Prosody of discontinuous nominal phrases in Indian languages

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ABSTRACT
The purpose of this survey is to compare the tonal and prosodic structure of discontinuous nominal phrases in several Indian languages with those of the better studied intonation languages, such as English and German. From a syntactic perspective, the SOV base order and the free constituent order property in nearly all Indo-Aryan, Dravidian, and Tibeto-Burman languages lead to a fairly rich system of discontinuous NPs of the type involving two independently generated NPs. From a prosodic perspective, the Indian languages discussed in the article are prototypical examples of phrase languages, i.e., the intonation is not dependent on variable pitch accent placement, but is rather based on the existence of prosodic domains, each with a characteristic 'phrasal' intonation. We will see that the division between cohesive and non-cohesive patterns that has been made for intonation languages is blurred in these languages. In line with this observation on prosody, the hierarchy-preserving and hierarchy-inverting discontinuous nominal phrases are not always easy to tell apart syntactically.

1 Introduction

More often than not, the study of prosody is confined to base word order without any change in information structure, i.e. declarative sentences with broad focus. This strategy is used to identify and study the basic tonal structure of a language, the position of pitch accents, boundary tones, and other intonational peculiarities. However, the relationship between tones, prosody, and syntax also needs to be studied with non-canonical word orders, as only special word orders can reveal more subtle properties of the prosodic and tonal patterns of languages. This paper examines the prosody of discontinuous nominal phrases (NPs) in several Indian languages: three Indo-Aryan languages (Assamese, Bengali, and Hindi), two Dravidian languages (Tamil and Malayalam), and two Tibeto-Burman languages (Bodo and Meithei).[1] The purpose of this survey is to compare the tonal and prosodic structure of these languages with those of the better studied intonation languages, such as English and German. Indian languages are still understudied, even though this area of linguistic investigation has experienced a rapid development in the last decades. The present article is a modest contribution to this research area.

All data in this paper were elicited in the course of interviews with native speakers and linguists. The data come from a long questionnaire on discontinuous NPs that was elaborated for the elicitation of data on this topic. We also asked our colleagues to pronounce the sentences elicited, sometimes in different information structural contexts if available.

The article is structured as follows. In Section 2, discontinuous NPs are first given a definition and two principled distinctions in their grammar are introduced. The first one is syntactic. Discontinuous NPs can be 'hierarchy-inverting' or 'hierarchy-preserving'; see Fanselow & Féry (in preparation) for this distinction. The second division concerns their prosodic structure and distinguishes 'cohesive' from 'non-cohesive' prosodic structures. These two distinctions are useful in a large number of European languages, especially in those where pitch accents change along with pragmatics, for example Slavic and Germanic languages, but also Baltic, Caucasian, Greek, and most Romance languages, although it is not clear whether they can be considered universally valid.

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[1] In the context of this research enterprise, we also collected data from four further Indo-Aryan languages (Gujarati, Maithili, Marathi, Oriya/Odia), and two further Dravidian languages (Kannada, Telugu) that we will not go into here because data collection could not reach a satisfactory level.

Section 3 addresses the role of information structure in the formation of discontinuous NPs: Focus, Givenness, and Topic are the categories used. It is shown that discontinuity is often related to differences in the information structural roles of the parts of the discontinuous construction.

Section 4 is a short survey of the main properties of the intonation system of some Indian languages. It is suggested that these Indian languages show a great deal of similarities across several families of languages.

In the following sections (Sections 5 to 7), the relationship between syntax and prosody of discontinuous NPs in the Indian languages mentioned above is examined from the following perspective: do we find a main division between cohesive and non-cohesive prosodic structure, especially in relation to a main syntactic division between hierarchy-preserving and hierarchy-inverting discontinuous NPs? The answer differs among the languages considered. From a syntactic perspective, the SOV base order and the free constituent order property present in nearly all Indo-Aryan languages lead us to expect a fairly rich system of discontinuous NPs of the type involving an independent generation of two NPs. From a prosodic perspective, Indian languages are prototypical examples of phrase languages, i.e. the intonation is not dependent on variable pitch accent placement, but is rather based on the existence of prosodic domains, each with a characteristic 'phrasal' intonation. We will see that the division between cohesive and non-cohesive patterns that has been made for intonation languages and that is summed up in Section 2.2 is blurred in the Indian languages. In line with this observation on prosody, we will also see that the hierarchy-preserving and hierarchy-inverting discontinuous NPs, see Section 2.1, are not always easy to tell apart syntactically in many Indian languages.

The last section contains a conclusion and a summary of the main results.

2 Two basic distinctions

This section introduces two basic distinctions. The first concerns the syntactic distinction between hierarchy-inverting and hierarchy-preserving discontinuous NPs, and the second concerns the prosodic distinctions between cohesive and non-cohesive prosodic structure.

2.1 Syntax: Hierarchy-inverting and hierarchy-preserving discontinuous NPs

Let us begin by introducing a major distinction between two types of discontinuous NPs. The core idea behind the notion of a discontinuous NP is, of course, that material that could fit into a single, standard, continuous NP can also appear scattered in two or more places in a single sentence in many languages, as illustrated by the German example in (1)a–b.

(1) a. Sie hat viele Bücher geschrieben   (German)
    she has many books written
    'She has written many books.'
  b. Bücher hat sie viele geschrieben
    books has she many written
    'As for books, she has written many.'

Not all constructions that pattern grammatically with simple instances of a discontinuous NP such as (1)b easily allow a reconstruction of their parts into a continuous form, a point to which we will briefly return below. For the standard case, reconstructability is the rule, however.

In the study of discontinuous NPs, it has proven useful to distinguish two different types of discontinuity. Normally, the left part of a discontinuous NP occupies a higher structural position than the right part, with the former c-commanding the latter, as illustrated in (1c).

(1) c. [$_{CP}$ **Bücher** [$_{C'}$ [$_C$ hat] [$_{TP}$ sie [**viele** [geschrieben]]]]] (German)
     books   has she many written
     'As for books, she has written many.'

We can now classify discontinuous no NPs as to whether the structural hierarchies that hold among their parts are identical to the hierarchies we find in the corresponding continuous construction, or

whether that fails to hold. In particular, we focus on the lowest head of the continuous construction, which is normally the noun, and distinguish discontinuous NPs in which the lowest head[2] is structurally higher than the other part of the discontinuous constructions from discontinuous NPs in which this is not the case. For an illustration, see (2): in a continuous NP, the higher functional heads (or the phrases they form) such as quantifiers and determiners asymmetrically c-command the noun, and exactly this asymmetric c-command relation also holds in discontinuous (2). E.g., *wieviel* 'how many' c-commands *Bücher* 'books' in both (2)c and (2)d. We will label such discontinuous NPs 'hierarchy-preserving', a term that is not fully accurate but which captures the core cases. We called such constructions 'simple' discontinuous NPs in our earlier work (Fanselow & Ćavar 2002, Féry et al. 2007); a frequently used alternative label is 'left branch extraction'. The prosodic phrasing is indicated by means of subscripted Φ standing for Φ-phrase (prosodic phrase), roughly equivalent to a syntactic phrase (Selkirk 2009, 2011, Elfner 2015, Ito & Mester 2013).

(2)   Hierarchy-preserving discontinuous NP (left branch extraction)
   a.   (**Hodně** má Marie **židlí.**)$_\Phi$ (Czech)
        many   has Mary chairs.GEN
        'Mary has many chairs.'
   b.   (**U jake** vin pojide **misto**?)$_\Phi$ (Ukrainian)
        in   which he will.go town
        'To which town will he go?'
   c.   (**Wieviel** hat Maria spannende **Büch-er** gelesen?)$_\Phi$ (German)
        how.many has Mary fascinating book-PL   read
        'How many fascinating books did Mary read?'
   d.   [**Wieviel** [spannende **Büch-er**]]   (German)
        how.many fascinating book-PL
        'how many fascinating books'

In the constructions in (3), the lowest head of the continuous NPs, viz. the noun, appears at the left periphery, the highest structural position. One can thus say that the hierarchy relative to the nominal head is inverted in this construction – the lowest head of the continuous construction (e.g., *Bücher* 'books' in (3)d c-commands the other heads in the discontinuous construction in (3)c. It makes sense to label these 'hierarchy-inverting' discontinuous NPs. The construction is often discussed under the label 'split topicalization'; in earlier work we spoke of 'inverted' discontinuous NPs.

(3)   Hierarchy-inverting discontinuous NP (split topicalization)
   a.   (**Krastavic-i**)$_\Phi$ (vseki   obica **presn-i i   makl-i**.)$_\Phi$ (Bulgarian)
        cucumber-PL   everyone likes fresh-PL and small-PL
        'Everyone likes fresh and small cucumbers.'
   b.   (**Knyžk-u**)$_\Phi$ (Marija pročytala **cikavui**.)$_\Phi$ (Ukrainian)
        book.ACC.F   Mary has.read   interesting.ACC.F
        'Mary has read an interesting book.'
   c.   (**Büch-er**)$_\Phi$ (hat sie **keine**   spannenden gelesen.)$_\Phi$ (German)
        book-PL   has she none   fascinating read
        'She read no fascinating books.'
   d.   ([keine [spannenden **Büch-er**]])$_\Phi$ (German)
        no   fascinating book-PL
        'no fascinating books'

There are several arguments for making a principled distinction between these two construction types. First, we observe that they need not co-occur. Georgian and the Slavic languages allow both kinds of discontinuous NPs (see, e.g., the Ukrainian examples above), but in German, the hierarchy-preserving version is quite restricted (unlike its inverting counterpart) – it is practically confined to wh-heads as in (2)c, and in this respect, the other modern Germanic languages pattern with German. In general, it is not uncommon that a language has hierarchy-inverting discontinuous NPs but lacks

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[2] or, more precisely, the part that contains the lowest head.

the hierarchy-preserving counterpart altogether, as in Yucatec Mayan (Skopeteas et al., to appear), while the reverse constellation appears less frequently – it is, e.g., typical of North American languages (cf. Fanselow & Féry, in preparation).

Second, the grammatical details of the two constructions can differ even when they coexist in a single language. Often, the hierarchy-inverting construction comes with morphological changes that are absent in the hierarchy-preserving counterpart. In (4), a Bulgarian example, the continuous version (4)a and the hierarchy-preserving split (4)b have the same form of the head noun, namely accusative, while the hierarchy-inverting one (4)c needs a genitive plural form for the noun.

(4)   Hierarchy-inverting discontinuous NP (split topicalization)

    a.   Toj   ima **tri**   **stol-a**.   (Bulgarian)
          he   has three chair-PL.ACC
    b.   **Tri**   ima toj   **stol-a**.
          three   has he   chair-PL.ACC
    c.   **Stol-ove**   toj ima   **tri**.
          chair-PL.GEN he   has   three
          'He has three chairs.'

This difference in grammatical behavior has been attributed to a fundamental difference in the status of the two parts in each case. In a hierarchy-inverting discontinuous NP, *both* parts appear to have the status of complete NPs (Fanselow 1988, van Riemsdijk 1989). This explains the need for morphological changes, and may also be responsible for the greater flexibility often observed with hierarchy-inverting discontinuity.[3] There are several proposals for how discontinuous constructions with two full NPs are generated, involving either movement (van Riemsdijk 1989), base generation (Fanselow 1988), or a mixture of both (Ott 2012) – a decision among these is not relevant for the purposes of the present paper. Hierarchy-preserving discontinuous NPs, on the other hand, do not have a uniform generation in the world's languages, but they all involve a very restrictive kind of movement process that does not create two complete and fully independent NPs, hence the absence of repair operations and the stricter locality we normally observe.

2.2 Prosody: Cohesive and non-cohesive prosodic structure

In addition to the syntactic subdivision just discussed, there is also a major prosodic distinction among discontinuous NPs. As will be shown below, it comes with the interesting potential of overwriting the syntactic distinction, for example for purposes of morphology or syntactic restrictions.

The major division in the prosodic structure of discontinuous NPs is referred to as 'non-cohesive' vs. 'cohesive'. The natural pairing with the two syntactic structures just introduced is non-cohesive with hierarchy-inverting, and cohesive with hierarchy-preserving. The first pattern is illustrated in Figure 1 for (3)a, reproduced with prosodic and tonal information in (5).

(5)   Hierarchy-inverting discontinuous NP (split topicalization)

        H*L H$_\Phi$ H*   L*H   H*L L$_\Phi$ L$_\iota$
      (**Krastavic-i**)$_\Phi$ (vseki   obica **presn-i i   makl-i**)$_\Phi$ (Bulgarian)
       cucumber-PL   everyone likes fresh-PL and small-PL
       'Everyone likes fresh and small cucumbers.'

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[3] For instance, what would be a syntactic island for movement can, nevertheless, be split up in a hierarchy-inverting fashion, and potential interveners such as negation do not affect the grammaticality of a hierarchy-inverting discontinuity (see Fanselow & Ćavar 2002 among others) in contrast to what holds for hierarchy-preserving discontinuity.
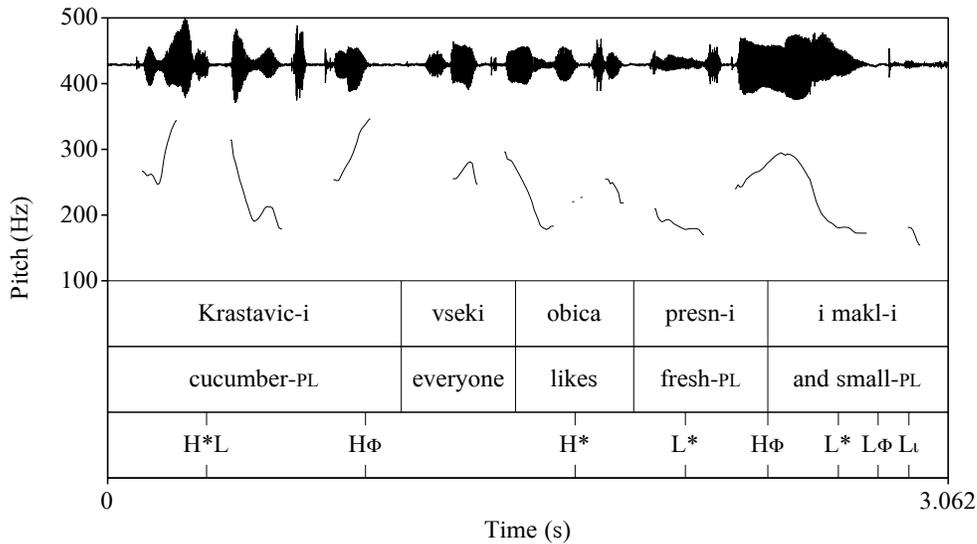
Figure 1. Non-cohesive intonation in a hierarchy-inverting Bulgarian sentence (3)a, recorded in June 2013 in Potsdam.

In the non-cohesive pattern, at least two (maximal) prosodic phrases (Φ-phrases) or two intonation phrases (ι-phrases) are present. Each of these prosodic domains must be well-formed. In particular, each one needs a pitch accent, at least in languages with pitch accents (and culminativity; see Hyman 2006, Féry 2017), and each one needs a boundary tone (Pierrehumbert 1980). Moreover, tone scaling is dependent on the relationship between the two parts of the discontinuous NP: there may be a downstep relationship between the two parts of the NP, but this is not obligatory. Downstep refers to the lowering of a high tone relative to a preceding high tone. Furthermore, the prosodic domains formed on each part of the discontinuous NPs do not need to be adjacent, which implies that more than two Φ-phrases may be involved in a non-cohesive prosodic pattern: there may be a prosodic phrase separating the discontinuous NP. The non-cohesive pattern is preferred in hierarchy-inverting splits. The prototypical case involves a topic on the fronted noun and a focus on the remnant element.

   In the cohesive pattern, by contrast, illustrated in Figure 2 for (4)b, reproduced in (6) with prosodic and tonal patterns, only one (maximal) Φ-phrase (or ι-phrase) is typically present.

(6)   Hierarchy-inverting discontinuous NP (split topicalization)
         H*L   L_Φ L_ι
        (**Tri**   ima toj   **stol-a**.)_Φ   (Bulgarian)
        three has he   chair-PL.ACC
        'He has three chairs.'
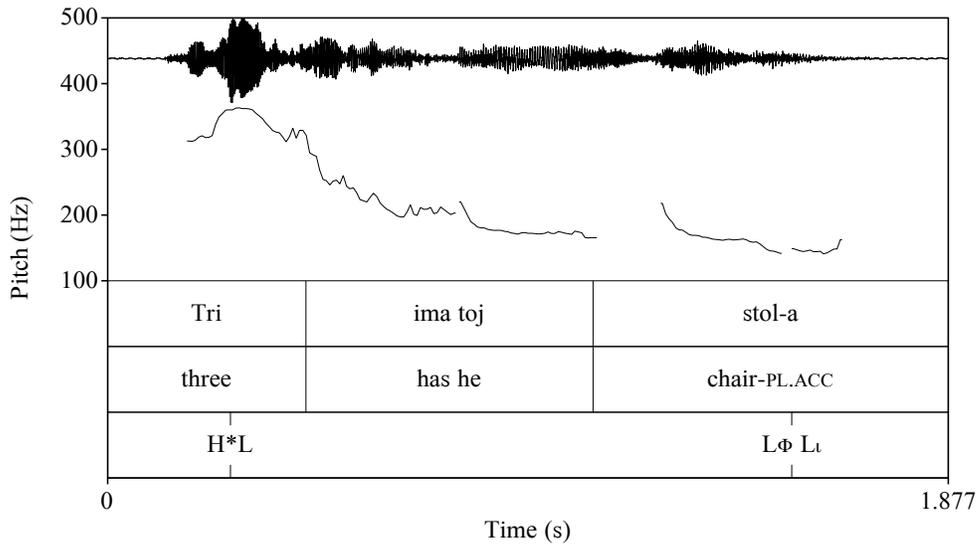
Figure 2. Cohesive intonation in hierarchy-preserving Bulgarian sentence (4)a, recorded in June 2004 in Potsdam.

The unique prosodic phrase implies that only one pitch accent is needed, as well as only one boundary tone of a prosodic phrase. The single pitch accent is often located on the fronted part of the discontinuous NP. The two parts of the discontinuous NP are minimally separated. Adding a prosodic phrase between the two parts may lead to ungrammaticality (but see Fanselow & Féry 2013 for examples involving non-cohesive prosodic structure in hierarchy-preserving discontinuous NPs in Slavic languages).

The natural pairing between syntactic and prosodic patterns illustrated in Figures 1 and 2 is also disrupted when a cohesive pattern is realized on a hierarchy-inverting split, as in (7), which requires a focus on the fronted noun and givenness on the remainder of the sentence.

(7)   { A: Many of what did Mary read? }
           B: (**Bücher**   hat sie **viele** gelesen.)$_\Phi$ (German)
                  books.FOC   has she many read
                  'She read many books.'

As Féry et al. (2007) show, it is the syntactic and not the prosodic type that determines the morphosyntactic properties of the discontinuous NP, at least in Ukrainian.

3 The role of information structure

That information structure plays a major role in the formation of discontinuous NPs has been noticed by several authors for various languages; see Fanselow & Ćavar (2002), van Hoof (2007), Ott (2012), and others. It has been assumed by these authors that specific information structural features are responsible for such NPs, as well as for movement (and deletion) of parts of them. For instance, in the case of 'split topicalization', the feature [Topic] defining the makeup of the left periphery of a clause determines which part of a discontinuous NP can be placed in that position. According to Ott, the left-peripheral part of a hierarchy-inverting discontinuous NP is necessarily a frame-setting topic: it is the sole reason why the NP part of the discontinuous NP is placed peripherally, while the DP part of the NP remains behind.

But there are problems with this view related to the fact that the information structural roles of the parts of a discontinuous NP are not invariable. In fact, even though there are preferred roles for some positions in the sentence, it is typically the case that any position of a part of a discontinuous

NP can have several discourse functions.[4] This is illustrated in (8) through (10). A possible context for each variant is set in curly brackets.

(8)   (Contrastive) topic on first part and focused second part
        {How many Italian books and French newspapers did she buy?}
        [Italienische Bücher]$_{Top}$ hat sie [drei]$_F$ gekauft.   (German)
        Italian   books   has she three   bought
        'She bought three Italian books.'

(9)   Focused first part and given second part
        {She bought three (Italian) watches, didn't she?}
        Italienische [Bücher]$_F$ hat sie drei gekauft.   (German)
        Italian   books   has she drei bought
        'She bought three Italian books.'

(10)   (Aboutness) topic for first part and a (contrastive) topic for second part
        {She did something with three Italian books
          (and something else with another four), what was that?}
        [Italienische Bücher]$_{Top}$ hat sie drei [gekauft]$_F$.   (German)
        Italian   books   has she three bought
        'She bought three Italian books.'

Moreover, under special prosodic conditions, the entire discontinuous NP can be part of a wide focus; see Fanselow & Lenertová (2011). However, in this case, the second part is necessarily unaccented. As a result, only one cohesive prosodic phrase is formed on the entire sentence.

    An alternative explanation taking the role of information structure into account is that in an intonation language like German, a discontinuous NP is preferred when the two parts of the NP have different information structural roles, see Fanselow & Féry (in preparation) for detail.

4 Intonation of Indian languages

When investigating the prosody of Indian languages, it is important to be aware of the differences between the intonation of these languages and that of the better studied Germanic languages, such as English. At the phonetic level, all languages have melodies that can be decomposed into a series of low and high tones, but the function of these tones in the grammar can differ a great deal from one language to another (see Gussenhoven 2004 and Féry 2017 for explicit accounts). Most Indian languages, especially Indo-Aryan and Dravidian ones, are prototypical examples of so-called 'phrase languages'. The intonation system of these languages is based on phrasal tones, assigned at the prosodic level of the Φ-phrase, rather than on pitch accents, which are typical for intonation languages, or on lexical tones, assigned to words or to lexically specified stressed syllables. In several Indian phrase languages, each non-final Φ-phrase has an initial prominent low tone and a final high boundary tone. The final Φ-phrase of a declarative sentence has an initial high tone and a final low tone. According to Hayes & Lahiri (1991), Bengali weakly stresses the initial syllable of each word. However, phrasal tones assigned at the Φ-phrase level sometimes overwrite any tone that can be associated with lexical stress: in these cases, intonation at the phrase level is all that is left.

    In the remainder of this paper, we do not try to formulate rules for the formation of Φ-phrases based on the morpho-syntax. Instead, we assume that in the default case, a grammatical word forms a Φ-phrase. In some cases, based on the tonal scaling and the tonal structure, it is assumed that a Φ-phrase is embedded in a larger one.

    Sentence (11), illustrated in Figure 3, is from Bengali (Bangla) and it illustrates important prosodic properties of this language. The sentence has a complex syntactic structure, but the prosodic structure is quite simple. It forms a single ι-phrase that consists of a sequence of Φ-phrases, differing

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[4] This has not escaped the attention of the authors just mentioned, who propose various solutions.

in length and in tonal scaling. The division of the ι-phrase into Φ-phrases correlates with the syntactic structure. In the pitch track, the typical rising contour of each Φ-phrase is clearly visible on all non-final Φ-phrases, and the final Φ-phrase has a falling contour. The rising contour of non-final Φ-phrases is analyzed as an initial prominent L* and a final H$_\Phi$, following Hayes & Lahiri (1991) and Khan (2008, 2014). These authors introduce rules for the formation of Φ-phrases, and a survey of different tunes used for the expression of pragmatic meanings. A syntactic head forms a Φ-phrase together with a constituent that precedes it within its maximal projection. Additional evidence for Φ-phrases come from segmental processes like /r/-assimilation and voicing assimilation, which only take place inside Φ-phrases. Some variations in phrasing occur as a consequence of rhythm, style, and information structural roles, but these variations are still subject to special syntactic constraints.

In the phonological notation, the contour of the final Φ-phrase is simplified to H*L$_\iota$ (not H*L$_\Phi$L$_\iota$), since there is just one falling contour.

(11)
     L*   H$_\Phi$ L* H$_\Phi$ L*H$_\Phi$ L* H$_\Phi$
(((chele-bêla-te)$_\Phi$ (piṭar)$_\Phi$ ((skul)$_\Phi$ šeše)$_\Phi$)$_\Phi$ (Bengali)
   child-time-LOC   Peter   school   after
   'When Peter was a child, after school…'

           L*   H$_\Phi$ L*   H$_\Phi$
(ta-r   bondhu-der)$_\Phi$ (šathe dêkha kor-t-o)$_\Phi$
 3-GEN friend-PL.GEN with seeing do-HAB-3
'…he used to meet with his friends…'

 L*   H$_\Phi$ L* H$_\Phi$ H*   L$_\Phi$ L$_\iota$
(eboň ta-der)$_\Phi$ (šathe)$_\Phi$ (ônek-khon) (khel-t-o.)$_\Phi$)$_\iota$
 and 3-PL.GEN with   much-time play-HAB-3
'…and play with them for a long time.'
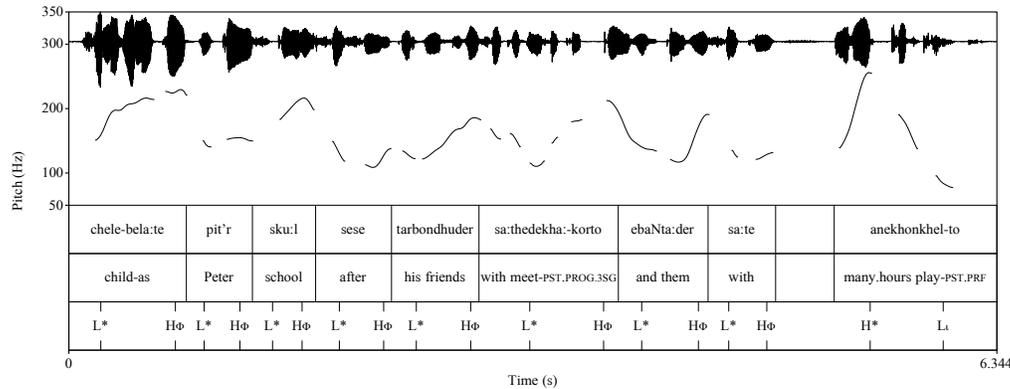
Figure 3. Tonal structure of a long Bengali sentence (11) in canonical word order.

Two comments are in order that hold for most of the languages addressed in the following subsections. The first one concerns the alignment of the two tones in their respective Φ-phrase. The final H$_\Phi$ is typically aligned as far to the right in its Φ-phrase as possible. But the initial low tone is not always linked to the first syllable of the Φ-phrase, though it seems to be systematically linked to the first syllable of a word, as in the Φ-phrase (šathe dêkha korto)$_\Phi$ 'used to meet with', where the first word šathe 'with' just smoothly interpolates from the high tone of the preceding Φ-phrase to the low tone on the first syllable of dêkha korto 'used to meet'. The same holds for eboň tader 'and them', where the low tone is associated with the first syllable of tader.

Second, tonal scaling of the high tones is crucial as it reflects the syntactic structure. Some H$_\Phi$ are higher than others. Compare for instance the high tone at the end of skul 'school' with the high tone at the end of šeše 'at the end', a postposition. The former one is much higher, and we assume that the scaling between these two tones reflects the syntactic relation they have with each other.

We express this by a recursive prosodic structure, homomorphic with the syntactic structure of the sentence (Féry 2017). Other high tones also display meaningful scaling in relation to each other. For instance, the first Φ-phrase *chelebêlate* 'as a child' ends much higher than the second one *piţar* 'Peter'. The third Φ-phrase *skul* 'school' returns to nearly the same height as the first one. There is an upstep relationship between *tar bondhuder* 'his friends' and *šathe dêkha korto* 'used to meet with' that is probably motivated by the syntactic structure. The higher rising tone on the verb expresses a continuation rise. The same is true for the final three Φ-phrases. The high tone of the prefinal Φ-phrase is higher than the preceding ones. Remarkably, it is even higher than the first high tone in the sentence. This is related to the status of the preverbal position in Bengali as the focus position.

Pitch scaling relationships have been studied in syntactically complex sentences in Bengali by Khan (2008, 2014) and in Hindi by Kügler (2020), but we do not try to address this topic here. It seems to us that the relative paucity of tonal contours in these phrase languages may be compensated for by the richness of pitch scaling, and the richness of the devices for expressing phrasing.

Before turning to intonation in discontinuous NPs in the next sections, let us briefly examine post-focal compression in Assamese. This language has been given a detailed and careful prosodic analysis by Mahanta (2010) and Twaha (2017). Assamese resembles other Indian languages as far as the intonational structure is concerned. The 'building blocks of an intonational contour' (Keane 2014 for Tamil) are provided by the prosodic phrases. As in Bengali, the building blocks of non-final Φ-phrases are characterized by a low tone at the beginning of the prosodic phrase and a high tone at the end; see Figure 4 with the same sentence (12) in different information structural contexts. The end of the intonation phrase is delimited with a low L_ι and an optional H_ι. Like Hayes & Lahiri (1991) and Khan (2008, 2014) do for Bengali, both Mahanta (2010) and Twaha (2017) analyze the initial low tones of Assamese as pitch accents.

(12)   L* H$_\Phi$ L*   H$_\Phi$ L* H$_\Phi$ L$_\iota$
          ((nôgên-ê)$_\Phi$ (nôyôn-ôk)$_\Phi$ (mala)$_\Phi$ (khuz-il-ê.)$_\Phi$)$_\iota$ (Assamese)
          Nagen-ERG Nayan-DAT garland ask-PST-3SG
          'Nagen asked Nayan for a garland.'

As can be seen in Figure 4(c), the phrasal tones following the focused phrase are reduced or even suppressed. However, narrow focus on the pre-verbal argument does not change the prosodic pattern, as can be seen from (b).

Similar patterns have been shown for Indo-Aryan languages Bengali (Hayes & Lahiri 1991; Khan 2008, 2014) and Hindi (Patil et al. 2008), but also for the Dravidian language Tamil (Keane 2014), among other Indian languages.

Given the prosodic and intonational properties of the Indian languages discussed in this section, the question arises of how discontinuous NPs are realized. Do they present any special contour? Is there a difference between cohesive and non-cohesive prosodic contours?

The short answer to be developed in the remainder of this article is that there seems to be no clear prosodic difference between hierarchy-preserving and hierarchy-inverting discontinuous NPs, and that this parallels the absence of a clear difference between hierarchy-inverting and hierarchy-preserving syntax. The left parts of inverting discontinuous NPs are neither prosodically more integrated into the clause than their inverted counterparts nor have there been observations of differences in 'accentuation'.

Discontinuity of NPs may trigger the emergence of a new Φ-phrase on the displaced constituent. However, this Φ-phrase has no particular properties that would distinguish it from Φ-phrases triggered by other non-canonical syntactic structures.
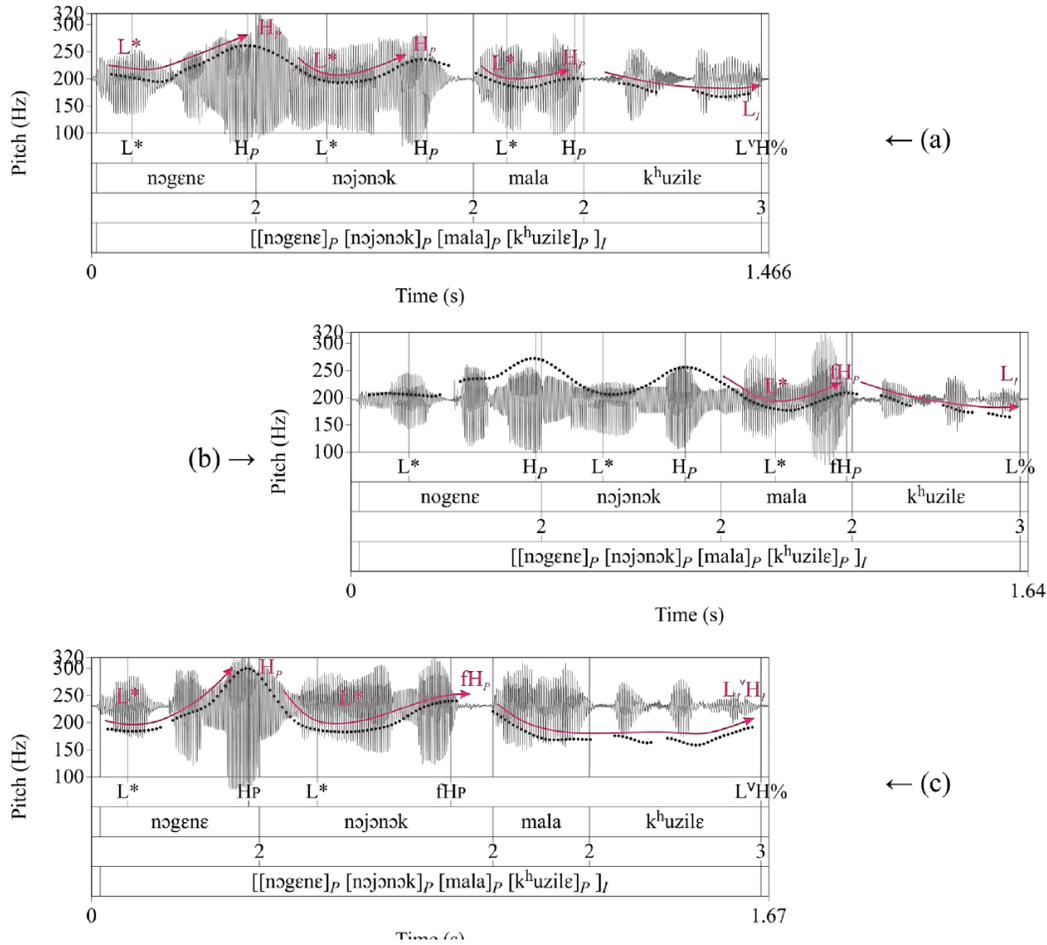
Figure 4. Tonal structure of Assamese sentence (12) in different information structural contexts: (a) in a wide focus, (b) with narrow focus on *mala* 'garland', and (c) with narrow focus on *nôyôn-ôk* 'Nayan-DAT' (from Twaha 2017).

5 Indo-Aryan: Hindi

By and large, the Indo-Aryan languages share a number of properties that make them tend to have discontinuous NPs among their repertoire of syntactic constructions. They come with an underlying SOV structure, and possess relatively free constituent order. At least since Déprez (1989), Mahajan (1990), and Dayal (1994), we know that both A-bar- and A-scrambling occur in Hindi, the latter being a close-to-perfect indicator of the possibility of discontinuous NPs (Fanselow & Féry, in preparation). Consequently, it is no surprise that all Indo-Aryan languages for which we have collected data possess discontinuous NPs, with the possible exception of Kashmiri.[5] For the other Indo-Aryan languages we have investigated (Assamese, Bengali, Gujarati, Hindi, Maithili, Marathi, Nepali, Odia, Panjabi, Sindhi, Sinhala), the existence of hierarchy-inverting discontinuous NPs is beyond doubt. It is quite remarkable that the distinction between inverting and preserving discontinuous NPs is blurred in these languages – quite in contrast to what we observe in other languages. This appears to be correlated with the observation that we also see no two classes of discontinuous NPs

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[5] Claims in the literature that Kashmiri lacks discontinuous NPs are difficult to reconcile with sentences such as (i) which sound fine to at least some speakers (Darakshan Mir, p.c.).

(i)   aer   khyav   yimav   wāriy.   (Kashmiri)
        plums ate   they.ERG many
        'They ate many plums.'

of cohesive and non-cohesive type.

Two of these languages (Bengali, Odia) lack hierarchy-preserving discontinuous NPs, as illustrated by (13) for Odia (Kalyanamalini Sahoo, p.c.). They differ from other Indo-Aryan languages such as Hindi or Nepali in that scrambling is more restrictive, in particular in the post-verbal domain (see Simpson & Choudhury 2015 among others).[6]

(13) a. **bôhi**, piṭôr **bôhutô** guḍae pôḍh-i-ch-i.   (Odia)
          book Peter many   CLA   read-PRF-AUX-3
          'Peter has read many books.'
      b. **côuki**, piṭôr **ketu-ṭa**   kiṇ-i-ch-i?
          chair   Peter how.many-CLA buy-PRF-AUX-3
          'How many chairs has Peter bought?'
      c. ***ketu-ṭa**   piṭôr **côuki** kiṇ-i-ch-i?
          how.many-CLA Peter chair   buy-PRF-AUX-3
          'How many chairs has Peter bought?'

Regarding discontinuous NPs in Hindi, we observe a high degree of flexibility (14). NPs may be split up even when both parts appear in the post-verbal domain of the SOV language; see (14)b.

(14) a. **kursi-yā̃** xarīd-ī   th-ī̃   **tīn**   rām-ne.   (Hindi)
          chair-PL   buy-PRF.F be.PST-FPL three   Ram-ERG
      b. xarīd-ī   th-ī̃   **kursi-yā̃** rām-ne **tīn**.
          buy-PRF.F be.PST-FPL chair-PL   Ram-ERG three
      c. xarīd-ī   **kursi-yā̃** th-ī̃   rām-ne **tīn**.
          buy-PRF.F chair-PL   be.PST-FPL Ram-ERG three
          'Ram bought three chairs.'

Even the specifiers of an NP may be discontinuous, as shown in (15).

(15) a. kitne   tum-ne *athletes*-k-ī ek foṭo dekh-ī?   (Hindi)
          how.many you-ERG athletes-GEN-F a   photo see-PRF.F
          'A picture of how many athletes did you see?'
      b. kis-k-ī   tum bahan-ke patī-se   mil-e?
          who-GEN-F you sister-GEN husband-ABL meet-PRF.M
          'Whose sister's husband did you meet?'

As shown in (16), we can also observe constructions that come with the appearance of a hierarchy-preserving discontinuous NP: the quantifier precedes the noun. However, the possibility of splitting across a negation (*nahī̃*), as illustrated in (16)a–b, shows the absence of negative intervention effects in Hindi hierarchy-preserving NPs – while such intervention effects often occur with Left Branch Extraction in other languages. In this respect, and also with respect to locality, the two NP types are quite similar in Hindi.

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[6] A reviewer notes that in some varieties of Bengali, sentences such as (i) and (ii) are fine:
(i)   tin-ṭe   kin-e-ch-il-o   ram   cear.   (Bengali)
      three-CLA buy-PRF-AUX-PST-3   Ram   chair
(ii) ram tin-ṭe   kin-e-ch-il-o   cear.
      Ram three-CLA buy-PRF-AUX-PST-3   chair
      'Ram had bought three chairs.'
Note that these structures place the noun in the postverbal domain, i.e. they are more liberal with postverbal scrambling than what is reported by Simpson & Choudhury (2015). Furthermore, it is not entirely clear that (i) involves hierarchy-preserving discontinuous NPs. If the construction comes about by a rightward scrambling of the noun, it is the noun that ends up in the highest position, c-commanding the numeral, so that the discontinuity would indeed be of the inverting type.

(16)   a.   rām-ne   **kitn-ī**   nahĩ pasand k-ĩ̄   **gāṛī-yā̃**?   (Hindi)
            Ram-ERG how.many-F NEG like   do-PRF.FPL car.F-PL
       b.   **kitn-ī**   rām-ne   nahĩ pasand k-ĩ̄   **gāṛī-yā̃**?
            how.many-F Ram-ERG NEG like   do-PRF.FPL car.F-PL
            'How many cars does Ram not like?'

There is a further observation that casts some doubt on the expectation that Hindi discontinuous NPs follow the distinction between preserving and inverting subtypes neatly. Quite in contrast to what is observed in other languages, in which the formation of hierarchy-inverting discontinuity is always at least as flexible with respect to grammatical functions as for the hierarchy-preserving discontinuous NPs, the latter ones can be constructed with more grammatical functions than hierarchy-inverting ones. The sentences (17) through (20) show hierarchy-inverting NPs are impossible for indirect objects and the ergative subjects of transitive verbs.

(17)   bahut sāre tum-ne ḍrāivar-õ-ko   šahar-k-ā   rāstā dikhā-y-ā?   (Hindi)
            many.M   you-ERG driver.M-PL-DAT city-GEN-M   way   show-PRF-M
            'Did you show the way to the city to many drivers?'

(18)   *ḍrāivar-õ-ko   tum-ne bahut sāre is šahar-k-ā   rāstā batā-y-ā?   (Hindi)
            driver.M-PL-DAT you-ERG many.M   this city-GEN-M   way show-PRF-M
            'Did you show the way to the city to many drivers?'

(19)   a.   kitne   kal   laṛk-õ-ne   tumhẽ   bulā-y-ā?   (Hindi)
            how.many yesterday boy-PL-ERG you.DAT   call-PRF-M
            'How many boys invited you yesterday?'
       b.   bahut sāre laṛk-õ-ne   mujhe   bulā-y-ā.
            many.M   boy-PL-ERG   I.DAT   call-PRF-M
            'Many boys invited me.'
       c.   bahut sāre mujhe   bulā-y-ā   laṛk-õ-ne.
            many.M   I.DAT   call-PRF-M   boy-PL-ERG
            'Many boys invited me.'

(20)   *laṛk-õ-ne bulā-y-ā   bahut sāre tumhẽ.   (Hindi)
            boy-PL-ERG call-PRF-M   many.M   you.DAT
            'Many boys invited you.'

Some speakers of Hindi (Alok 2016) do not accept the formation of hierarchy-preserving NPs in the above constellation either, in line with our data for Gujarati. On the other hand, subjects and indirect objects can be split up even in the restrictive languages Bengali and Odia.

    Closer inspection reveals that the constraint in question is due to a ban on the appearance of an overt case marker in hierarchy-inverting discontinuous NPs. Thus, when the subject appears in absolutive rather than ergative case, i.e. when it bears no case particle, it can be discontinuous, as shown by the contrast in (21) (Anoop Mahajan, p.c.).

(21)   a.   *bacc-õ-ne kal   bahut sāre yah gānā gā-y-ā   thā.   (Hindi)
            child-PL-ERG yesterday   many   this song sing-PRF-M be.PST
            'Many children sang this song yesterday.'
       b.   bacc-e   kal   bahut sāre yah gānā gā-ẽ-g-e.
            child-PL   tomorrow   many   this song sing-PL-FUT-PL
            'Many children will sing this song tomorrow.'

Data such as (21) show that the difference between the two discontinuous NP types with respect to grammatical functions is epiphenomenal – the topical noun in the left-peripheral position simply seems to be unable to bear an overt case marker. The relevant constraint not only affects 'standard' discontinuous NPs, but also constructions with two overt nouns, as in (22).

(22)　　a.　pakšī　to　use　　sirf　koyal　pasand　hãĩ.　　　　　　　　(Hindi)
　　　　　　　bird　TOP　he.DAT　only　cuckoos　like　　be.PRS
　　　　　　　'As for birds, he likes only cuckoos.'
　　　　b.　??ciṛiyã̄　to　bhārat　me　sirf　koyal-ko　　saṅgīt　pasand　hai.
　　　　　　　birds　　TOP　India　in　only　cuckoos-DAT　music　like　be.PRS
　　　　　　　'As for birds, in India only cuckoos like music.'
　　　　c.　ciṛiyã̄　to　bhārat　me　kal　sirf　cīlõ-ne　　hāthī-ko　　*attack* ki-y-ā.
　　　　　　　birds　TOP　India　in　y'day　only　eagles-ERG　elephants-DAT　attack　do-PRF-M
　　　　　　　'As for birds, in India only eagles attacked elephants yesterday.'

We therefore assume that the two types of discontinuous NPs have roughly the same grammatical analysis in Hindi. This fundamental parallelism notwithstanding, constructions with a left-peripheral nominal topic are subject to a further case restriction (that we will not characterize in more detail here) that blocks certain discontinuous NPs, but is orthogonal to their formation. From a syntactic perspective, there is thus little reason to distinguish the two discontinuous NP types in Hindi.

　　　This leads us to expect that the prosodic distinctions introduced above are also absent, or blurred, in Hindi. First, examine a sentence of the kind discussed above in its normal word order, uttered in an all-new context in (23).[7]

(23)　　Normal word order in Hindi
　　　　　L*　　HΦ　　L*HΦ　　L*　　HΦ　　　H*　　　　Lɩ
　　　　((rām-ne)Φ　**(tīn)**Φ　**(kursi-yã̄)**Φ　(xarīd-ī　　th-ĩ̄.)Φ)ɩ　　　　　　(Hindi)
　　　　　Ram-ERG　three　　chair-PL　　buy-PRF.F　be.PST　-FPL
　　　　　'Ram bought three chairs.'

Each word is realized in a separate Φ-phrase, and each high tone ending a Φ-phrase is (slightly) downstepped relative to the preceding one; the H* in the last Φ-phrase has the largest downstep. The low tones starting the Φ-phrases are clearly visible in the pitch track in Figure 5, and are perceptively prominent, even though the ones on *tīn* 'three' and *kursiyã̄* 'chairs' are located rather high in the register of this speaker.
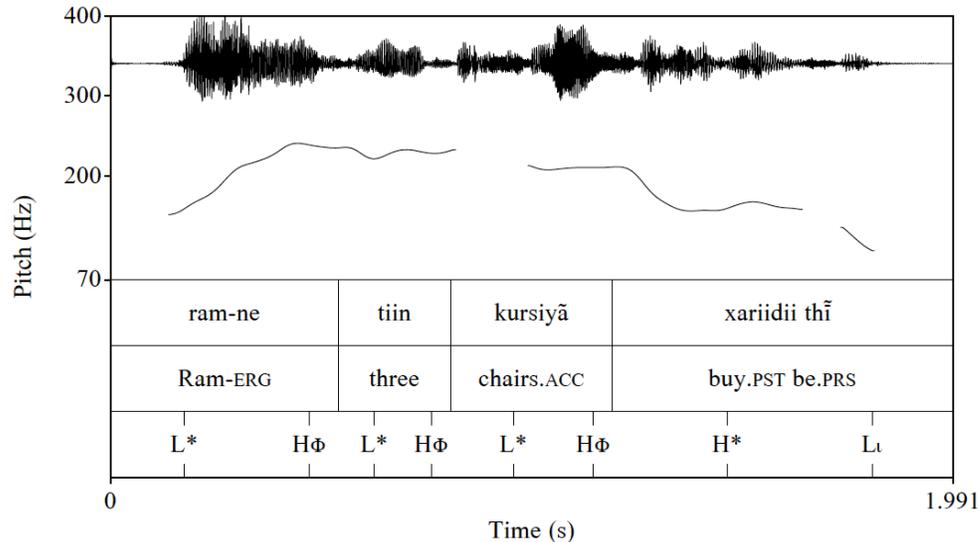
Figure 5. Canonical word order of Hindi, from sentence (23).[8]

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[7] Realizations and comments on possible contexts for Hindi were provided by Rajesh Bhatt (p.c.).
[8] All Hindi sentences were recorded during the CreteLing Summer School in July 2018.

As a relatively unmarked example of a hierarchy-preserving discontinuous NP, consider (24) with verb finality. *Kursiyã̃* 'chairs' is not more focused or contrasted than it is in (23). It is in the pre-verbal position in both cases. Sentence-initial *tīn* 'three' may be felt to be slightly more prominent, but the reason is related to the fact that it is separated from its head noun, rather than because of its hypothetical topic role.

(24)   Hierarchy-preserving discontinuous NP with verb finality in Hindi
        L*H$_\Phi$ L* H$_\Phi$ L* H$_\Phi$ H*   L$_\iota$
        ((**tīn**)$_\Phi$ (rām-ne)$_\Phi$ (**kursi-yã̃**)$_\Phi$ (xarīd-ī   th-ĩ̄.)$_\Phi$)$_\iota$ (Hindi)
        three   Ram-ERG   chair-PL   buy-PRF.F be.PST-FPL
        'Ram bought three chairs.'

Low and high tones defining the Φ-phrases can easily be spotted in the pitch track of this sentence in Figure 6. As shown for the sentence in its base word order, every word forms a separate Φ-phrase and the high tones of the sentence are in a downstep relation to each other. What changes is the tonal scaling among the tones rather than the phrasing itself or the distribution of the tones. The downstep is larger in Figure 6 than in Figure 5. However, at least in the present case, this difference does not seem to have an impact on the interpretation of the sentence.
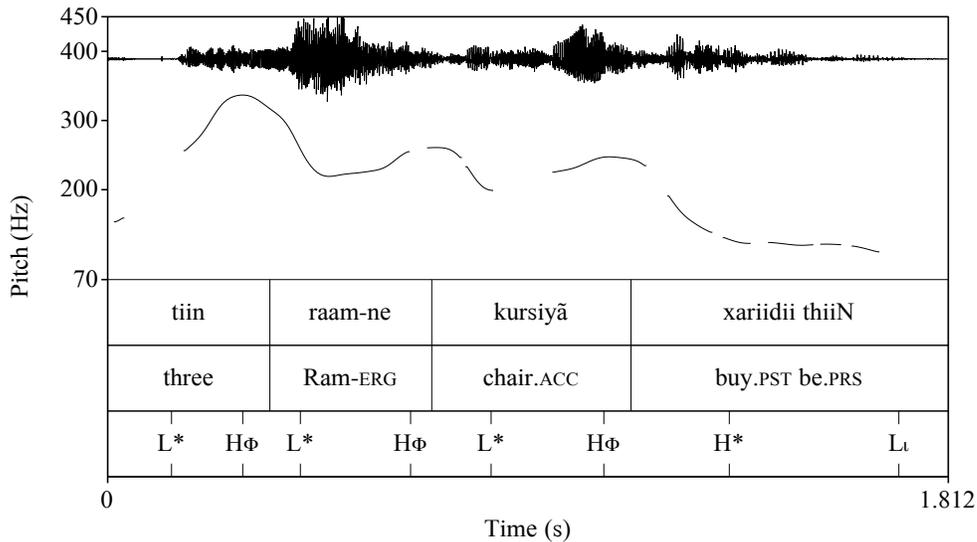
Figure 6. Hierarchy-preserving discontinuous NP with verb finality in (24).

In the next version of the sentence in (25), the head noun is post-verbal and focused. The context in which such a sentence may be uttered can be paraphrased as 'What has Ram bought three of?'[9] An important property of the pitch track in Figure 7 is that the word *kursiyã̃* 'chairs' is not particularly prominent from the point of view of prosody. It is realized with the typical final default tonal structure that has been illustrated in Figures 5 and 6, and analyzed phonologically with H* and L$_\iota$. A similar result, pointing to the absence of reliable prosodic differences between focused and given material, has been found for Hindi (Jyothi et al. 2014). However, a crucial prosodic cue appears to be the high boundary separating the auxiliary from the following narrow focus, which is very prominent due to cancellation of downstep. In other words, it is the tonal scaling of the boundary tone preceding the focused element that attracts attention to the focus; see also Féry et al. (2016) for a

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[9] If the subject and the verb are inverted (***tīn** xarīdī thĩ̄ rāmne **kursiyã̃***), an even stronger contrast on *kursiyã̃* is called for. This latter version is felicitous when the sentence is continued by *aur tīn kitābẽ*, 'and three books'.

similar observation. A last interesting feature in this sentence is the recursive phrasing of the participle plus auxiliary. The participle alone has the tonal pattern of a Φ-phrase, and together with the auxiliary, it forms a larger Φ-phrase.

(25)   Hierarchy-preserving discontinuous NP with verb finality in Hindi
  L*H_Φ L* H_Φ L* H_Φ L*H_Φ H* L_ι
  ((**tīn**)_Φ (rām-ne)_Φ ((xarīd-ī)_Φ th-ĩ)_Φ)_Φ (**kursi-yā̃**.)_Φ)_ι   (Hindi)
  three Ram-ERG buy-PRF.F be.PST-FPL chair-PL
  'Ram bought three chairs.'
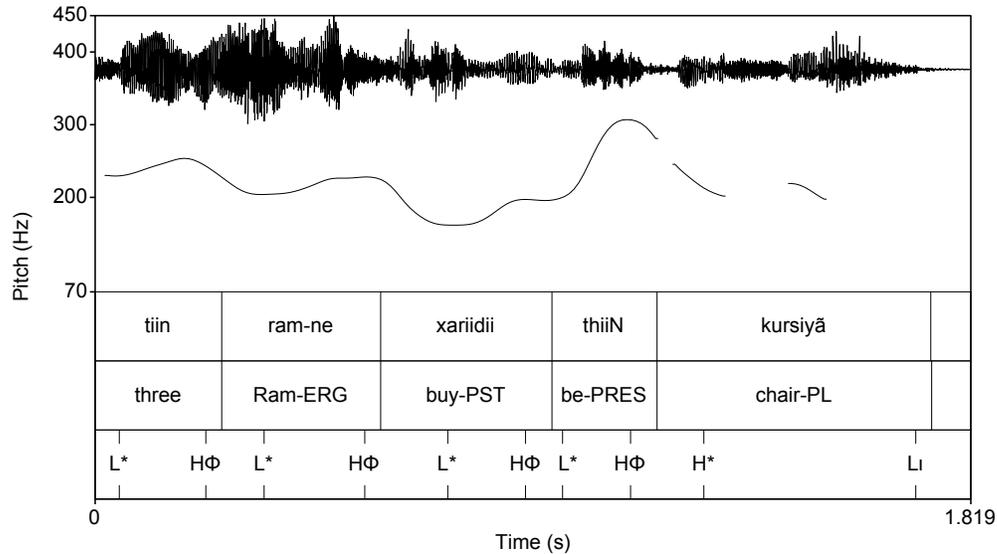
Figure 7. Hierarchy-preserving discontinuous NP in (25), in which the head noun is post-verbal and focused.

That the post-verbal position may be a preferred place of focus is also illustrated by the word order in (26), where the subject is post-verbal and focused: *it was Ram who bought three chairs.*

(26)   Hierarchy-preserving discontinuous NP with post-verbal head noun and subject in Hindi
  ((**tīn**)_Φ (xarīd-ī th-ĩ)_Φ (**kursi-yā̃**)_Φ (rām-ne.)_Φ)_ι   (Hindi)
  three buy-PRF.F be.PST-FPL chair-PL Ram-ERG
  'Ram bought three chairs.'

However, in some cases, the post-verbal element is not focused, but given. Compare the next version in (27) and its pitch track in Figure 8. In this case, the focused element is pre-verbal *tīn* 'three' rather than post-verbal *kursiyā̃*, which is preferably interpreted as given. A prosodic difference between (25) and (26) on the one hand and (27) on the other hand lies in the prosodic attachment of the auxiliary. While it is this element that carries the boundary tone in Figure 7, it is part of the last Φ-phrase in Figure 8. In this case, it is the verb *xarīdī* that carries the high boundary tone. *Kursiyā̃* is uttered entirely at a low level, and the final fall takes place on *thĩ*.

(27)   Hierarchy-preserving discontinuous NP with a pre-verbal numeral in Hindi
  ((rām-ne)_Φ (**tīn**_F)_Φ (xarīd-ī)_Φ (th-ĩ **kursi-yā̃**.)_Φ)_ι   (Hindi)
  Ram-ERG three buy-PRF.F be.PST-FPL chair-PL
  'Ram bought three chairs.'
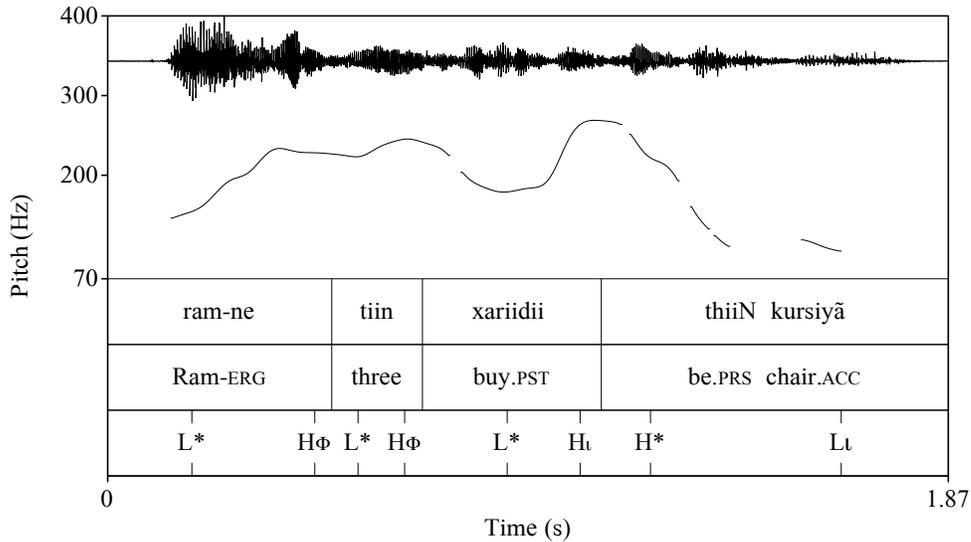
Figure 8. Hierarchy-preserving discontinuous NP in (27), in which the head noun is post-verbal but given.

Hierarchy-preserving discontinuous NPs can be formed with adjectives as well; see (28) and (29). Hindi allows intermediate discontinuous NPs, as in (29). In this particular case only the adjective is fronted, while the quantifier remains adjacent to the noun even though the adjective is located between Q and N in the base word order.

(28) **lāl**   xarīd-ī   th-ī   us-ne   **gāṛī**.   (Hindi)
      red   buy-PRF.F   be.PST-F   he-ERG   car.F
      'He bought a red car.'

(29) **kāl-ī**   mãĩ-ne dekh-ī   th-ĩ̃   **tīn   billi-yā̃̃**.   (Hindi)
      black-F I-ERG   see-PRF.F   be.PST-FPL   three cat.F-PL
      'I had seen three black cats.'

Turning now to the prosodic structure of hierarchy-inverting versions of discontinuous NP, the same word order freedom as before is observed. In (30) the focus-given relation among the two parts of the discontinuous NP is inverted relative to (27). It is again the pre-verbal word *kursiyā̃* that is focused, and the post-verbal numeral *tīn* 'three' is 'out of the way'. A possible context for this word order is: 'What was it that Ram bought three of?' Figure 9 shows that the prosodic structure remains unexceptional: each word, except the auxiliary, forms its own Φ-phrase.

(30)   L* H_Φ   L* H_Φ   L*   H_Φ   H* L_ι
       ((rām-ne)_Φ   **(kursi-yā̃̃)_Φ** (xarīd-ī   th-ĩ̃)_Φ   **(tīn.)_Φ)_ι**   (Hindi)
        Ram-ERG   chair-PL   buy-PRF.F   be.PST-FPL   three
       'Ram bought three chairs.'
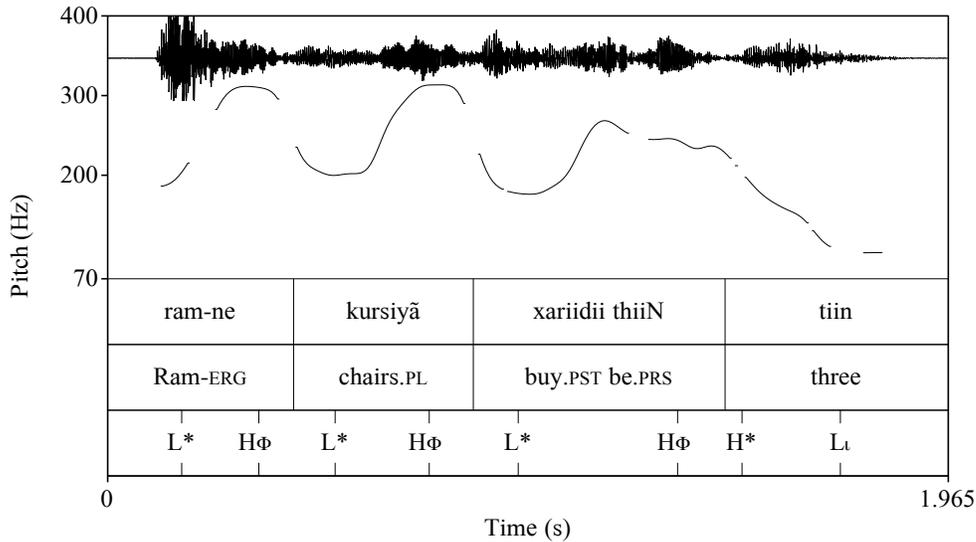
Figure 9. Hierarchy-inverting discontinuous NP in (30), in which the head noun is pre-verbal and focused.

In the next examples, base word order (31)a is compared to two hierarchy-inverting word orders in which the quantifier is separated from the fronted head noun. In (31)b, the quantifier is post-verbal and in (31)c, it is pre-verbal. All three versions of this sentence are perfectly natural. Quantifiers are intrinsically focused, and both non-canonical positions favor a focused reading of the quantifier.

(31) Base word order and hierarchy-inverting discontinuous NPs in Hindi
   a. ((pareš-ne)_Φ (**bahut sār-ī**)_Φ (**kitāb-ẽ**)_Φ (paṛh-ī   th-ī̃.)_Φ)_ι   (Hindi)
        Paresh-ERG many-F   book.F-PL read-PRF.F be.PST-FPL
   b. ((**kitāb-ẽ**)_Φ (pareš-ne)_Φ (paṛh-ī   th-ī̃)_Φ   (**bahut sār-ī**.)_Φ)_ι
        book.f-PL   Paresh-ERG read-PRF.F be.PST-FPL many-F
   c.   L* H_Φ   L* H_Φ   L* H L H_Φ   H*   L_ι
        ((**kitāb-ẽ**)_Φ (pareš-ne)_Φ (**bahut sār-ī**)_Φ (paṛh-ī   th-ī̃.)_Φ)_ι
         book.F-PL   Paresh-ERG many-F   read-PRF.F be.PST-FPL
        'Paresh read many books.'

The sentence (31)c is illustrated in Figure 10. It can be seen that prosodic and tonal structure are unchanged, except for the fact that the complex expression *bahut sārī* 'many' also has a complex tonal structure, analyzed as L*HLH_Φ in (31)c. High tones are downstepped relative to each other (except in *bahut sārī*).
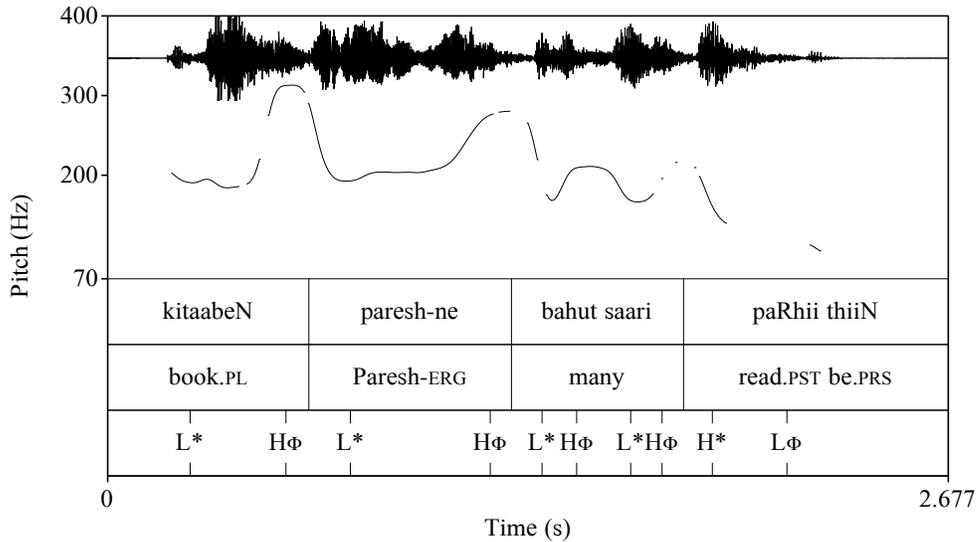
Figure 10. Hierarchy-inverting discontinuous NP in (31)c, with a pre-verbal quantifier.

By and large, the prosodic properties of hierarchy-inverting and hierarchy-preserving discontinuous NPs are quite similar in Hindi – in line with the profound syntactic non-distinctness of the two constructions.

6 Dravidian languages: Tamil and Malayalam

Dravidian languages do not allow discontinuous NP constructions as freely as Hindi or other Indo-Aryan languages, if at all, even though they all have a fairly free word order. Kannada seems to lack discontinuous NPs of the usual sort, while Malayalam (32), Tamil, and Telugu have hierarchy-inverting discontinuous NPs, but the construction is confined to underlying direct objects.

(32)　**mantri-mār-e**　jōn̲　**pala-r-e**　kaṇḍu.　　　　　　　(Malayalam)
　　　minister-PL-ACC　John　many-PL-ACC　saw
　　　'As for ministers, John saw many.'

6.1 Tamil

In this section, the prosodic structure of Tamil discontinuous NPs is investigated, which has been described by Keane (2007, 2014). Keane finds that the building blocks of intonation in Tamil consist of an initial low tone and a final high tone in the pre-final Φ-phrase, thus the same intonational pattern that was described for Hindi, Bengali, and Assamese. She observes that 'intonational differences between broad and narrow focus readings may be minimal. […] Intonational resources […] are limited: besides enforcing the presence of a rising contour on constituents that might otherwise lack one, manipulation of the relative scaling of f0 peaks appears to be the primary means of signaling semantic salience intonationally' (Keane 2014: 150). This description also corresponds to what has been found for Indo-Aryan languages.

　　Let us start the survey of the prosodic structure of discontinuous NPs in Dravidian languages with an example of a topic construction. Such sentences begin with an XP functioning as a free topic and marked as such by a postposition or similar devices. The topicalized NP is a hypernym of an NP that appears in the clause proper. We refer to such instances of a topicalized NP co-occurring with its clause-internal NP referent as 'double-noun constructions'.

　　As can be seen from Figure 11, a pitch track of this sentence, we find the pattern that is described

by Keane and that is also typical for Hindi. Each Φ-phrase has an initial low tone and a final phrasal high tone. The first Φ-phrase in this sentence is delimited by a very high boundary tone that separates the topicalized constituent from the remainder of the sentence. In Tamil, words are long and often complex and nearly each one of them consists of two series of L and H tones. Only the first of each Φ-phrase is marked by a star. In this sentence, except for the first high tone, we do not see much variation in tonal scaling, still the alternation of L and H tones is pervasive.

(33)   Double-noun construction in Tamil

    L*   H L Hᵩ   L* H L Hᵩ   L*H L   Hᵩ   L*H L Hᵩ   H*   Lₜ

    (paṟavai-gaḷ-uḷ)ᵩ (avan-ukku)ᵩ   **(nīla vaṇṇa.p)**ᵩ **(paṟavai-gaḷ)**ᵩ (piḍ-ikk-um.)ᵩ)ₜ

    bird-PL-among   he-DAT   blue color   bird-PL   seize-FUT-3NSG

    'As for birds, he likes blue ones.'
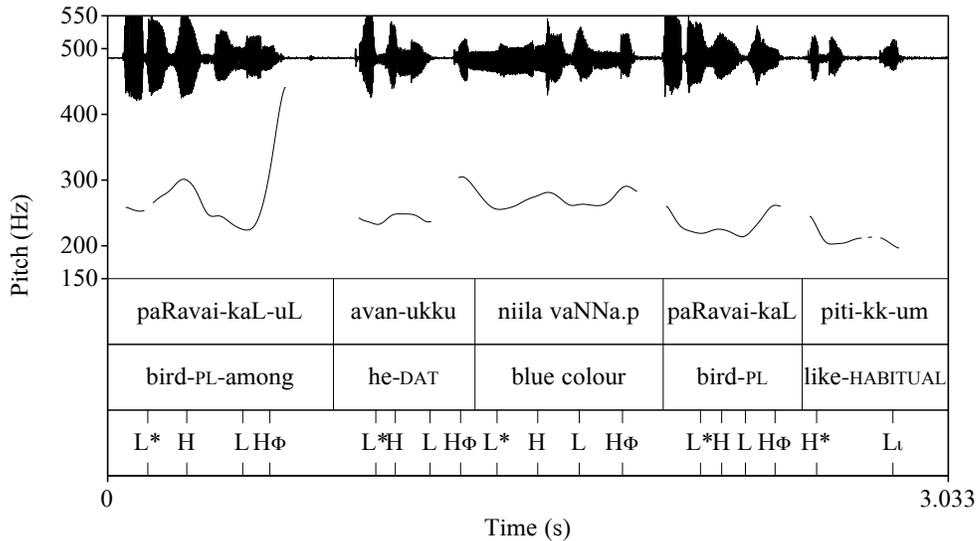
Figure 11. Tamil sentence (33) with a double-noun NP.[10]

Turning now to Φ-phrase formation and tonal structure in sentences containing a discontinuous NP, it can be seen once again that different word orders do not necessarily come along with different prosodic phrasings. In the two sentences in (34), which show base word order and an inverting discontinuous NP respectively, each word forms a separate Φ-phrase. Words are shorter than in (33), and alternation between L and H inside words is rarer. Furthermore, the quantifier *ettanai* 'how many' is prominent and bounded by a high boundary tone in both versions. In the base order in (34)a, illustrated in Figure 12, the Φ-phrases following the quantifier are compressed: the F0 register is smaller than at the start of the sentence. The tonal structure is present but not clearly perceptible.

(34)   Base word order and hierarchy-inverting discontinuous NP in Tamil

    a. ((pīṭṭar)ᵩ **(ettanai)**ᵩ   **(cēr)**ᵩ (nēṭṭru)ᵩ (pār-tt-ān?)ᵩ)ₜ   (Tamil)

        Peter   how.many   chair   yesterday see-PST-3MSG

    b. ((pīṭṭar)ᵩ **(cēr)**ᵩ   (nēṭṭru)ᵩ **(ettanai)**ᵩ (pār-tt-ān?)ᵩ)ₜ

        Peter   chair   yesterday how.many   see-PST-3MSG

    'How many chairs did Peter see yesterday?'

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[10] All sentences from this and the next sections were recorded during the ICOLSI 39 in Patna in December 2017.
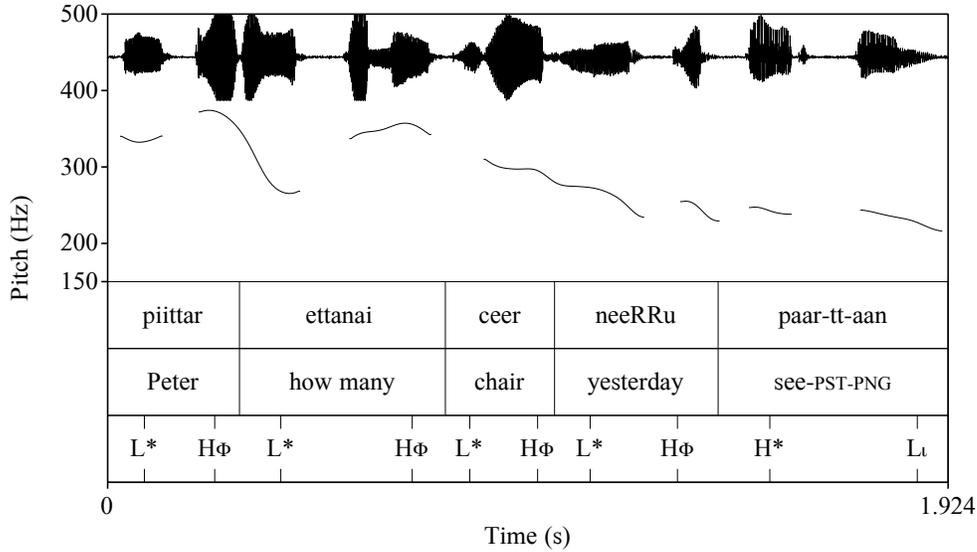
Figure 12. Base word order in Tamil sentence (34)a.

In the hierarchy-inverting NP (34)b illustrated in Figure 13, the first Φ-phrase has an initial low tone and a final phrasal H tone, but the following Φ-phrases, except for the one formed on the quantifier *ettanai* 'how many', are tonally inconspicuous with a tonal interpolation between the first H$_Φ$ and the L* of the quantifier. This realization may correspond to integration of *cēr* 'chair' and *ettanai* 'how many' in one Φ-phrase, but since there is no strong reason to assume this, the solution adopted here is to assume that the prosodic phrasing is unchanged (each word forms its own Φ-phrase), but the tonal structure is eliminated.
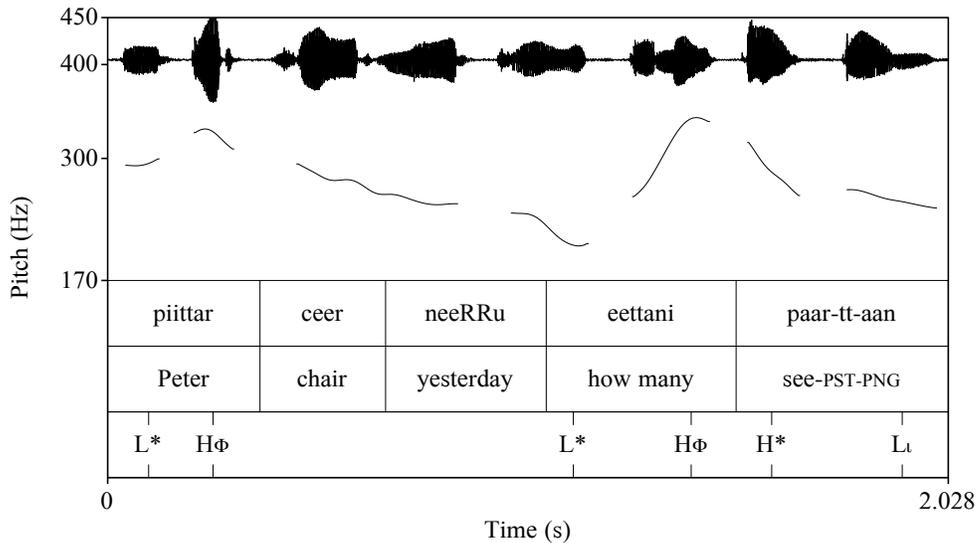
Figure 13. Hierarchy-inverting discontinuous NP in Tamil sentence (34)b.

6.2 Malayalam

As we mentioned earlier, Malayalam has hierarchy-inverting discontinuous NPs as in (35) when the XP moves to the topic position, but again, only for direct objects and subjects of unaccusative verbs.

Malayalam seems to allow more discontinuous NPs than the other languages, but this may be due to the fact that this language has -*āṇŭ*, a copula playing the role of a focus particle (FOC in the glosses), as illustrated in (36).

(35) **mantri-mār-e**   jōṇ **pala-r-e**   kaṇḍu.   (Malayalam)
      minister-PL-ACC John many-PL-ACC saw
      'As for ministers, John saw many.'

(36) Focus particles (copula) in Malayalam
      a. **etra-āṇŭ**   mēri   kaṇḍa   **kasēra-gaḷ**?   (Malayalam)
          how.many-FOC   Mary   saw   chair-PL
          'How many chairs did Mary see?'
      b. mūnnŭ-āṇŭ   mēri   vāṅṅicca   kasēra-gaḷ.
          three-FOC   Mary   bought   chair-PL
          'Mary bought three chairs.'

Examples comparing a sentence with base word order and the same sentence with a discontinuous NP appear in (37). The focus particle is attached to *etra kasēragaḷ* 'how many chairs' in the continuous order, but to *etra* 'how many' in the discontinuous order. In both cases, it has its own rising contour, which is analyzed here as forming an embedded Φ-phrase in the Φ-phrase formed by its host, a recursive structure also seen in Basque (Elordieta 2015), Irish (Elfner 2015), and Japanese (Kubozono 2007, Ishihara 2014). As for as the remaining tonal pattern, the same pattern as before is found, with initial low tones and final high tones in most Φ-phrases and a fine tonal scaling. The last word of the sentence, the verb in (37)a and the head noun in (37)b, has a low and falling tonal pattern.

(37) Base word order and hierarchy-preserving discontinuous NP in Malayalam
      　　　 L* HΦ   L* H L HΦ   L* HΦ H*   Lι
      a. ((etra)Φ   (**kasēra-gaḷ-(āṇŭ**)Φ)Φ ((pītṭar)Φ vāṅṅicca-adŭ.)Φ)ι   (Malayalam)
          how.many   chair-PL-FOC   Peter   bought-NMZ
      　　　 LH L HΦ   L* HΦ   L*   HΦ   H*   Lι
      b. ((**etra-(āṇŭ**)Φ)Φ (pītṭar)Φ (vāṅṅicca)Φ (**kasēra-gaḷ**.)Φ)ι
          how.many-FOC   Peter   bought   chair-PL
          'How many chairs did Peter buy?'
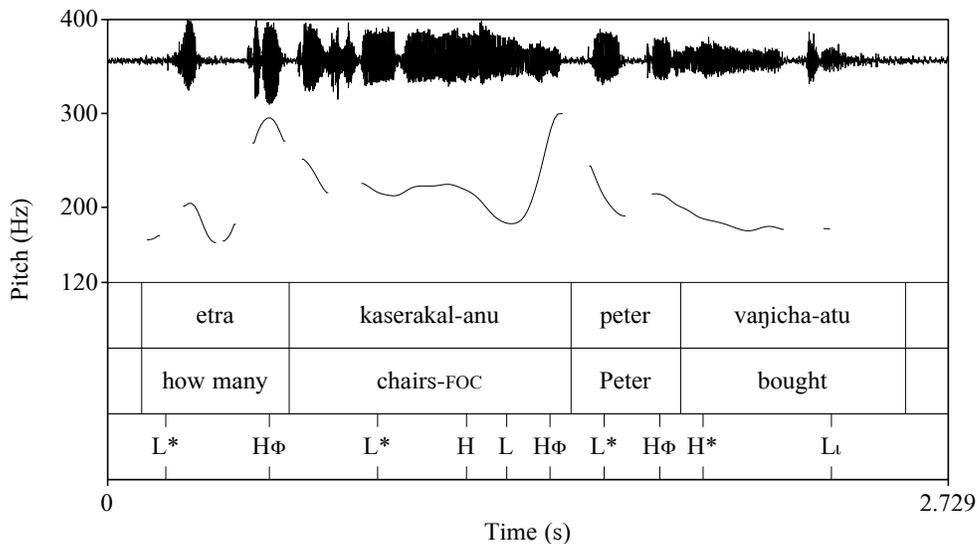
Figure 14. Malayalam sentence (37)a in base word order.
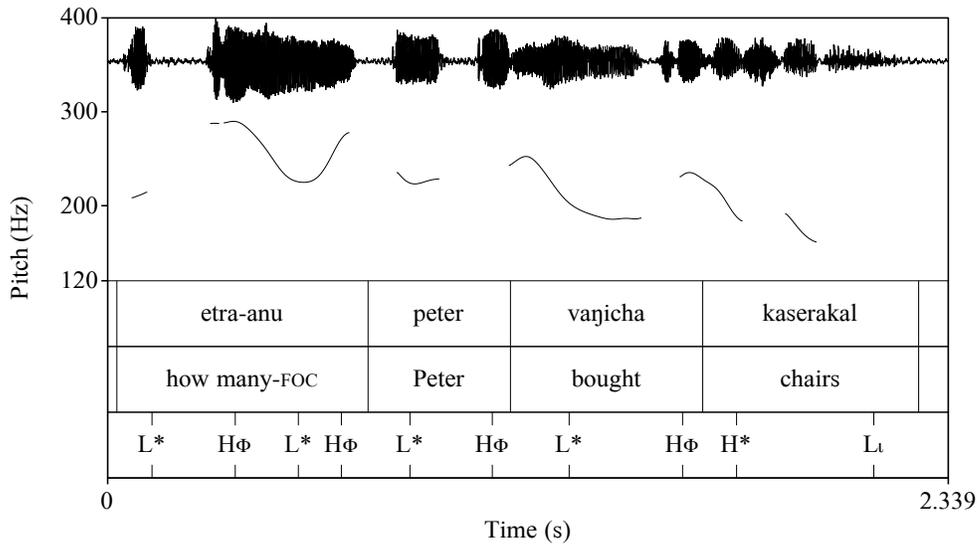
Figure 15. Malayalam sentence (37)b with hierarchy-preserving discontinuous NP.

To conclude this section, the tonal structure of both sentences with base word order and sentences with a discontinuous NP is very similar to that found in the Indo-Aryan languages examined.

7 Tibeto-Burman: Bodo and Meithei

In this section, two Tibeto-Burman languages are compared in regard to their intonational properties in base word order and in discontinuous NPs. Since there are only very few studies investigating the tonal and prosodic patterns of these languages, the results of this section are largely explorative and need more experimental investigation. On the basis of the descriptions of Indo-Aryan and Dravidian languages, it is tentatively proposed that the tonal patterns of Bodo and Meithei are superficially similar to those of these languages, but see some caveats below.

7.1 Bodo

Bodo (or Boro; Bodo-Garo, Brahmaputran) allows both hierarchy-inverting and hierarchy-preserving discontinuous NPs. Let us start the prosodic investigation of this language with a hierarchy-inverting discontinuous construction as in (38), drawing on intonational descriptions of the language in Das & Mahanta (2019). The left-peripheral noun has inflectional suffixes that participate in the tonal pattern: we find two rising contours, one on the nominal stem and one on the suffixes, and the same holds for the second nominal head followed by the exclusive particle. The pronominal subject has a simple rising contour and the final words, an adverb and the verb, carry the final falling contour.[11] In other words, we again find the same phrasal intonation that was described for the Indo-Aryan and Dravidian languages. In the Bodo sentence (38), downstep is present.

(38)　　Discontinuous construction in Bodo
　　　　L*Hφ　L*　　　Hφ　L*　Hφ　L*　H　L　　Hφ　H*　　　Lι
　　　　((**dau-(phwr-khwu**)φ)φ (bi-yw)φ　(**gwthang-phwr-khwu**-lo)φ (mwzang　mwn-w.)φ)ι
　　　　 bird-PL-ACC　　　　　he-NOM　blue/green-PL-ACC-only　　good　　find-PRS
　　　　'As for birds, he only likes blue/green ones.'

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[11] Das & Mahanta (2019) analyze the H tones of *bi-yw* 'he-NOM' and *dau-phwr-khwu* 'birds-ACC' and the L tones of *bai* 'buy' and *mwzang* 'good' as lexical tones.
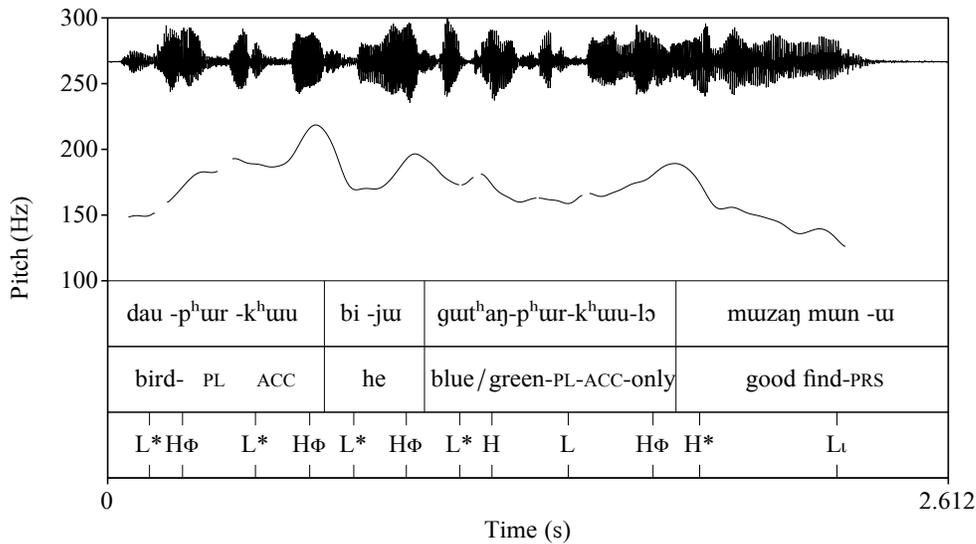
Figure 16. Hierarchy-inverting discontinuous construction in Bodo sentence (38).

In the discontinuous NP examples that we collected, the hierarchy-preserving NPs are grammatical only when the second part is placed post-verbally. In fact, the focal quantifier or numeral is the only preverbal element in these examples, giving Bodo the appearance of a verb-second language (but only in these contexts). As was the case for the other languages examined here, Bodo largely confines discontinuous NPs to direct objects.[12]

Turning to the prosodic and tonal structure, phrasing does not change much, only register changes are pervasive. In the pitch track of (39)a in Figure 17, the wh-word *gongbwise* 'how many' has a high boundary tone. The same is true for Figure 18, but there the wh-word is high anyway by virtue of being initial in the sentence.

(39)   Bodo sentence in base word order and as discontinuous NP
               L* H⏀   L*   H⏀   L*H⏀   H* Lₗ
    a.   ((pitar-a)⏀ (**gongbwise**)⏀   (**masi**)⏀ (bai-khw?)⏀)ₗ   (Bodo)
         Peter-NOM how.many   chair   buy-PRF.Q
               L*   H⏀   L* H⏀   L* H⏀   H* Lₗ
    b.   ((**gongbwise**)⏀ (bai-khw)⏀ (pitar-a)⏀   (**masi**?)⏀)ₗ
         how.many   buy-PRF.Q   Peter-NOM   chair
         'How many chairs did Peter buy?'

---

[12] Chelliah (1997: 120) observes for Meithei that post-verbal elements are given information. Predicate focus is a pragmatic condition that favors the presence of post-verbal material. In spite of the 'afterthought' nature of the second split part in pragmatic terms, it must be integrated quite firmly into the clause proper, because the construction is confined to direct objects in both Bodo and Meithei – neither subjects nor indirect objects can be split up.
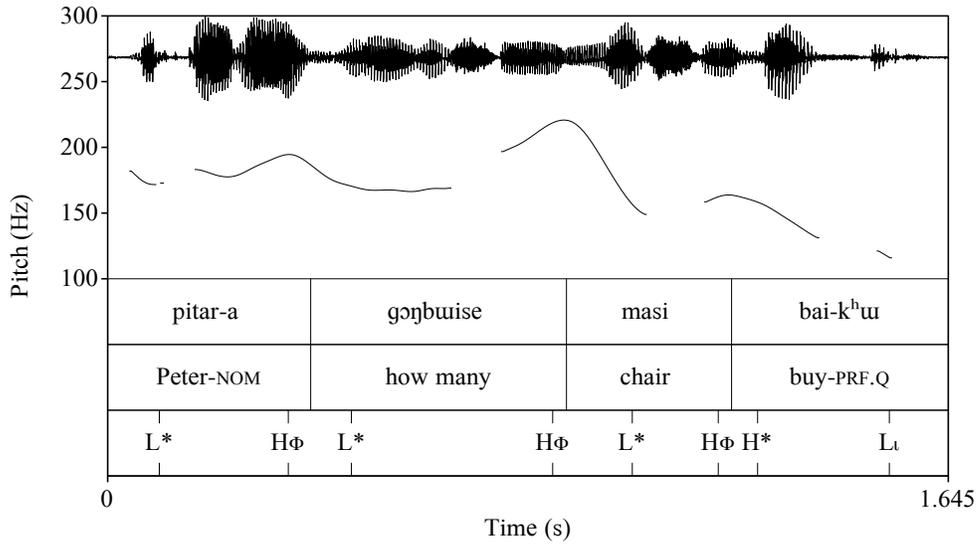
Figure 17. Sentence (39)a in base word order in Bodo.
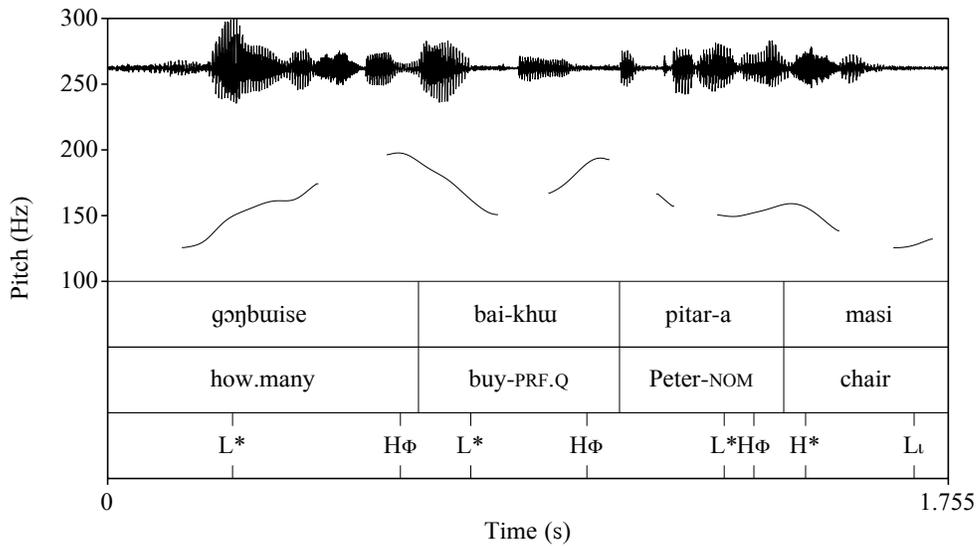
Figure 18. Hierarchy-inverting discontinuous NP with a post-verbal head in Bodo sentence (39)b.

7.2 Meithei

Meithei (or Meetei, Meitei, Manipuri; Kuki-Chin-Naga) is also very permissive as far as discontinuous NPs are concerned: it has both hierarchy-inverting and hierarchy-preserving examples, as well as double-noun constructions. The pair of examples in (40) shows a sentence in base word order and the same sentence with a hierarchy-inverting NP in which the adjective is post-verbal.

(40)   Meithei sentence in base word order and as hierarchy-inverting discontinuous NP

              L*   HΦ   L* HΦ   L* HΦ   L*   Lₜ

a.   ((pitar-nā)Φ   (**nungaiba**)Φ   (**lāirik amā**)Φ   (pā-re.)Φ)ₜ   (Meithei)

       Peter-ERG   interesting   book one   read-PST

             L*   HΦ   L* HΦ   L* HΦ   L*   Lₜ

b.   ((pitar-nā)Φ   (**lāirik**)Φ (pā-re)Φ   (**nungaiba   amā**.)Φ)ₜ

       Peter-ERG   book   read-PST   interesting   one

       'Peter read an interesting book.'
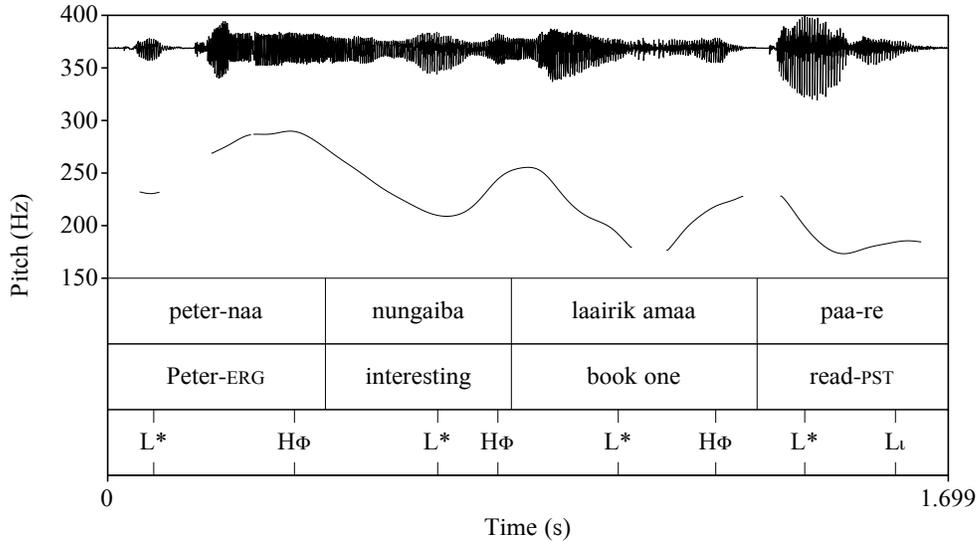
Figure 19. Meithei sentence (40)a in base word order.
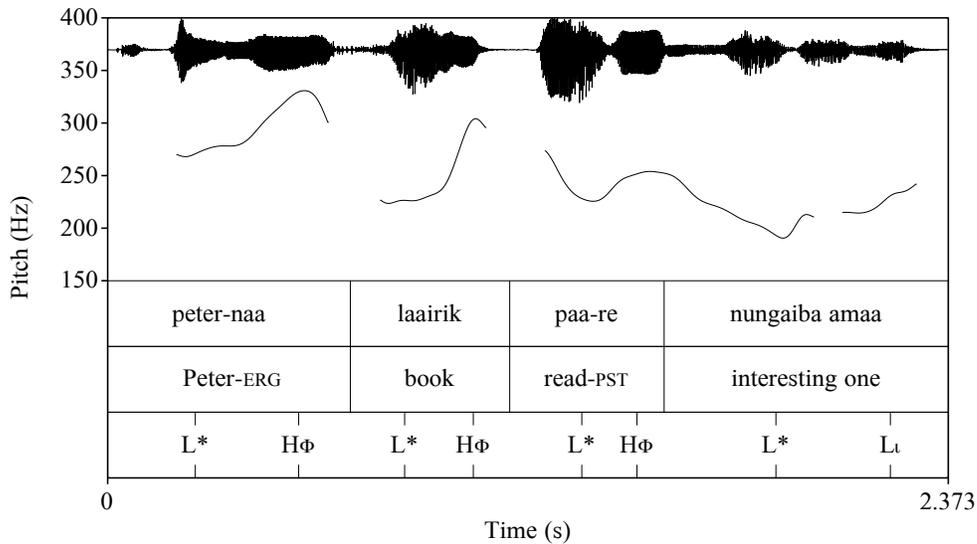
Figure 20. Meithei sentence (40)b, with a hierarchy-inverting discontinuous NP with a post-verbal quantifier.

When comparing the position of the low tones in the Tibeto-Burman languages with that in the Indo-

Aryan and Dravidian languages, it is conspicuous that they are placed later in their Φ-phrase, closer to the final H tone. It could be the case that the similarity in the tonal structure of all the Indian languages examined in this paper will turn out to be illusory and that the rising contour found in all the languages cannot be analyzed as resulting from the same underlying tones. It is not possible to give an informed answer to this question here.

8 Conclusion

In this paper, the prosodic structure of sentences containing a discontinuous NP has been examined in several Indian languages. The main research question was to test the division that Fanselow & Féry (in preparation) propose for a large number of languages, and that we call non-cohesive vs. cohesive intonation. In these languages, a continuous NP is typically included in a single prosodic phrase (Φ-phrase) that bears a unique information structural role. By rendering an NP discontinuous, the two parts of the NP may carry different roles and different tonal structures. Specifically, a special intonation can then be produced on the preposed phrase playing the role of the topic. There is also F0 raising on the focus and F0 compression on the post-focus material. We could also show that a non-cohesive intonational contour is typically associated with a hierarchy-inverting type of discontinuous NP and a cohesive intonational contour is preferred on a hierarchy-preserving one, although the pairing is not obligatory.

The specific question addressed above was whether the division between non-cohesive and cohesive intonation – and secondarily the division between hierarchy-inverting and hierarchy-preserving discontinuous NPs – is universal or whether it depends on specific intonational and prosodic properties. Indian languages are a good testing area because the intonation of these languages is different from that of intonation languages. They have a so-called phrase intonation because each content word typically forms a Φ-phrase of its own, and the tonal structure of the resulting Φ-phrases does not differ much, except for the sentence-final one in declarative sentences, which has a falling contour. The non-final phrases nearly always consist of an initial prominent low tone (written L*) and a final phrasal high tone (written H$_\Phi$). It is important to realize that some grammatical features resulting from information structure are common to both intonation languages and Indian languages, namely word order changes and tonal scaling. In other words, NP discontinuity obviously elicits word order changes, and F0 can be raised or lowered depending on the focused or given status of the parts of the NP.

What does change in intonation languages is both the number of Φ-phrases and their tonal form, as a consequence of their pragmatic role in the sentence. And these are the features that do not change in Indian languages. The number of Φ-phrases is left unchanged because the noun and its modifier form different Φ-phrases to begin with, and the tonal pattern of the phrase does not change either: it does not depend on the information structural roles assumed here: focus, givenness, and topic.

To conclude, because of these properties, there is no clear difference between sentences in base word order, sentences containing hierarchy-inverting discontinuous NPs, and sentences containing hierarchy-preserving NPs as far as the prosodic and intonational patterns of the Indian languages examined in this paper are concerned. In other words, there is no clear prosodic division between non-cohesive and cohesive patterns.

The effect of information structure has not been tested systematically on the data presented in the paper, but for the cases that were tested, word order is crucial and tonal scaling is dependent on it. Tonal scaling is an important component of intonation in all the Indian languages discussed above, although its role is not completely clear. A constituent in focus is not necessarily raised in its F0, and sometimes, the preceding boundary seems to be at least as important.

What was not addressed in the paper is how Φ-phrases are mapped from morpho-syntax. Even though it is often the case that every word builds its own Φ-phrase, we can only suspect that the prosodic embedding that we could identify in some cases is much more common than we could demonstrate here. Tonal scaling is again the cue to prosodic embedding, but this must be the subject of separate research.

And the last point that needs further investigation concerns the alignment of the initial low tone, which seems to be later in the Tibeto-Burman languages than in the Indo-Aryan and Dravidian languages, although this point also needs more careful analysis.

Acknowledgements

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