are the least common, occurring each in one lexeme only. Gutturals, i.e., [h] and [ʔ], are visible but significantly less prominently than stops and rhotics/liquids, featuring 25 times in total. Nasals are even less common being found 17 times. Affricates are attested 16 times and sibilants (plain and affricated) 42 times in total. Table 1 below captures the consonants attested in onomatopoeias and the number of lexemes in which each of them is found:[9]

[8] The vocalic-consonantal nature of onomatopoeias also contrasts with interjections which tend to be vocalic, both in Teŋukan and across languages. Indeed, according to the data from our ongoing fieldwork activities, Teŋukan interjections "largely draw on vowels and approximants" (Andrason & Sagara 2024: 88). From a typological perspective, "vocalic nature" is one of the properties associated with the prototype of interjections (Nübling 2001; 2004; Andrason & Dlali 2020).

[9] It would certainly be interesting to compare the frequencies of phones (consonants, approximants, vowels) and other phenetic features attested in onomatopoeias with their counterparts in sentence grammar. At this stage, however, we do not have such exact statistical data for (any of the categories of) sentence grammar.

Table 1: The presence of consonants in Teŋukan onomatopoeias

Phone	Number of words
[k]	40
[g]	31
[p]	25
[ɾ]	25
[s]	25
[d]	23
[b]	15
[r]	18
[ʔ]	13
[h]	12
[l]	10
[t]	10
[d͡ʒ]	9
[n]	8
[t͡ʃ]	7
[m]	6
[ɲ]	2
[ŋ]	1
[ʃ]	1
[v]	1

Except for dispersals (see below), few – and still rather speculative – generalizations have been proposed with regard to the types of consonants used in CACs across languages. Overall, the variation of consonants in CACs in a language is usually less than what typifies onomatopoeias. This may however stem from the much more limited set of CACs in comparison to onomatopoeias, which as explained above tend to be numerous. Nevertheless, there is some evidence suggesting that primary CACs tend to make a more abundant use of voiceless consonants, stops [p, t, k] and non-pulmonic ones, especially clicks (cf. Heine 2023; Andrason, Mulugeta Onsho & Shimelis Mazengia 2024). While stops also feature abundantly in Teŋukan onomatopoeias, this pertains to both voiceless and voiced variants. Furthermore, no clicks are attested in our onomatopoeic data (see section 3.4 below). The typological profile of dispersals and, especially, their consonantal buildup, have been determined in a more systematic and exact manner (see Andrason 2023). Crosslinguistic evidence demonstrates that dispersals tend to contain voiceless sibilants (plain and affricated) especially [ʃ] and [s], and voiceless stops, especially [k] (and to a lesser extent [p] and

[t]). In contrast, liquids and rhotic are the least common in dispersals. This visibility of sibilants and [k] in dispersals and absence of liquids and rhotics are also patent in Teŋukan (Andrason & Sagara 2024). As we mentioned above, in Teŋukan onomatopoeias, voiced strops are equally common as voiceless ones, rhotics are highly prominent, and liquids are not rare either.[10]

4.4 *Approximants*

Two canonical approximants are attested in onomatopoeias in Teŋukan: the labio-velar [w] and the palatal [j]. The former, also found in a nasal variant [w̃], is significantly more frequent than the latter. Indeed, [w] appears in 15 onomatopoeias while [j] only in 3. The third approximant that is found in the standard phonetic system of Teŋukan, i.e., [ɻ] (see *puyi* 'quickly'), does not feature in the onomatopoeic material collected by us. Additionally, one can include [h] into the set of approximants due to its blended fricative-approximant character. As explained in the previous section, [h] is found in 12 lexemes.

Table 2: The presence of approximants in Teŋukan onomatopoeias

Phone	Number words
[w]	15 of which 6 are nasal
[h]	12
[j]	3

Approximants are very rare in primary CACs in Teŋukan. There are no instances of [w], while [j] and [h] feature rarely (Andrason & Sagara 2024). Similarly, from a crosslinguistic perspective, there is some evidence suggesting that approximants are not particularly common in CACs, and among them, [j] is more common than [w] (see the data from Maasai [Andrason & Karani 2021] and Macha Oromo [Andrason, Mulugeta Onsho, Shimelis Mazengia 2024]).[11]

4.5 *Vowels*

As was the case of consonants, all vowels that form part of the standard Teŋukan phonetic inventory feature in onomatopoeias. This includes both oral and nasal vowels and both short and long vowels (regarding length, see section 4.7 below). Any given oral vowel is more common than any nasal vowel or any diphthong. As a set, pure oral vowels feature 161 times (if oral diphthongs are included this number ascends to 183). Nasal vowels feature only 52 times (all of them are pure

[10] Rhotics are also rare in interjections. For instance, there are no rhotic consonants in 91 primary interjections in Gorwaa (Andrason & Harvey under review). Nor are these types of phones attested in primary interjections in Hadza and Maasai (Andrason, Harvey & Griscom 2023; Andrason & Karani 2023). Sometimes, as in Polish, the presence of rhotics is limited to sensorial interjections, which have an imitative foundation (see *brrr* that expresses cold by mimicking shaking).

[11] In contrast, approximants are highly pervasive in primary interjections and the visibility of [j] and [w] seems relatively similar although the palatal variant may be somewhat more common (Andrason & Karani 2023; Andrason, Harvey & Griscom 2023).

vowels).[12] The presence of diphthongs is limited to a meagre set of 22 occurrences. Among oral vowels – and all vocalic sounds in general – [u] is the most common, being followed by [a], and subsequently the open vowels [ɔ] and [ɛ]; with [i], [o], [e] being the least common. With the exception of [õ] and [ẽ], the nasal vowels (i.e., [ɛ̃], [ũ], [ĩ], [ɔ̃], and [ã]) exhibit extremely similar frequencies ranging between 10 and 8 words. The frequency of diphthongs also decreases gradually through minimal changes ([ui] > [oi] > [ai] / [ɔi] > [ɛi] > [iu]). However, the difference between the most common and the least common diphthong is considerable: compare [ui] which is attested in 6 lexemes with [iu] attested in one lexeme. (Additionally, onomatopoeias contain a vocalic rhotic [ɾ/ɻ], which is attested 5 times; see section 4.8.) Table 3 below presents the frequencies of all vocalic phones.

Table 3: The presence of vowels and diphthongs in Teŋukan onomatopoeias

Phone	Number of words
[u]	41
[a]	32
[ɔ]	23
[ɛ]	22
[i]	17
[o]	15
[e]	11
[ɛ̃]	10
[ũ]	10
[ĩ]	9
[ɔ̃]	9
[ã]	8
[ui]	6
[oi]	5
[ai]	4
[õ]	4
[ɔi]	4
[ẽ]	2
[ɛi]	2
[iu]	1

[12] See however, that in some words the final labio-velar approximant could alternatively be interpreted as forming a nasal diphthong. This would slightly increase the number of diphthongs, which feature 22 times in our analysis.

With regard to the quality of vowels – with oral and nasal types combined – the following may be observed: U-type vowels are the most frequent, being followed by A-type vowels, and next Ɔ- and Ɛ-types. I-type vowels are less prominent and O- and E-type vowels are the least visible (see Table 4 below). More generally, back vowel types U/Ɔ/O (102x) seem more frequent than front vowels Ɛ/I/E (71x).

Table 4: The exploitation of vocalic quality in Teŋukan onomatopoeias

Vowel type	Occurrences
[U]	51
[A]	40
[Ɔ]	32
[Ɛ]	32
[I]	26
[O]	19
[E]	13

Typological generalizations concerning the properties of the vocalic material found in CACs are still tentative, with the exception of dispersals, as was the case with consonants. The data from Tjwao, Arusa Maasai, Xhosa, and Oromo suggest that summonses favor high and/or front vowels (i.e., I- or U-type) (Andrason & Phiri 2023; Andrason, Mulugeta Onsho & Shimelis Mazenga 2024). The data from Teŋukan do not seem to support this claim. Less controversially, CACs disprefer nasal vowels. This is patent in both Teŋukan (Andrason & Sagara 2024) and crosslinguistically (cf. in Ewe and Polish) and clashes with what we observed in onomatopoeias, in which nasal vowels are well represented (see also onomatopoeic data from Tjwao; Andrason, Phiri & Fehn 2023). As far as the dispersal subset of CACs is concerned, both typological and Teŋukan evidence shows that U- and I-type vowels and, slightly less so, A-types clearly predominate (Andrason 2023). As explained above, in Teŋukan onomatopoeias, the visibility of [i] is much lower.[13]

4.6 *Phonic extra-systematicity*

The sounds found in the Teŋukan onomatopoeias are overwhelmingly systematic although divergencies from this systematicity are also attested. Interestingly, onomatopoeias do not contain sounds that are not included in the IPA. Inversely, speakers harness sounds which are present in the prosodic system of their language, even if in some cases rarely; or make use of sounds which

[13] This again clashes with the crosslinguistic gutturality of interjections, i.e., the common presence of glottal, epiglottal, pharyngeal, and velar consonants, and the preference for A-type vowels (Andrason, Harvey & Griscom 2023). Indeed, in Teŋukan, most interjections draw on guttural consonants [h], [ʔ] and the vowel [a] (cf. *a'a* [aʔa], *aaa* [a::], and *heee* [he::]; Andrason & Sagara 2024).

form part of the general consonantal and vocalic inventory of human language despite being absent in Teŋukan. The following phones, which are absent in the lexical classes of sentence grammar, appear in onomatopoeias: [r], [t͡ʃ], [ʃ], and [v]. While the fricative [ʃ] and [v] are each attested only in a single onomatopoeic lexeme (i.e., *kɔshi* and *vuuu-ga-vu*), the two other consonants are quite common. The trill features in 18 tokens and the affricate [t͡ʃ] is found in 7 tokens. As far as we know, [t͡ʃ], [ʃ], and [v] are limited to onomatopoeias. That is, they are absent not only in the lexical classes of sentence grammar but also in the other types of interactives, which similar to onomatopoeias are crosslinguistically prone to phonetic extra-systematicity. Two other consonants that are present in onomatopoeias are rare in the standard phonetic inventory of Teŋukan. These phones are [ʔ] and [h]. Although the glottal stop [ʔ] features in the lexemes of sentence grammar, its presence is restricted to words that involve the reduplication of a vowel-initial stem (Andrason & Sagara 2024; see also Heath 2015). In interactives, [ʔ] is attested without the above-mentioned restrictions. The glottal fricative/approximant [h] also belongs to the Teŋukan phonetic repertoire, however being limited to borrowings and, once again, interactives (Heath 2015; Andrason & Sagara 2024). As we explained in the previous sections, in onomatopoeias, both [ʔ] and [h] are common and do not display phonotactic restrictions similar to those noted above (see also section 4.8 below). Contrary to what typifies consonants, no extra-systematic vowels are attested in Teŋukan onomatopoeias.

Similar to onomatopoeias, primary CACs in Teŋukan may exploit extra-systematic sounds. The attested extra-systematic IPA phones are typically consonants: clicks ([!] and [|]), glottalized clusters (e.g., [kχ’]), and a voiceless labial nasal ([m̥]). CACs also draw on consonants that are absent or rare in sentence grammar, i.e., [ʔ] and [h], like onomatopoeias. In further similarity to onomatopoeias, CACs make use of the trill [r]. Nevertheless, CACs exploit a greater variety of rhotic consonants, additionally including [ʁ], [ʁ], [ɹ], and its weakened variant [ʊ]. Contrary to onomatopoeias, Teŋukan CACs tolerate various sounds that do not belong to the IPA. These include whistles, kisses, and other types of “noises” (Andrason & Sagara 2024), which are all absent in onomatopoeias. This marked phonic extra-systematicity of CACs and their ability to host both IPA and non-IPA extra-systematic sounds is regular from a typological perspective. The most common phones of the former set are clicks; the most common sounds of the latter set are kisses and whistles (Andrason & Karani 2021). As explained above, all such sounds are absent in Teŋukan onomatopoeias.

4.7 *Length*

Length plays a relevant role in onomatopoeias, both in vowels and consonants. Apart from exhibiting two degrees of length and being short or long – as, at least for vowels, is typical of the lexical classes of Teŋukan sentence grammar – several onomatopoeias exhibit exaggerated length degrees. We refer to all such prolonged realizations as extra-long and mark them with the symbol [ːː]. One should however note that the duration of such phones can be extended far beyond trimoraicity suggested by our notation. Extra-length is not a standard phonetic feature in Teŋukan and is absent in sentence grammar. It does however feature in other categories of interactive grammar (see next paragraph). The examples of onomatopoeias containing extra-long vowels are multiple: [bɛːː], [bɛ̃ːː], [buːː], [bũːː], [kɻːaːː], [mɛːː], [mɔ̃ːː], [sɛːː], [sɛ̃ːː], [siːː], [sɔ̃ːː], [suːː], [tũːː],

[vuːː-ga-vu], and [wuːː]. Vocalic material longer than bimoraic also arises in diphthongs whose latter part is long, e.g. [puiː], [tuiː], and [suiː]. Similar to vowels, consonants found in onomatopoeias can be short, long, and extra-long, of which the two latter types are absent (or highly rare) in sentence grammar. Long and extra-long consonants include the nasals [ŋ] and [m] (e.g., [puŋː] and [gudumː]), the sibilant [s] ([sːːup]), and a few liquids: the lateral [l] ([gulːa]), the tap [ɾ] ([paɾː-paɾː]) and, especially commonly, the trill [r] ([d͡ʒarː], [grurː], [grurː-grarː-grurː], [prirː-prirː], [prirːp], [srərː], [t͡ʃrurː], [wrurː], [gɔrərːː], [kɔrərːː], [krarːː], [pɛrːː-pɛrːː], and [t͡ʃurːː]).

Similar to onomatopoeias, Teŋukan CACs attest to the three degrees of length in consonants: short, long, and extra-long. The consonants allowing for long and extra-long realizations are the sibilant [s] and the rhotics, especially [r]. In contrast, no extra-long vowels seem to be entrenched in CACs although idiolectal spontaneous prolongations are always possible (Andrason & Sagara 2024). The presence of extra-long phones in CACs, not only consonants but also vowels, seems common from a crosslinguistic perspective and has been attested in a variety of languages (Bynon 1976; Amha 2013; Andrason & Karani 2021).

4.8 *Syllable structure*

The most common syllabic structure in Teŋukan onomatopoeias is an open syllable. This type of syllable is attested in 150 tokens. In nearly all such cases, an open syllable transpires as CV with the vowel being short or (extra-)long, oral or nasal, and monophthongal or diphthongal. This complies with the phonotactic principle of Teŋukan sentence grammar, where syllables tend to be open (Andrason & Sagara 2024; also drawing on Heath 2015). However, the presence of V-only open syllables is rare in onomatopoeias (3x). Very rarely, the onset position in open syllables is fulfilled by the approximants [w] and [j]. These last two facts may be related to the simultaneous, vocalic and consonantal nature of onomatopoeias explained in section 4.2. In one instance, the open syllable has a CCV form: see [gɾɔː] in *grɔɔ-gɔd* (see further below).

Closed syllables are much less frequent in our database, being found in 56 onomatopoeias. The most common type of a closed syllable is CVC, which appears in 45 tokens. Other types are significantly rarer: C_1C_2VC – 10x (e.g., [grurː], [krarːː], [prirː-prirː], [srərː], [t͡ʃrurː]); VC – 2x ([ug.ʔug] and [ɛh.ʔɛh]); and the only type with two consonants in the coda, i.e., [$C_1C_2VC_1C_2$] – 1x ([prirːp]). Overall, the following consonants are attested in codas in onomatopoeias: [r] – 13x; [ʔ] – 9x; [d] – 9x; [g] – 5x; [k] – 4x; [p] – 3x; [d͡ʒ] – 2x; [m] 2x; [n] – 2x; [b] – 1x; [h] – 1x; [l] – 1x; [ŋ] – 1x; [ɾ] – 1x; [t] – 1x. An additional 9 tokens contain syllables that end in the approximant [w]. Closed syllable and thus (C)VC(C) structures are exceptional in Teŋukan. The only codas attested in sentence grammar are sonorants, especially approximants [j] and [w], as well as [g]. This however takes place very rarely and "in a stem-internal position only" (Andrason & Sagara 2024: 74; see also Heath 2015: 13, 20). In a word-final position, sonorant codas are virtually limited to borrowings (Andrason & Sagara 2024). As our data indicate it, onomatopoeias tolerate not only a larger set of sonorant codas (i.e., [m], [n], [ŋ], [l], [r], and [-ɾ]), but also exhibit codas containing stops, both voiced ([b], [d], [g]) and voiceless ([p], [t], [k]), the glottal stop and glottal fricative/approximant ([ʔ] and [h]), and affricates ([d͡ʒ]). With the exception of [l], all such codas may appear in a word-final position. Interestingly, in onomatopoeias, the [n] found in coda need

not trigger nasalization of the vowel. See [kon-kon] and [pen-pen], which are by-forms of *konu-konu* and *penu-penu* respectively.

Onomatopoeias also attest to complex onsets. The most common variant is CCVC. The two other structures are much less frequent: CCV ([gɾɔː-gɔd] and [blaː-blaː]) and CCVCC ([prirːp]). All complex onsets exhibit a liquid as the second consonants: [r], [ɾ], and [l]. The most frequent liquid is the trill [r]. Overall, the following onset clusters are attested: [gr] – 3x; [pr] – 3x; [kr] – 2x; [gɾ] – 1x; [sr] – 1x; and [t͡ʃr] – 1x; and [bl] – 1x. Additionally, the initial segment of a cluster may be fulfilled by the approximant; see [wr] in *wrurr*.

Onomatopoeias also tolerate non-vocalic nuclei, which are extra-systematic from a sentence-grammar perspective. Three types of consonants may carry a syllable in such cases. The most common are rhotics: [ɾ] found in [kɻe-kɻa-kɻe] and, particularly often, [r] found in [kɻːaː], [kɻarːː], [pɻːp], and [pɻup-pɻup]. Additionally, in some optional cases, [t] may act syllabically as [t̩] in *trɛnɛ-trɛnɛ*, which is realized as [t̩.trɛ̃nɛ-trɛ̃nɛ], due to what speakers call a strengthened (i.e., emphatic) pronunciation. Lastly, as explained in section 4.7 above, long and extra-long consonants as well as extra-long vowels attested in onomatopoeias all generate extra-systematic syllable structures.

Similar to onomatopoeias, CACs exhibit a range of phonotactic oddities in Teŋukan: aberrant structures of syllables, broader spectrum of closed syllables and consonant clusters, and non-vocalic nuclei and words. Specifically, CACs exhibit [ʔ] and [h] in the coda and tolerate the coda sonorants [j, w, m] in a stem-final position. Obstruents are not restricted to a stem-initial position, and [ʔ], [d] and [d͡ʒ] may appear stem/word-medially. Initial, medial, and final consonants can be realized as geminated, i.e., long and extra-long. As explained in the previous section, vowels also tolerate an extreme degree of length. Lastly, CACs may host syllables with non-vocalic nuclei. In such cases, a syllable is carried by [s], [m], or [r]. In fact, two CACs are entirely consonantal and thus vowel-less: [!] and [kχ']. CACs also exhibit complex onsets of a CR form (Andrason & Sagara 2024).

4.9 *Replication*

Replications are highly common in Teŋukan onomatopoeias. Out of 168 tokens collected, 107 tokens, i.e. 64%, exploit some replicative strategies. The various types of replications attested render onomatopoeias particularly rhythmic and/or rhymical phenomena.

Reduplication is the most common replicative strategy. 67 onomatopoeias are reduplicated, e.g., *bɔi-bɔi*, *koyi-koyi*, *pɛl-pɛl*, *pɛrrr-pɛrrr*, *mɛnrɛnɛ-mɛnrɛnɛ*. Triplication is less frequent, with 19 triplicated lexemes attested, e.g., *dendendenw*, *gondoro-gandara-gondoro*, *su-sa-su*. There is only one case of quadruplication: *pɛpɛpɛpɛ*. Altogether, the reduplicated, triplicated, and quadruplicated onomatopoeias yield a robust set of 87 tokens.[14]

In most of the triplications mentioned above, i.e., in 17 lexemes out of the total of 19, the second segment exhibits a different quality of the vowel than the first and the third segments. This alternating vowel is always [a]. Six major alternation patterns are attested. Their subtypes and

[14] One lexeme, i.e., *hɔɔnhin*, may be analyzed as replicative or not. Note that *-hin* is a common segment in a few onomatopoeias such that the phonetic resemblance between *hɔɔn* and *hin* may be accidental rather than reflects some type of replica.

respective frequencies are provided in Table 5 below. In reduplicated onomatopoeias, vowel alternation is much less frequent with 6 cases attested: *logo-laga*, *suu-saa*, *jɔɔ-jaa*, *wuu-waa*, *bun-baan*, and *kɛyɛw-kɔyɔw*. Except for one lexeme (*kɛyɛw-kɔyɔw*), the alternated vowel is [a] (*logo-laga* and *suu-saa*) like in triplications.

Table 5: Vowel alternations in triplicated onomatopoeias

Type	subtype	Instances		
[u(u)-a(a)-u(u)]	[u-a-u]	5	3	*cup-cap-cup*
	[uu-aa-uu]		2	*suu-saa-suu*
[ɔ-a-ɔ]	[ɔ-a-ɔ]	5		*gɔd-gad-gɔd*
[o-a-o]	[o-a-o]	4		*koro-kara-koro*
[e-a-e]	[e-a-e]	1		*kre-kra-kre*
[ɛ-a-ɛ]	[ɛ-a-ɛ]	1		*pɛd-pad-pɛd*
[ii-aa-ii]	[ii-aa-ii]	1		*nii-naa-nii*

In a few lexemes, it is one syllable rather than the entire segment that is replicated. There are 9 onomatopoeias of this type, to which we refer as replicated partials. Reduplicated partials are attested 5 times. The replicated syllable may be the final syllable (*surududu* and *gundorololo*) or the initial syllable, which is repeated at the end of the word (*sɔgɔrɔ-sɔg*, *vuuu-ga-vu*) or at the beginning of it (*sinsine*).[15] Triplicated partials are attested three times. Again, the replicated syllable may be the final syllable (*sɛbɛbɛbɛ* and *turururu*) or the initial syllable (*sɛgɛrɛ-sɛg-sɛg*). There is one onomatopoeia with quadruplicated partials where the final syllable is repeated (*kɔjɔjɔjɔjɔ*).

Replications are also found in Teŋukan primary CACs, being however only common in summonses. In CACs, triplication is more common than reduplication and quadruplication. Crosslinguistically, replications are highly common in CACs. In some languages, such as Xhosa, CACs replicate only slightly less often than ideophones, 30% of which exploit some types of repetitive patterns (Andrason 2020: 155-157). This tendency towards replication is again particularly common in summonses (Andrason & Karani 2021: 34-35). Drawing on data from Tjwao (Andrason & Phiri 2023), Khwe (Kilian-Hatz 2008), and Macha Oromo (Andrason, Mulugeta Onsho, Shimelis Mazengia 2024), triplicated patterns seem more common than reduplicated and quadruplicated, as in Teŋukan mentioned above. Overall, summonses tend to favor long replicative sequences rather than the shortest ones possible, i.e., reduplicated. Other types of CACs, i.e. directionals and especially dispersals, tend to be punctual across languages (Andrason & Karani 2021).

[15] These onomatopoeias could also be analyzed as reduplicated.

4.10 *Tone*

Onomatopoeias exhibit a great variation of tonal patterns. Monosyllabic onomatopoeias with short vowels may host any of the tones found in the language: high (H) [kúk], low (L) [sɛ̀d], or middle (M) [kā̃]. In monosyllabic lexemes that contain a long vowel, the tonal quality persists throughout the nucleus: HH [kɔ̃́ː], LL [kùːk], and MM [grṹː]. In contrast, in monosyllabic token with extra-long vowels, the tone may either remain the same or change. Compare LLL [sùːː] and MMM [tũːː] with HLL [sɛ́ɛ̀ː], HMM [sáāːː], LHH [pùíːː], HLL [wúùːː], and MHH [mɔ̃́ɔ̃́ːː]. The same may be observed in disyllabic onomatopoeias. Tones may persist (L.L [kɔ̀rɔ̀rːː] and H.H in [súhí-súhí]) or vary (H.L [gɛ́d͡ʒù], L.H [gùdúmːː], and M.LH in [īlàáʔīlàá]). However, the H.L pattern seems to predominate, especially in replicated disyllabic lexemes such as [gɔ́dù-gɔ́dù] and [bújɔ̃̀-bújɔ̃̀]. Trisyllabic onomatopoeias generally alternate their tones and attest to the following patterns: H.L.M [ɔ̃́d͡ʒɔ̃̀hī̃], H.L.L [kɛ́gùrù], and H.H.H [kɔ̃́dɔ́rɔ́]. Analogously, quadrisyllabic onomatopoeias alternate their tones and exhibit the following sequences: H.L.L.M [áràl̃̀hī̃], HL.H.L.L [kóì-kógɔ̀rɔ̀], and H.L.L.LH [kógɔ̀rɔ̀kóì].

Tonal harmony – or the use of the same tonal pattern – is most visible in reduplicated monosyllabic short-vowel onomatopoeias such as [gɔ́d-gɔ́d]. In other types of reduplicated onomatopoeias, it is the entire pattern found in the first segment that may remain unchanged in the second segment: [pɔ̃̀ː-pɔ̃̀ː], [prùp-prùp], [bláà-bláà], [jɛ̀mí-jɛ̀mí], [búlù-búlù], [súhí-súhí], [īlàáʔīlàá], [kēgɛ̀ré-kēgɛ̀ré], and [kɔ̃́dɔ́rɔ́-kɔ̃́dɔ́rɔ́]. However, tonal alternations are also attested in reduplicated onomatopoeias as illustrated by [grɔ̀ː-gɔ́d]. In contrast to reduplications, triplicated onomatopoeias tend to alternate the tone in their subsequent segments such that the second segment differs from the first and the third (this is similar to the vocalic alternation discussed in section 4.9 above). See, for instance, H.L.H in [wɔ́-wà-wɔ́], [krɔ́r-kràr-krɔ́r], [súːː-sàːː-súːː], [gɔ́d-gàd-gɔ́d], [t͡ʃúp-t͡ʃàp-t͡ʃúp]; L(L).H(H).L(L) [kùːː-káːː-kùːː], [tɔ̀-tá-tɔ̀], [sù-sá-sù]; HH.MM.HH in [níːː-nāːː-níːː]; and H.H-L.L-H.H in [kɔ́rɔ́-kàrà-kɔ́rɔ́]. See also [dɛ̃́dɛ̀dɛ́w̃] and [dṹdù̇dṹw̃] in which three different tones (M.L.H) are used in the three segments. Nevertheless, examples in which the same tone is used in the three segments are also found: [pɛ̀d-pàd-pɛ̀d], [grūrːː-grārːː-grūrːː], and [kórù-kárù-kórù]. In the only quadruplicated onomatopoeia, the same tone persists: [pɛ́pɛ́pɛ́pɛ́]. Replicated partials may also carry the same tone ([súrùdùdù], [gṹdɔ́rɔ́lòlò], [sɛ́gɛ̀rɛ̀-sɛ́g-sɛ́g], [sɪ̀sɪ̀nè], [vúːː-gà-vú]) or alternate it ([sɛ̀bɛ́bɛ̀bɛ̀], [túrùrūrū], [sɔ̄gɔ̀rɔ̀-sɔ́g]). Overall, our data show a somewhat greater visibility of mid tones, which seem to be rare elsewhere in the language.

Similar to onomatopoeias, no clear tendency with regard to tones can be observed in primary CACs in Teŋukan (Andrason & Sagara 2024). However, from a crosslinguistic perspective, there seems to be some evidence supporting the claim that summonses tend to bear high tones in consonance with their "friendly" pronunciation. A similar preference for high tones is also observed in dispersals, which may reflect their "aggressive" realization (see primary CACs in Tjwao, Arusa Maasai, Xhosa, Ewe, Macha Oromo and three Akan varieties Asante, Bono, and Fante as discussed in Andrason & Phiri 2023 and Andrason, Mulugeta Onsho & Shimelis Mazangia 2024).[16]

[16] Onomatopoeias also clash with the tonal behavior exhibited by interjections. There are some crosslinguistic data indicating that interjections exhibit preference for high/extra-high tone on the first syllable (vowel or mora) and a decreasing tonal pattern, i.e., from higher to lower, in plurimoraic syllables and plurisyllabic words. This phenomenon

4.11 *Modulations*

All onomatopoeias collected by us lend themselves to exploit marked types of articulation or modulations. Any onomatopoeia may be "performed" in a way that approximates more or less closely the sound that it aims to imitate. This means that onomatopoeias can and, indeed, often are pronounced with an unusual volume (i.e., very loudly or on the contrary in whisper-line manner) or a particular articulatory speed (i.e., extremely fast or slowly). Speakers can freely navigate between two modulation extremes: pronunciations that are more "tamed" and thus less aberrant from a sentence-grammar perspective, on the one edge, and pronunciations that are highly extra-systematic, on the other edge (see section 5). The choice of a particular realization depends on the type of discourse or register, the degree of acquaintance among the interlocutors or people involved in the communication, and/or a general acceptability for such expressive realizations in a specific social context. In Teŋukan, such marked manners of articulation are generally confined to interactives (see next paragraph).

Similar to onomatopoeias, Teŋukan CACs tend to be accompanied by a marked articulation. These unusual articulation types, referred to in literature as modulations, may involve "intensity, loudness and articulatory speed", as well as a gentle articulation in the case of summonses and an aggressive articulation in the case of dispersals (Andrason & Sagara 2024). All such modulations are typical of CACs crosslinguistically (cf. Bynon 1976; Amha 2013) and are indeed associated with the protype of a CAC (Andrason & Karani 2021: 21, 34-35).

5 Evaluation

The data presented in the previous section reveal the following contrast between onomatopoeias and CACs, in Teŋukan and, whenever there is some evidence available, across languages:

(a) Both onomatopoeias and CACs are structurally simple in Teŋukan. However, this simplicity, in particular monosyllabicity, is much more patent in CACs than onomatopoeias.
(b) While vowels and consonants are exploited in Teŋukan onomatopoeias to a similar extent, in CACs, consonantal material seems more relevant than vocalic material. This particular relevance of consonants in CACs is pervasive cross-linguistically and the prototype of CACs is consonantal in nature. No such association has been proposed for an onomatopoeic prototype.
(c) Regarding consonants, Teŋukan onomatopoeias draw on a larger set of phones than CACs. In onomatopoeias, the most common consonants are stops (both voiced and voiceless), then liquids/rhotics, and finally sibilants. In contrast, CACs – both in Teŋukan and across languages – draw abundantly on only the voiceless types of stops. Crosslinguistically, CACs tend to exploit clicks, which are absent in Teŋukan onomatopoeias. In the dispersal

has been demonstrated for Hadza and also operates, to some extent, in Arusa Maasai (Andrason & Karani 2023; Andrason, Harvey & Griscom 2023).

class of CACs, sibilants and voiceless stops predominate typologically, while liquids and rhotics, quite visible in onomatopoeias, are very rare.

(d) Regarding approximants, [w] is more common than [j] in Teŋukan onomatopoeias. In contrast, in CACs – both in Teŋukan and typologically – [j] seems to predominate.

(e) Regarding vowels, onomatopoeias make use of all types of vowels available in Teŋukan, including nasals and diphthongs. Oral vowels are more common than nasal vowels, which are in turn more common than diphthongs. The various vowel types reveal the following quality hierarchy: U > A > Ɔ / Ɛ > I > O > E. This means that back vowels are more frequent than front vowels. Cross-linguistically, CACs, especially summonses, favor high and/or front vowels (i.e., I or U), although this trend is less patent in Teŋukan. In dispersals, U, I and A vowel types predominate, both in Teŋukan and across languages. Contrary to onomatopoeias, primary CACs disprefer nasal vowels.

(f) While both onomatopoeias and CACs may host extra-systematic phones in Teŋukan, only the latter category draws on whistles and kisses and thus sounds that expand beyond the IPA. In Teŋukan onomatopoeias and CACs, the only extra-systematic phones attested are consonants. Within the set of extra-systematic consonants, clicks and glottalized consonants are limited to CACs. Clicks are also more visible in CACs than onomatopoeias from a typological perspective.

(g) Both onomatopoeias and CACs make extensive use of length in Teŋukan and exhibit length degrees that are extra-systematic in this language: extra-long vowels as well as long and extra-long consonants. However, the presence of extra-long vowels is less marked in CACs. Onomatopoeias also attest to a larger set of consonants that tolerate extra-long realization than is the case of Teŋukan CACs.

(h) Similarly, both onomatopoeias and CACs may exploit extra-systematic syllable structures in Teŋukan. In the two categories, open syllables are much more common than closed syllables, as is true of Teŋukan sentence grammar in general. However, the presence of closed syllables is significantly more common in onomatopoeias and CACs than elsewhere in the language. Onomatopoeias attest to a larger set of consonantal codas in Teŋukan than CACs and may end in sonorants, rhotics, nasals, and stops (both voiced and voiceless). The codas found in onomatopoeias may be complex contrary to CACs and the categories of sentence grammar, more generally. Complex onsets are also more patent in Teŋukan onomatopoeias than CACs, with liquids being the only C_2 attested. Nevertheless, CACs tolerate non-vocalic nuclei better than onomatopoeias: more consonant types can carry syllables in CACs and entire non-vocalic CAC lexemes are attested, which is not the case of onomatopoeias.

(i) Replications are highly common in Teŋukan onomatopoeias with reduplication being the most common replicative strategy. Triplications tend to exhibit vowel alternations (V_1- V_2- V_1 with [a] as V_2) Replications are also found in Teŋukan CACs. However, in CACs, replications are only common in summonses. In summoning CACs, longer, i.e., triplicated patterns seem more common than shorter, i.e., reduplicated ones, which as noted above, are typical of onomatopoeias. Other CACs, both in Teŋukan and cross-linguistically, favor a punctual realization and thus non-replicated structures.

(j) Teŋukan onomatopoeias exhibit a great variation of tonal patterns. Some extent of tonal harmony is present in reduplicated tokens, while triplicated onomatopoeias tend to alternate their tone. Across languages, tonal patterns in onomatopoeias vary considerably from tonal flexibility to a preference for low tones. Like onomatopoeias, Teŋukan CACs draw on variety of tonal patterns. There is however some typological evidence suggesting that summonses and dispersals favor high tones.
(k) Both onomatopoeias and CACs make use of extra-systematic manners of articulation or modulations: unusual volume (loudness or whispering) or articulatory rate (speed or slowness). In onomatopoeias, this markedness can decrease or increase in response to the performativity of imitations. For CACs, communicative needs underlie the extent of this extra-systematicity: friendly pronunciation is associated with summonses while aggressive pronunciation is associated with dispersals.

The above results indicate that, while in certain aspects, the phonetic profiles of onomatopoeias and CACs are comparable, in several others, the phonetics of both categories differ substantially. In other words, despite their shared participation in the interactive domain of (a) language, while onomatopoeias and CACs are phonetically related, they are also different. The following divergencies seem the most relevant: onomatopoeias are less monosyllabic than CACs; more evenly consonantal-vocalic; exhibit a lesser tolerance for non-IPA sounds; favor shorter replicative sequences (than summonses) but also show lesser compatibility with non-replication (in comparison to directionals and dispersals); make larger use of vocalic length; attest to a more marked propensity to alternate vowels in replications; exhibit a greater variety of extra-systematic syllables and a more diversified set of codas – although a lesser ability to host non-vocalic nuclei and form non-vocalic words; and are less favorable towards high tones. This indicates that the differences between onomatopoeias and CACs pertain to nearly all phonetic aspects which were analyzed in this study and are relevant to the prototype of both categories: simplicity (monosyllabicity), vocality-consonantality, phonic and phonotactic extra-systematicity, replicability, and tones, as well as the phonic make-up in terms of the consonants, approximants, and vowels used. Overall, onomatopoeias seem to be less extreme in their extra-systematicity than CACs. Onomatopoeias are also more homogenous than CACs, the three sub-types of which (i.e., summonses, dispersals, and directionals) exhibit quite different sets of properties.

What is the reason for the phonetic dissimilarities attested in onomatopoeias and CACs? We think that the somewhat different phonetic profiles of onomatopoeias and CACs have their origin in the distinct functions of these two categories, their dissimilar communicative goals and contexts of use, and radically disparate addressees. As explained in section 2, onomatopoeias are referential – they depict sounds and actions associated with these sounds. Importantly, they are in principle addressed to other human interlocutors and often feature in narrative contexts, oral and even written. In contrast, CACs are directives addressed to non-human recipients. Although CACs have propositional content, usually equivalent to motion verbs (plain or accompanied by modifiers), their principal goal is not to describe an action but rather to trigger its performance on the part of the animal – and thus influence it. CACs are also generally confined to direct speech.[17]

[17] In the rare cases of their narrative use, CACs are generally confined to reported speech.

As far as onomatopoeias are concerned, their phonetic extra-systematicity by definition reflects the human ability to mimic sounds perceived in nature and reproduce them to other humans. Onomatopoeias depict, and if they require an addressee, their interlocutor is human. Given the diversity of sounds produced in the world – which can originate in humans themselves, as well as in animals, objects, and natural phenomena – the set of onomatopoeias can be (extremely) large, which increases the likelihood of a large set of systematic phones being used. As our study indicates, all phones that are available in a language should be present in onomatopoeias. Since such imitations are used in inter-human contexts including narratives, they need not make use of non-IPA sounds and, if such sounds occur, they can gradually be harnessed (or tamed) and rendered more systematic. This harnessing is a well-known phenomenon in ideophones where it refers to the "domestication" of ideophonic forms "from 'rebel' to 'tame" status'" (Heine 2023: 313) or "the process whereby ideophones become assimilated to prosaic language" (Haiman 2018: 104). Indeed, the narrative context, especially its written subtype, is highly conducive to this harnessing (cf. Levisen 2019; Andrason, Phiri & Fehn 2023). The general compatibility with nasal vowels and the greater visibility of vocalic length also stem from the large size of onomatopoeic categories. This creates grounds for a robust presence of *all* vowels, with vowels being as relevant as consonants in onomatopoeias. By contrast, the extra-systematicity of CACs is related to the morphism triggered by the non-human addressee of CACs or the fact that when directing their speech to animals, humans use some type of 'animal-ish'. CACs are directives, aimed at changing the behavior of an animal addressee. When coining and/or producing CACs, humans are therefore motivated first and foremost by uttering what they believe animals would understand and induce these animals to modify their comportment. Differently put, the phonetic extra-systematicity of CACs reflects the human's ability to adapt their language to what they think is either used by the animal (typical of summonses) or that can be perceived by the animal in a specific way (typical of dispersals). This kind of motivation, which is absent in onomatopoeias, explains several properties of CACs: their remarkable extra-systematicity, extensive use of non-IPA sounds, and lesser complexity (specifically, a more monosyllabic character) than is the case of onomatopoeias. Since from the human language's perspective, the addressees of CACs represent highly extra-systematic interlocutors, there is also no need to harness the sounds found in CACs nor is the context of use of CACs conducive to such harnessing. While both the punctuality of directives and dispersals and the longer replications of summonses are related to the respective communicative goals of these classes of CACs – i.e., direct an animal, repel it, and make it come closer – the explanation of the tendency towards reduplication in onomatopoeias (rather than, for instance, triplications) is more complicated (cf. Dingemanse 2015 regarding ideophones and reduplication). In some cases, sounds being imitated are indeed perceived as occurring in pairs. For example, in Polish, clock ticking (*tik-tak*), gun shooting (*pif-paf*), or walking (*człap-człap*) mimic a sound consisting of two parts. However, in many instances, there is neither direct nor indirect (metaphorical and diagrammatic) relationship between the sound and its reduplicated onomatopoeic imitation. Therefore, we think that systemic pressures may be at play in the regularization of reduplicative forms in onomatopoeias. While interjections and dispersing/directional CACs tend to be punctual, and summoning CACs are usually entrenched as triplications (or longer sequences), the most common replicative patterns in onomatopoeias are, due to systemic contrast, minimal replications, i.e., reduplication. The fact that, in CACs, only

voiceless stops are the most common consonants while, in onomatopoeias, all stops, including voiced ones, seem to be equally frequent and that liquids are highly visible in onomatopoeias but largely avoided in CACs reflect the consonantal nature of CACs and the vocalic-consonantal nature of onomatopoeias. Indeed, voiceless stops are the most consonantal and least sonorous – therefore, they may be the preferred consonants in CACs. In contrast, as onomatopoeias are equally consonantal and vocalic, they tolerate not only voiceless stops but are also fully compatible with voiced stops and liquids, which are more sonorous and occupy higher positions on the sonority scale, gradually closer to vowels, which are the most sonorous (cf. Clements 1990; Kenstowicz 1994; Parker 2002; 2008; 2011; 2015).

The results of our study also contribute to the theory of onomatopoeias. First, our data corroborate the soundness of the five crosslinguistic characteristics of onomatopoeias regarded by Körtvélyessy (2024: 1111) as "definitional". As expected, Teŋukan onomatopoeias have "potential to employ extra-systemic phonemes […], violate phonotactic rules [and], deviate from the suprasegmental properties of [the] language" (ibid.). Onomatopoeias also exhibit a "tendency to employ full and/or partial reduplication [and the capacity] for unrestricted multiplication" (ibid.). Second, our data provide further evidence demonstrating that consonantal and vocalic material is equally relevant in onomatopoeias (Körtvélyessy 2024) and that the phonetics of onomatopoeias may be tamed in some languages to a considerable extent (see Körtvélyessy's [2020] study of English). While Teŋukan onomatopoeias exhibit some extra-systematic IPA phones, they lack any non-IPA sounds. This more tamed character of onomatopoeias in Teŋukan is at odds with the oral character of our data but may reflect the relatively profound entrenchment of onomatopoeic lexemes in the local variety and thus their adaptation – although still imperfect – to the phonetic rules governing the Teŋukan language. Third, our study advances the comparative analysis of onomatopoeias and interjections (cf. section 2). The two categories contrast in their vocalicity/consonantality (interjections are vocalic while onomatopoeias are equally consonantal and vocalic), the presence of rhotic consonants and nasal vowels (which are extremely rare in interjections but common in onomatopoeias), the preference for a particular approximant (all approximants are common in interjections but only [w] is common in onomatopoeias), the visibility of consonantal gutturality and A-type vowels (highly prevailing only in interjections), and the use of tonal patterns (high and decreasing tones are typical of interjections but not onomatopoeias).

6 Conclusion

In the present article, we studied the extent of phonetic distinctiveness of Teŋukan Dogon onomatopoeias within the class of interactives. After analyzing the phonetic properties of 168 onomatopoeias collected during our fieldwork activities in the Dourou community in Mali and contrasting them with what we knew about another well-studied interactive category in Teŋukan, namely, conative animal calls (CACs), we concluded the following: while in certain aspects, the phonetic profiles of onomatopoeias and CACs are comparable, in several others, the phonetics of both categories differ substantially. Overall, onomatopoeias seem to be less extreme in their extra-systematicity than CACs. We proposed that the partially different phonetic profiles of

onomatopoeias and CACs had their origin in the distinct functions of these two categories (referential vs. directive), their dissimilar communicative goals (depicting vs. influencing) and contexts of use (narrative vs. direct speech), as well as their radically disparate addressees (human vs. non-human).

Our study did not clarify all the issues related to Teŋukan onomatopoeias and interactives. First, we limited our discussion to phonetics, inversely ignoring the semantics of onomatopoeias as well as their morphology and syntax. Second, we limited our contrastive analysis to CACs paying less or no attention to other interactive categories such as interjections, directives, and response signals and elicitators. As a result, a principled study of the semantic, morphological, and syntactic properties of onomatopoeias and their distinctiveness from the interactive categories other than CACs will unavoidably become one of our main research activities in the near future.

Abbreviations and symbols

C	consonant
CAC	conative animal call
H	high tone
L	low tone
M	middle tone
R	rhotic
σ	syllable
V	vowel

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Appendix

lexeme	IPA	meaning
aralanhin	áràlə̀hĩ̄	sound of burning straw
bɛɛɛ	bɛ̄ɛ́ː	sound made by a sheep
bɛɛɛn	bɛ̄̃ːː	sound made by a car
bɛnhin-bɛnhin	bɛ́hə̀̃-bɛ́hə̀̃	sound made by a burst / spark of fire
biu-biu	bíù-bíù	sound of fire when fanning it
blaa-blaa	bláà-bláà	sound of fire igniting
bɔi-bɔi	bɔ̀ì-bɔ̀ì	noise made while tapping ripe fruit
budunw-budunw	búdə̀ũ̃w-búdə̀ũ̃w	sound made by a calabash enclosed in water (musical instrument)
bulu-bulu	búlù-búlù	sound made by a calabash-based container when being filled with water
bun-baan	bũ̄-bã̄ã́	sound made by a plane
bun'	bṵ́ʔ	sound made while breaking wind with much noise
buuu	bùːː	sound made by water pouring
buuun	bũ̄ːː	sound made by a motorbike
buyɔn-buyɔn	bújə̀̃-bújə̀̃	sound made by a plane
cɔd	t͡ʃɔ́d	sound made by animals when defecating
cɔi-cɔi	t͡ʃɔ́i-t͡ʃɔ̀ì	sound coming from the ground when cultivating it
cɔki	t͡ʃɔ́kì	sound of digging the ground
cɔɔn	t͡ʃɔ̃̀ː	sound made by a fish coming close to the surface of the water
crurr	t͡ʃrūrː	sound made by animals when urinating
cup-cap-cup	t͡ʃṵ́p-t͡ʃə̀ap-t͡ʃṵ́p	sound made while walking on water
currr	t͡ʃṵ̀rːː	sound of water coming out of a small hole/opening
dendendenw	dɛ̃̄dɛ̀dɛ́w̃	sound made by tam-tam
dui-dui	dúí-dúí	sound made by an anvil in the workshop of a blacksmith / the forge
dundundunw	dũ̄də̀ũ̃dṵ́w̃	sound made by a drum
ɛh-'ɛh	ɛ̀hʔɛ̀h	imitation of stuttering
gɛju	gɛ́d͡ʒù	sound made when removing ashes
godu-godu	gódù-gódù	sound made a closed bidon (with a tap)
gondoro-gandara-gondoro	gɔ̋dɔ̀rɔ̀-gə̃̀dàɾà-gɔ̋dɔ̀rɔ̀	sound of stones on the ground
gɔd-gad-gɔd	gɔ́d-gàd-gɔ́d	liquid (especially, sauce) stewing

gɔd-gɔd	gɔ́d-gɔ́d	sound of boiling; sound made by a stew during its preparation in an open pot
gɔdu-gɔdu	gɔ́dù-gɔ́dù	sound made by a stew during its preparation (closed pot)
gɔrɔrrr	gɔ̀rɔ̀r::	sound made while snoring
grɔɔ-gɔd	grɔ̀:-gɔ́d	sound made by *to* (a traditional Dogon dish) while being boiled
gru'	gɾúʔ	sound made by big animals while walking
grurr	grūr:	sound made by the stomach
grurr-grarr-grurr	grūr:-grār:-grūr:	sound made by a bloated belly
gruun	grṹ:	sound imitating animals crying
gud-gud	gúd-gúd	liquid stewing; sound made by meat being cooked
gudumm	gùdúm:	sound of stones exploding during a dynamite blast
guii	gúì:	sound of a solid object falling to the ground
gulla	gúl:à	sound of water/liquid when being swallowed in large gulps
gun-gun	gṹ-gṹ	sound imitating whispering
gundorololo	gṵ́dóɾólòlò	sound made by a round stone rolling (down)
hɛhi-hɛhi	hɛ̀hí-hɛ̀hí	sound made by an old person laughing
hi-hi	hí-hí	sound made by a child laughing
hɔɔnhin	hɔ̃̀ɔ̃́hi̋	sound made by a donkey
ila-ila	íláʔílá	sound of rubber being blown away by the wind
ilaa-ilaa	īlàáʔīlàá	sound made by a fire
jarr	d͡ʒār:	sound made when delimiting/outlining the plot (to cultivate something, construct, play etc.)
jɛmi-jɛmi	jɛ̀mí-jɛ̀mí	sound of fire when fanning it
jɔd	d͡ʒɔ́d	sound of a bucket when placing it on the ground
jɔɔ-jaa	d͡ʒɔ̀:-d͡ʒà:	sound made by hot air
kai'	káìʔ	sound made by hand bones
kan	kã̄	sound of the branch breaking away from the tree
kang-kang	kã̄g-kã̄g	sound made by a cock/by a hen laying eggs
kank-kank	kã̄k-kã̄k	sound made by a crow
kede-kede	kédé-kédé	sound made by a woman laughing
kegere-kegere	kēgɛ̀ɾé-kēgɛ̀ɾé	sound made by dried peas and fruit stones against a surface
kenhin-kenhin	kɛ́hi̋-kɛ́hi̋	sound made by a hammer hitting stone
kerenw-kerenw	kéɾɛ́w̃-kéɾɛ́w̃	sound of keys rattling
kɛguru	kɛ́gùɾù	sound made when making a hole in a rock
kɛi-kɛi	kɛ́ì-kɛ́ì	sound of hard wood cracking in the fire
kɛnki-kɛnki	kɛ́kì-kɛ́kì	sound made while coughing

kɛyɛw-kɔyɔw	kɛ́jɛ̀w-kɔ́jɔ̀w	sound made by dead leaves (when crushing, breaking, stepping on them)
kodo-kodo	kódó-kódó	sound made by a man laughing
kogorokoi	kógòɾòkóì	sound made by a calabash
koi-kogoro	kóì-kógòɾò	sound made when knocking/tapping a dry tree shell
koi-kondoro	kóí-kṍdòɾò	sound made by pebbles
koii-koii	kóí:-kóí:	sound coming from the hill during its demolition
kon(u)-kon(u)	kón(ù)-kón(ù)	sound made by a bowl when placed on the ground
kondoro	kṍdóɾó	sound of empty cooking pot in contact with the ground
kondoro-kondoro	kṍdóɾó-kṍdóɾó	sound made by dry animal skin when putting them on top of each other
konhiin	kṍhĩ̀:	sound made by a *daba* (a hoe-type tool used to cultivate the field) in contact with the ground
koro-kara-koro	kóɾó-kàɾà-kóɾó	sound of water falling on a metal sheet
koru-karu-koru	kórù-kárù-kórù	sound made by pestles and a mortar
koyi-koyi	kójì-kójì	sound made when cutting a dry tree
kɔd	kɔ́d	sound made by animals when defecating
kɔi'	kɔ́ìʔ	sound made by the spine/vertebrae
kɔjɔjɔjɔjɔ	kɔ̀d͡ʒɔ́d͡ʒɔ̄d͡ʒɔ̄d͡ʒɔ̀	sound of urinating
kɔk-kɔk	kɔ̀k-kɔ̀k	sound made by a cock
kɔɔn	kɔ̃́:	sound made by a frog
kɔrɔrrr	kɔ̀rɔ̀r::	sound made by finger bones
kɔshi	kɔ̀ʃí	sound made by matches being lit
krarrr	krár::	"metallic" sound made when soldering something
kre-kra-kre	kɾ́é-kɾ̀à-kɾ́é	sound made when shaking a liquid in a glass/bottle
krɔr-krar-krɔr	krɔ́r-kràr-krɔ́r	sound made by aluminium packaging/wrap
krraaa	kɾ̀:ā::	sound made when scratching a rock
kuk	kúk	sound made by the bones of the neck
kuru'	kúɾùʔ	sound made by hip bones
kuu-kaa-kuu	kù:-ká:-kù:	sound made by a leather bag when carrying it on one's back
kuuk	kù:k	sound made by an owl
leli-leli	lélì-lélì	sound imitating the walk of a limping person
logo-laga	lògó-làgà	sound of water/liquid being shaken in a container
mɛɛɛ	mɛ̄ɛ́:	sound made by a goat
mɛm	mɛ́m	noise made when closing/filling up a hole
mɛnrɛnɛ-mɛnrɛnɛ	mɛ̃̀rɛ̃̂nɛ̀-mɛ̃̀rɛ̃̂nɛ̀	noise made by wet corn stalks falling to the ground

mɔɔɔn	mɔ̄ɔ́ː	sound made by a cow/ox
nii-naa-nii	níː-nāː-níː	sound made when pedalling a bike
ɲanw	ɲa̋w̋	sound made by a cat
ɲɔnhin	ɲɔ́hi̋	sound of bricks being crushed
ɔnjɔnhin	ɔ́d͡ʒɔ̀hi̋	sound of fire igniting
paan'	pa̋ːʔ	sound made while breaking wind (a long fart)
pajai-pajai	pàd͡ʒáì-pàd͡ʒáì	echo sound in the hills
pan	pa̋	sound made by someone blowing their nose
pane-pane	pánè-pánè	noise made when cutting a wet tree trunk
parr-parr	páɾː-páɾː	sound made by a spatula when cooking
peet-peet	péːt-péːt	sound made by a flute
peg-peg	pég-pég	clapping sound
pen(u)-pen(u)	pén(ù)-pén(ù)	sound made when tapping unripe fruit/vegetables
pɛd-pad-pɛd	pèd-pàd-pèd	sound made by flip flops when walking
pɛɛn	pɛ̋ː	sound made while breaking wind
pɛl-pɛl	pèl-pèl	sound made by corn being harvested
pɛn-pɛn	pɛ̋-pɛ̋	sound made when sneezing because of a cold
pɛpɛpɛpɛ	pɛ́pɛ́pɛ́pɛ́	sound made by cool air
pɛrɛ-pɛrɛ	pɛ́rè-pɛ́rè	sound made by air/wind while resting in a cave
pɛrrr-pɛrrr	pèrː:-pèrː:	noise made by walking on straws (or cereal stalks)
pii-pii	píì-píì	sound of watering
pɔdu'	pɔ́dùʔ	sound of mud falling
pɔɔn-pɔɔn	pɔ̄ː-pɔ̄ː	sound of animal drinking
pr(i)rrp	prīrːp	sound made by a whistle
prirr-prirr	prírːprírː	sound made when spinning wool
prup-prup	prùp-prùp	sound made by the fabric loincloth when walking
puii	pùíː	sound made by bursting root vegetables while being cooked
puŋŋ	púŋː	sound made by vegetables bursting while being smoked underground
sa'-sa'	sàʔsàʔ	sound of seeds being crushed
saaa	sáāː	noise made by someone falling
sɛw-sɛw	séw-séw	sound made by bare feet on the ground
sɛbɛbɛbɛ	sɛ̀bɛ́bɛ̀bɛ̀	sound of water flowing
sɛd	sɛ̀d	sound made when spitting saliva
sɛɛɛ	sɛ́ɛ̀ː	sound of water being filtered
sɛɛɛn	sɛ̰̀ː	sound of boiling tea

sɛgɛnw-sɛgɛnw	ségɛ̃̀w-ségɛ̃̀w	sound made by coins
sɛgɛrɛ-sɛg-sɛg	ségèɾè-ség-ség	sound made by a calabash pierced with shells (musical instrument)
siii	sì::	sound made while tickling someone
siin	sĩ̄:	sound made by animals when snorting
sinsine	sĩ̀sĩ̀nè	sound made by a cricket
siwuu	síwù:	sound made by an eagle
sɔb	sɔ́b	sound made by an axe hitting something
sɔgɔrɔ-sɔg	sɔ̄gɔ̀ɾɔ̀-sɔ́g	sound made by a *kɛwɛrɛ* (musical instrument made of calabash played by circumcised youth)
sɔɔɔn	sɔ̃̄::	sound made by a radio
srɔrr	srɔ̀r:	sound made by someone suffering from diarrhoea
sssup	s::úp	sound of a solid object when falling into water
su-sa-su	sù-sá-sù	sound of a bucket when drawing water from the well
suhi-suhi	súhí-súhí	noise made when chattering
suii	sùí:	sound made by bursting root vegetables while being cooked
surududu	súɾùdùdù	sound made by a water fountain
suu-saa	sù:-sà:	sound made by a wind in the countryside
suu-saa-suu	sú:-sà:-sú:	sound made by a fan
suuu	sù::	(a) sound of rain; (b) sound of air passing through the ear
(t)trɛnɛ-(t)trɛnɛ	(ṭ)tɾɛ̃̀nè-tɾɛ̃̀nè	sound of water/liquid being sipped through the lips
tɛi-tɛi	tɛ̀ì-tɛ̀ì	noise made when chattering
toi-tai-toi	tóì-tàì-tòí	sound made by cereals (especially, corn) being roasted
tɔ-ta-tɔ	tɔ̀-tá-tɔ̀	noise made when walking on mud
tɔi-tai-tɔi	tɔ́ì-tàì-tɔ̀í	sound made by cereals (especially, peanuts) being roasted
tuii	tùí:	sound made by bursting root vegetables while being cooked
tun-tun	tũ̄-tũ̄	sound made when testing a microphone
turururu	túrùrūrū	sound made by a horn
tuuun	tũ̄::	sound made by a tv
ug-ug	úg-úg	sound made by cereals in boiling water
vuuu-ga-vu	vú::-gà-vú	sound made by the cloth when rubbing it against other cloth
warau'	wāràúʔ	sound made by any solid object shattering
wɛj	wɛ́d͡ʒ	sound of a stone being broken in two
wow	wów	sound made by a dog
wɔ-wa-wɔ	wɔ́-wà-wɔ́	sound made by a crowd of people perceived from a distance
wrurr	wrūr:	sound of a wall collapsing

wui-wui	wùì-wùì	sound imitating a distant cry
wuu-waa	wù:-wà:	sound of a storm/tornado
wuuu	wúù:	sound made by a strong (rainy) wind