Rhythm and the Synthetic Drift of Munda*

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1. The Structural Divergence of Munda and Mon-Khmer

The South Asian (Munda) and South-East Asian (Mon-Khmer) branches of the Austroasiatic language family² are perhaps the most divergent in the world. They are opposite in structure at every level (Table 1):

Table 1. Polarizations in Munda vs Mon-Khmer discussed in this paper.³

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In Sora,⁴ a Koraput Munda language of Orissa, the sentence ‘He doesn’t want to give me the rice’ is head-last and synthetic, as in (1), but in Khmer⁵ (Cambodian), it is head-first and analytic, as in (2):

(1) Sora: anin ɗən- penet daraj -ən ə- tiy -ben یدسیم
he/she OBJ- me rice -ART INF- give -INF want
-te  ted
-3PR not

(2) Khmer: ʔət cəŋ ʔəʊy baay kəpom
he/she not want give rice me
The polarity of Munda vs Mon-Khmer recalls that of ancient vs modern Indo-European: synthetic head-last vs analytic head-first (Lehmann 1974). But Munda and Mon-Khmer are far more divergent. Indo-European was never polysynthetic, but many Munda languages are. For example, in Sora an even more synthetic (and more idiomatic) rendering of sentence (1) crystallizes it into a single complex word ədməltiydarîndae:

(3) Sora: ə-d- məl- tiy -dar -iŋ -da -e
not- want- give -rice -me -AUX -3PR

And while all modern Indo-European languages, even English, retain some inflection, most Mon-Khmer languages lack it entirely, and Vietnamese-Muong lacks affixation entirely. The Munda and Mon-Khmer branches of Austroasiatic, rarely studied by typologists, provide a nearly exhaustive inventory of the extremes of difference in human language structure.

2. The Structural Oppositions of South Asia and South-East Asia

The main reason for the neglect of the Munda and Mon-Khmer divergence is that each is spoken in a linguistic area (Sprachbund) where its structure is sufficiently typical as to seem unremarkable. Most of the Munda traits in Table 1 are found also in the other language families of the South Asian area—Dravidian, Indo-Aryan, and Tibeto-Burman, as well as isolates like Nihali and Burushaski. And most of the Mon-Khmer traits in Table 1 are found also in the other language families of the mainland South-East Asian area—Tai-Kadai, Hmong-Mien, Chamic (Austronesian), and Chinese.

In some respects Munda and Mon-Khmer are not typical of their areas. For example, South Asian languages are predominantly suffixed (and Dravidian exclusively so), but Munda languages are also prefixing and infixing:

(4) Sora: ə- ədn- əl- gə\{b\}rəj- -l -ay
PL- not- RECIP- {CAUS} feel-ashamed -PA -1st
‘We (exclusive) didn’t shame each other’

And South-East Asian languages are prefixing or isolating, but Nicobarese is also suffixing. However, in most respects Munda and Mon-Khmer are more like the unrelated languages of their areas than they are like each other. Most of the boundary lines between major typological differences in Asia in the maps in Masica (1976) run precisely between South and South-East Asia. Except in groups that have crossed over that boundary in the past two millenia, there has been deep and divergent coalescence in the respective areas.
Areal contact certainly might explain the similarities within each area. But it cannot explain the differences between them. And Munda and Mon-Khmer, and the South and South-East Asia areas, are not just different from each other, they are systematically opposite at every level. To explain the holistic polarization of structures in Munda vs Mon-Khmer, and in South vs South-East Asia, we seek a linguistic opposition which might pervade and organize every level from syntax to phonetics. The only plausible candidate is initial vs final accent in phrases and in words. We will speak of these as falling vs rising rhythms.

Munda and other South Asian languages have falling phrase rhythms (as in noun + postposition) and, excepting some Indo-Aryan languages, also falling word rhythms (as in base-suffix). Mon-Khmer and other South-East Asian languages have rising phrase rhythms (as in preposition + noun) and rising word rhythms (as in prefix-base).

We will argue that this opposition of falling vs rising rhythm is what maintains the opposition of South Asian vs South-East Asian structure, and that it was a change from a rising rhythm in proto-Austroasiatic (which we will show originally had a rising rhythm and analytic typology) to a falling rhythm in proto-Munda that channeled the drift of the individual Munda languages as their highly synthetic structures evolved.

3. Historical Issues

Grierson, in the introduction to the Linguistic Survey of India, at first doubted whether languages with such an opposite “order of ideas” as Munda and Mon-Khmer could be related at all (1904: 2). Schmidt (1906) established their genetic relationship, and Pinnow (1959 et passim) has removed all reasonable doubts. But there remain disagreements about what proto-Austroasiatic was like, and therefore about how the polar opposition of Munda and the eastern Austroasiatic languages came about.

3.1. The analytic basis of proto-Austroasiatic

Pinnow argued that proto-Austroasiatic had SVO order, based on the order of elements in the Munda verb (1960, 1966). Repeating our own examples (sentences 1, 3, 2, respectively), the Sora verb phrase is head-last:

(5) Sora: *anin* *daj- nen* *daraj* -on *ə* *tiy* -ben *idsim* -tə

\[ \text{he/she OBJ- me rice -ART INF- give -INF want -3PR} \]

\[ \text{me rice give want} \]

ted

not

not
The head-last order of non-inflectional elements (bold-faced) in the Sora verb phrase (5) is the exact opposite of their head-first order in the Sora polysynthetic verb in (6) and their head-first order in the Khmer verb phrase in (7). The glosses apply to both (6) and (7):

(6) Sora: (anin) əd- məl- tiy -dar -iŋ -da -e
e he not want give rice me -AUX -3PR

(7) Khmer: kōt ?ətcaŋ ?aoy baay kpom

Not surprisingly for languages separated for many millenia, there is but one cognate form in (6) and (7): the Sora prefix əd- and the Khmer verb ʔət (lit. ‘lack’), from proto-Austroasiatic *ət. But the patterns of (6) and (7) are cognate: the analytic Mon-Khmer pattern of the verb phrase in Khmer (7), ʔət caŋ ?aoy baay kpom, has crystallized into the polysynthetic Munda pattern of the verb stem in Sora (6), əd-məl-tiy-dar-iŋ-. From cognate patterns like these in Munda and Mon-Khmer, Pinnow concluded that proto-Austroasiatic must originally have had the analytic subject–verb–object (SVO) pattern that persists in Mon-Khmer syntax and in Munda morphology. Lehmann, in an article (1973) that extended the notion “VO/OV” to mean head-first/head-last order in other phrases, also extended Pinnow’s conclusion about proto-Austroasiatic to other phrases:

If we examine further evidence provided by Pinnow, we note that Munda contains VO characteristics. It has VO order in compounds (Pinnow [1960], 97); it also provides examples of NG [noun–genitive] order and of prefixes. Since the Khmer-Nicobar languages are consistently VO, I assume that it was the Munda languages which were modified syntactically.... We may conclude that Proto-Austro-Asiatic was VO and non-agglutinative in morphological structure. (Lehmann, 1973: 57)

Sora is particularly rich in examples of such “VO” (head-first) survivals:

(8) Noun–genitive compounds: head-first with first and second person pronouns: ʦiʔiŋ1-ɲeŋ2 ‘my2 house1’; ʦoʔaŋ1-ɲəm2 ‘your2 eye1’; ɡəɾjɑŋ1-ɿən2 ‘our2 village1’; oŋ1-yaŋ2-ɿeŋ3 ‘your (pl.)3 parents (lit. father1-mother2)’.

(9) Noun–nouns compounds: head-first is recessive but is still regular for many nouns: kɔyɔkɔy1-im2 ‘chicken2 tail-plume1’; ʔɔsiŋ1-ɿəd2 ‘snail2 shell (lit. house1)’; ʔɔsiŋ1-ɿaŋ2 ‘cow2 dung1’; ɿoŋ1-ʃiŋ2 ‘interior1 of a house2’; ʔɔbɔŋ1-ɿəd2 ‘pupil (lit. seed1) of the eye2’.

(10) Verb–object (object incorporated) compounds, all head-first: ə1-ʃi2 ‘wash1 the hand2s’; ə1-ʃeŋ2 ‘wash1 the feet2’; ɡu1-ɿə2 ‘erect1 a
funeral stone2'; \textit{gu}_1-\textit{siŋ}_2 \text{ 'erect a house2'; } \textit{gəd}_1-\textit{bir}_2 \text{ 'clear (lit. cut1) a hill2 for shifting cultivation'; } \textit{gəd}_1-\textit{ban}_2 \text{ 'sacrifice (lit. cut1) a buffalo2'; } \textit{gay}_1-\textit{saŋ}_2 \text{ 'dig1 turmeric-root2'; } \textit{gay}_1-\textit{lon}_2 \text{ 'dig1 a pit2'; } \textit{jom}_1-\textit{dər}_2 \text{ 'feast (lit. eat1 rice2)'. } \text{Similarly the reflexive is head-first: } \textit{gəd}_1-\textit{dəm}_2 \text{ 'cut1 oneself2'; } \textit{ə}_1-\textit{siṭ}_2-\textit{dəm}_3 \text{ 'wash1 one’s own3 hand2s'.}

(11) \text{Other verb–dependent compounds, also all head-first: (agent) } \textit{ma}_1-\textit{kid}_2 \text{ ‘be caught1 by a tiger2’; } \textit{mə}_1-\textit{kol}_2 \text{ ‘be swallowed1 by a ghost2’; } \textit{duŋ}_1-\textit{yəŋ}_2 \text{ ‘for the sun2 to rise1’; } \text{ (instrument) } \textit{ra}_j1-\textit{kən}_2 \text{ ‘chop1 with a knife2’, } \textit{ti}_d1-\textit{daŋ}_2 \text{ ‘beat1 with a stick2’; } \text{ (locative) } \textit{dəkə}_1-\textit{siŋ}_2 \text{ ‘stay1 at home2’; } \text{ (completive) } \textit{jom}_1-\textit{aj}_2 \text{ ‘eat1 up2’}.\text{ The shapes of the elements in the Sora compounds in (8) through (12) echo the bare and often monosyllabic shapes of independent words in Mon-Khmer, and their head-first internal order echoes the order of phrases and compounds in Mon-Khmer. All this, together with the striking rarity of head-last order in Mon-Khmer, supports Lehmann’s conclusion that proto-Austroasiatic syntax was head-first not only in the predicate (VO) but in phrases generally.}\

Both Pinnnow’s and Lehmann’s conclusions rest on an implicit but well-tested hypothesis that syntactic patterns become morphological patterns, but morphological patterns do not become syntactic patterns. An original proto-Austroasiatic head-first syntactic pattern, maintained in Mon-Khmer, has become a head-first morphological pattern in the Munda polysynthetic verb. The converse change—dissolving a polysynthetic word like Sora \textit{əd}-\textit{mə}_1-\textit{tiŋ}-\textit{dar}-\textit{ip}- (6) into an analytic phrase like Khmer ?at \textit{caŋ} ?aŋ \textit{baay \textit{knom}} (7)—seems quite impossible. Clearly, it is Munda that innovated, first by joining proto-Austroasiatic head-first analytic phrases (7) into head-first polysynthetic words (6), a process paralleled also in a few other Austroasiatic languages like Nicobarese, and then, along with a reversal from rising to falling rhythm, by reversing head-first analytic phrases into head-last inflected phrases (5).

Despite his own evidence for SVO structure in proto-Austroasiatic, Pinnnow (1960) hypothesized that proto-Austroasiatic might have been synthetic, on the basis of variation in Khmer word-final consonants that he took as evidence for former suffixes. But Jacob (1992), citing extensive Khmer data, showed that this consonant variation is not grammatical but
affective, and that it involves not only final but also initial consonants and even vowels. Such affective variation is widespread in Mon-Khmer (see Jacob’s list of references, 1992: 71) and in Munda (Kuiper 1965).

More recently, Zide and Anderson (2001) have assembled cognates in various eastern Austroasiatic languages for a number of verbal formatives in the Munda languages. They take many of these not only to have been part of proto-Munda but also of proto-Austroasiatic. Some are derivational prefixes or infixes of nominalization, causativization, and so on, that have long been accepted as proto-Austroasiatic. Others are inflectional elements like person and number affixes, tense/aspect affixes, and so on, which were also reconstructed by Pinnow in his work on the Munda pronouns (1965) and the verb (1966). Zide and Anderson’s work on these incorporates South Munda data that provide a much clearer view of early Munda than was available to Pinnow. They criticize Donegan and Stampe (1983) for the view that the Munda morphology must be seen as in large part due to the independent synthetic drift of the daughter languages rather than due to the breakdown of a fully formed verbal system in proto-Munda. Our views are based not on some a priori scepticism about reconstruction, but on the difficulty of explaining the variety of combinations of elements of the verb in the daughter languages if those elements were already affixes rather than free forms in proto-Munda. At the level of proto-Austroasiatic the difficulty is far greater, because in the vast majority of eastern languages the cognate elements are free forms. To reconstruct synthetic morphology for proto-Austroasiatic implies that the vast majority of eastern languages lost verbal inflection and morphology and became analytic. But that would entail that in most Mon-Khmer languages that former affixes—elements characteristically faded in pronunciation, grammatical autonomy, and meaning—have been restored to full lexical specificity and function. It is far more likely that Munda and the few eastern languages that show some signs of synthesis have innovated it. The reason is that most of the elements that are functionally identical, whether cognate or not, are placed at one end of the verb in Munda and at the other end the eastern languages. The only obvious explanation for that is that those elements were still free forms that could trade places with the verb after Munda changed from head-first and prefixing to head-last and suffixing.

3.2. Syntax: Progression vs regression

There is an old view that languages naturally change from synthetic to analytic, but that the opposite change, if it were to occur at all, would have to be due to external causes. The same scepticism has extended to changes from head-first to head-last order.
Friedrich von Schlegel (1808) contrasted the “ancient and artful” forms of Sanskrit, Greek, and Latin, which expressed structure morphologically, by affixing or modifying a root, with the younger Romance or English, which expressed structure by adding separate words like auxiliaries and prepositions. The general tendency for languages to change from synthetic to analytic “shows up everywhere the same”, Schlegel said; “no external cause is necessary”:

The ingenious structure is readily lost through wearing away by common usage, and the grammar with auxiliaries and prepositions is actually the shortest and most convenient, like an abbreviation for simple, general usage; in fact one could almost establish the general rule that a language is the easier to learn, the more its structure has been simplified and approximated to this abbreviation (translation by Lehmann 1967: 26).

Jespersen (1922; chapters 18–20) concurred, arguing that the change from synthetic to analytic is not “decay” but “progress”:

(1) The forms are generally shorter. . . . (2) There are not so many of them to burden the memory. (3) Their formation is much more regular. (4) Their syntactic use also presents far fewer irregularities. (5) Their more analytic and abstract character facilitates expression by rendering possible a great many combinations and constructions which were formerly impossible or unidiomatic. (6) The clumsy repetitions known under the name of concord have become superfluous. (7) A clear and unambiguous understanding is secured through a regular word order. . . . This development may truly . . . be termed a progressive evolution (1922: 364).

The implication is clear: that an opposite change from analytic to synthetic would be regressive, and would occur only due to some external cause.

The typological classification of languages as head-last vs head-first has come to be treated as an even more basic “parameter” of grammar than analytic vs synthetic. Roughly half the world’s languages are of each type. From a purely logical view of grammar, there is no reason to regard one as more natural than the other. But Yngve (1960) argued that left-branching (head-last) structure puts a burden on short-term memory and that many transformations function to reduce left-branching. Chomsky (1965: 197–198) quarreled with this, but neither he nor Yngve observed that head-last structure seems to require synthesis. As Greenberg (1963: 96) put it, “if in a language the verb follows both the nominal subject and nominal object as the dominant order, the language almost always has a case system”—as in Dravidian and Indo-Aryan. And if not a case system, we could add, then subject and object marking on the verb, as in Munda. There is rarely such marking either of nouns or verbs in Mon-Khmer and other languages of South-East Asia, where the verb precedes the object.
Also, head-last sentences seem uncomfortable with more than one finite verb. Clauses that head-first sentences comfortably embed often must be nominalized in head-last sentences. Head-last clauses are flattened down into phrases. In Sora and many head-last languages, a conditional clause must be nominalized and treated as the object of a postposition equivalent to the preposed subordinating conjunction if of head-first languages.

An explanation of these remarkable asymmetries was proposed by one Mark Twain in *The Awful German Language* (1880). Based on research “upwards of nine full weeks” (616), Twain found that a German sentence treats of fourteen or fifteen different subjects, each enclosed in a parenthesis of its own, with here and there extra parentheses which re-enclose three or four of the minor parentheses, making pens within pens; . . . after which comes the VERB, and you find out for the first time what the man has been talking about. . . . German books are easy enough to read when you hold them before the looking-glass or stand on your head—so as to reverse the construction (Twain 1880: 603).

He provided an example of a verb-last subordinate clause, with a literal translation, and parentheses and hyphens to help the English reader:

*Wenn er aber auf der Strasse der in Sammt und Seide gehüllten jetzt sehr ungeniert nach der neuesten Mode gekleideten Regierungsrathin begegnet . . .*

But when he, upon the street, the (in-satin-and-silk-covered-now-very-unconstrainably-after-the-newest-fashion-dressed) government counselor’s wife met”, etc., etc. (Twain 1880: 604).

“You will observe”, Twain said, “how far that verb is from the reader’s base of operations”. Putting this in terms linguists can understand, the verb is the head of its sentence, and the head of a construction can stand for the whole. In Twain’s example, the verb, *begegnet ‘met’,* singlehandedly gives us the gist of the sentence: *a meeter met a meetee.* If the verb came early, everything else would just elaborate that gist. But the verb comes last and its elaborations come first! So to make the best of a bad thing, we are given case marking to help us sort out which elaborations are which—*er* is the masculine *doer,* and *der* the feminine *doee,* etc.—until at last we get to the verb and find out what he did, upon the street, to her, dressed after the latest fashion, the government counselor’s wife: he met her.

Case marking or verb agreement occur in most languages, but as Mon-Khmer shows, both can be dispensed with entirely in head-first languages. Head-last order may be *logically* equal to head-first order, but if it requires synthetic structure, whatever the reason for that may be, then it is not *psychologically* equal. Elements that are compounded or affixed are altered
in form and meaning—grammaticized or lexicalized. To say our example sentence in Khmer, (2), we only need to know the Khmer words for he not want give rice I. To say it in Sora, (1), we need to know not only the Sora words but also how to mark want for tense, person, number, and other things that we won’t even mention, what affix to wrap around give to show that it isn’t the head verb, whether rice needs an article, and how to show that I isn’t the subject. It is hardly surprising that a change from head-last to head-first order and synthetic to analytic structure could be viewed as progress, but that a change from head-first to head-last order, and from analytic to synthetic structure, could be viewed as regression—something that would happen only under outside influence.

3.3. Outside influence?

Scepticism about whether a ‘natural’ or ‘internal’ drift could be toward head-last and synthetic structure accords with the persistent view that this structure in common Munda arose due to areal influence—Dravidian rather than Indo-Aryan influence, given the relatively late date of Indo-Aryan settlement in the subcontinent. It is still customary to assume that areal similarities that do not have a genetic basis must be due to areal contact.

This assumption resulted in classifications of languages as “mixed” in the South-East Asian as well as the South Asian area. In particular, Vietnamese was thought to be mixed until Haudricourt (1954) showed that its tones were not derived from Thai or Chinese but arose by rephonologization of the phonation types of its inherited Austroasiatic consonants.

Sora was labeled mixed until the appearance of Ramamurti’s grammar (1931), which brought him a letter from Edward Sapir, saying, in part:

I note from the references to Savara in recent general linguistic surveys by Kieckers, by Meillet and Cohen and by Father Schmidt that Savara is classified as a mixed Mundā language, owing to supposed serious influence exerted by Aryan and Dravidian. I gather from what you say that the language is quite definitely of the Mundā type and is to be classified without reservation with such typical Mundā languages as Santāli. (Letter quoted in an advertisement in Ramamurti 1933: 259–260)

The classifications of Sora to which Sapir referred all simply echoed the statement by Konow in his Munda and Dravidian volume of the Linguistic Survey of India that “Savara has been largely influenced by Telugu and is no longer an unmixed speech” (1906: 218). Konow says that all he knows of Sora was gleaned from the texts submitted to the Survey, but there is nothing Telugu in those texts. Konow had some knowledge of Santali and
other North Munda languages, and apparently, wherever Sora seemed to
differ from them, he simply assumed it was due to non-Munda influence.

But while Santali is “typical” of Munda languages in having assimilated
every phoneme of a neighboring Indo-Aryan language, Sora alone has no
foreign phonemes. Santali and most Munda languages have adopted much
vocabulary from neighboring non-Munda languages (Pinnow estimates
that Kharia has 40 per cent Indo-Aryan words). And they have adopted
grammatical processes and constructions along with them. But Sora has
adopted only one, the Indo-Aryan flexional -i/-i of Oriya for naming
males/females, as in tabɔnɔ/tabɔnĩ, a man/woman called ‘bamboo shoot’
(tabɔŋ), or gɔd-sɔr-gaŋɔ/-gani, a man/woman born in gɔd₁-sɔr₂-gaŋj₃
‘cut₁-rice₂-moon₃’.

Finally, speakers of most Munda languages also speak a local non-
Munda language, and some speakers of the less populous languages use
their mother tongues only in private. For example, Das Guptă (1978: 4)
could find no monolingual Juangs at all. But among Hill Soras, inquiries
during our 1980’s field work about how many know any language besides
Sora were answered not with numbers but with names. Hill Soras expect
to be spoken to in Sora, and do their trading via agents bilingual in Sora
and Oriya (Vitebsky 1993).

But not only Sora but all Munda languages, despite the recent influence
of non-Munda languages, remain solidly Munda in their basic structures.
Despite foreign phonemes, they have kept native phonemes and processes
intact. Though most languages have lost the central vowel series of proto-
Munda, these vowels are retained in Sora, and they are reconstructible at
every branch in the Munda family tree (see section 7.4). As for consonants,
Munda languages retain the treatment of final stops as checked and voice-
less but morphophonemically voiced (see section 7.3)—even Kharia and the
North Munda languages, which have added the full complement of released
final stops (e.g. p ph b bh) from Indo-Aryan.

As to an ancient influence of Indo-Aryan or Dravidian on Munda, no
convincing evidence has been presented to support the theory that Munda
syntaxis and head-last order were borrowed. Even in vocabulary, few
Indo-Aryan or Dravidian words appear in a form in Munda languages
that would indicate ancient borrowing.11 And the converse is true as well:
Few of Kuiper’s Proto-Munda Words in Sanskrit (1948), for example, have
turned out to be proto-Munda, and only a handful of words in the large
eytymological dictionaries of Indo-Aryan by Turner (1966) or of Dravidian
by Burrow and Emeneau (1984) seem likely to turn out to be Munda.12

As for grammatical form, though Munda is head-last and synthetic like
Indo-Aryan and Dravidian, it differs from them in a way which Nichols
(1986, 1992) has argued is more resistant to change than is word order.
Indo-Aryan and Dravidian languages are mainly dependent-marking, marking noun phrases for their case relation to their verbal head. The Munda languages are mainly head-marking, marking verbal heads for their relation to their noun phrase arguments. Most Mon-Khmer languages mark neither. The hypothesis of a Dravidian substratum would imply something that seems unimaginable: that dependent-marking speakers adopted a noninflecting language and made it head-marking.\textsuperscript{13}

Sapir said, “Language is probably the most self-contained, the most massively resistant of all social phenomena; it is easier to kill it off than to disintegrate its individual form” (1921: 220). Indeed, the impact of Indo-Aryan and Dravidian languages on Munda languages has been less to change them than to replace them. Munda languages were once spoken over much of India—see Elwin’s summary (1955: chapter 1) of ancient Indic and Greek references to Šabara or Savara or Suari—but most of that vast area is now Indo-Aryan or Dravidian-speaking.

But death is not diffusion. There is little solid evidence of assimilation of early Munda to Indo-Aryan or Dravidian, or the reverse. Languages of India share traits like those in the Munda column of Table 1, but so do head-last languages everywhere. These and many other traits Indologists have regarded as areal were shown by Masica (1976) to extend over central and northern Eurasia, as well as to occur in geographically remote areas. Munda languages have been seen as genetically related not only to Mon-Khmer, but also Dravidian, Tibeto-Burman, Burushaski, Nihali, Vedda, and geographically remote head-last languages like Finno-Ugric, Turkic, Australian, Basque, and Japanese, by linguists who found deep similarities in Munda.\textsuperscript{14} Such comparisons have been ridiculed when the similarities proved not to be inherited nor diffused, but they deserve some explanation.

The structures of languages are not just inherited or borrowed, they are also shaped to the needs of their speakers and hearers, and of those needs, two are inseparable: first, a consistent grammatical form, and second, a consistent rhythmic scaffolding for realizing that form in utterances that must be constructed, communicated, and comprehended in real time.

4. Falling and Rising Rhythm

“Finding a way into a conversation”, said Tannen (1994: 18), “is like joining a line of dancers”. Speaking and listening, and all regular voluntary action, in ensemble or solo, outwardly or in imagination, is performed and perceived to a tacit real time rhythmic score. Knowing a language is not just a knowledge of words and constructions and propositions, it is also the ability to hear and speak them as beats and phrases and melodies.\textsuperscript{15}
The characteristic rhythm of a language depends on how it fits words and phrases to the beats and measures of the rhythmic score. If the *fronts* of words and phrases go on the main beats, that is *falling* rhythm; if their *ends* go on the main beats, that is *rising* rhythm.

The distinction between falling and rising rhythm is particularly evident in oral verse and song. Old English had a falling rhythm, and an alliterative verse that foregrounded the fronts of words at the fronts of phrases (13a), but Modern English has a rising rhythm, and a rhyming verse that foregrounds the ends of words at the ends of phrases (13b):

(13)  a. Falling: *stôrmâs þêr stânciflu bêótân*
    storms there stone-cliffs beat
    ‘Storms beat the cliffs of stone there’

    *(Seafarer, l. 23a)*

    b. Rising: *álông câmê a spîdêr and sât dôn ên bêzîêd hêr*
    *(Little Miss Muffet, l. 3)*

Old English with its falling rhythm had a mainly head-last syntax, while Modern English with its rising rhythm has a mainly head-first syntax. The concomitant historical drifts in English that reversed the Germanic rhythm, word order, and verse structure also occurred independently in Latin and Romance, Celtic, and other western Indo-European families.

Falling phrase rhythms are typical of head-last languages, such as the Munda group and other languages of the South Asian area, Australia, northern Eurasia, Korea, and Japan. Rising phrase rhythms are typical of head-first languages, such as the Mon-Khmer group and other languages of the South-East Asian area, Oceania, western Europe, and much of sub-Saharan Africa.

4.1. Heads and dependents

A phrase consists of a head word or phrase plus zero or more dependent words or phrases which specify (qualify, quantify, modify) the head. The head can stand for the whole phrase, but the dependent cannot (*to read a book* is *to read*, not *a book*). Even when the head is pronominalized or deleted (*The brown book* or *the blue one*?—*The brown one, please*), its presence is always implicit. The dependent must be explicit. This is well illustrated by questions, which assume some information and ask for more information about it, and by answers, which present the assumed information as head (or just omit it) and the new information as dependent. This relationship of known and unknown information has universally been grammaticalized and lexicalized by the provision of interrogative pronouns.
that request a dependent for a known head, e.g. \( \text{Which}_D \ \text{book}_H \)?—*The \( \text{brown}_D \ \text{book}_H \). But there are no interrogative pronouns that request a head for a known dependent, e.g. *\( \text{What}_H \ \text{brown}_D \)?—*The \( \text{brown}_D \ \text{book}_H \). As is shown in Table 2, in every phrase type, the head corresponds to old information and the dependents to new information, but not the reverse, in a potential question and answer.\(^{16}\)

| Table 2. Question words correspond to dependents (in bold), not heads. |
|----------------------------------|----------------------------------|----------------------------------|
|                                  | *WH-Verb he clearly?             | *Speaks.                          |
| [Mod V] He [can type].           | What can he do?                  | Type.                            |
|                                  | *WH-Modal he type?               | *Can.                            |
| [Prep N] [from there]            | Where from?                      | There.                           |
|                                  | *WH-Prep there?                  | *From.                           |
| [N Rel] The [book that we lost]. | Which books?                     | The ones we lost.                 |
|                                  | *What that we lost?              | *The books.                       |

The dependent also gets the main beat (accent) relative to the head. This is true not only if it is newer information than the head, as in answering the questions of Table 2, but also if the head and the dependent are both old or both new, as in *We didn’t read\(_H\) a 'book\(_D\), we barked\(_H\) a 'cake\(_D\). The usual situation has been conventionalized as the usual rhythm: modern English has a rising rhythm, and most dependents have moved to the phrase-final beat.\(^{17}\) Where the ancient dependent-first word order has not shifted to dependent-last, as in English [\( \text{Adj}_D \ \text{N}_H \)] \( \text{red}_D \ \text{books}_H \) (cf. French [\( \text{N}_H \ \text{Adj}_D \)] \( \text{livres}_H \ \text{rouges}_D \)), there is a discrepancy: if the dependent is newer than the head, it steals the main beat from the end of the phrase: \( \text{red}_D \ \text{books}_H \). But if there is no contrast in newness, the default English phrase-last rhythm is dominant: \( \text{red}_D \ \text{books}_H \).

4.2. Munda vs Mon-Khmer heads and dependents

In section 3.1 we showed that Munda morphology has the same head-first order of elements in Mon-Khmer syntax, that proto-Austroasiatic must have had head-first syntax, and that Munda must have shifted its syntax...
from head-first to head-last. In Table 3 we contrast Munda and Mon-
Khmer order in various phrase types, showing how their opposite word or-
ders reflect their opposite phrase rhythms. In either rhythm, dependents go
on the main beat, so that in Munda with its falling phrase rhythm there is
a dependent—head phrase order, while in Mon-Khmer with its rising phrase
rhythm, there is a head—dependent phrase order.

Table 3. Opposite order in Munda vs Mon-Khmer: ['] marks dependents.18

<table>
<thead>
<tr>
<th></th>
<th>Munda (Sora)</th>
<th>Mon-Khmer (Khmer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>reads1 the book2</td>
<td>[O V] kəmbəl2-ən ken-əl₁-t-ɛ</td>
<td>[V 'O] məəl səwpəiw₂</td>
</tr>
<tr>
<td>gives1 the book2 to me3</td>
<td>['Dat [O V]] dəŋ-pən₃ kəmbəl2-ən tə́y₁-t-ɛ</td>
<td>[[V 'O] 'Dat] qəoy₁ səwpəiw₂ kʰəm₃</td>
</tr>
<tr>
<td>goes1 quickly2</td>
<td>['Adv V] oṃəŋ₂ yer₁-t-ɛ</td>
<td>[V 'Adv] tɪw₁ rəhah₂</td>
</tr>
<tr>
<td>stays1 in2 the house3</td>
<td>['N Adpos V] səʔiŋ₃-ʔən ɗəko₁-t-en</td>
<td>[V ['Adpos 'N]] niw₁ knəŋ₂ pəəh₃</td>
</tr>
<tr>
<td>very1 small2 house3</td>
<td>['Adv Adj] N] bəyəby₁ sənna₂ səʔiŋ₃-ən</td>
<td>[N ['Adj 'Adv]] pəəh₃ təoc₂ nəh₁</td>
</tr>
<tr>
<td>grandfather1's2 house3</td>
<td>['Gen N] jəjo₁-t ə₂-səʔiŋ₃-ən</td>
<td>[N 'Gen] pəəh₃ təa₁</td>
</tr>
<tr>
<td>the book1 which3 is3 in3</td>
<td>['Rel N] ə₂-səʔiŋ₃-ʔən ɗəko₁-t-en-ən₃ kəmbəl₁-ən</td>
<td>[N 'Rel] səwpəiw₁ niw₂ knəŋ₃ pəəh₄</td>
</tr>
</tbody>
</table>

Reversals of rhythm and word order, as in Indo-European and in
Munda, are not very common in the world’s languages. Niger-Congo
(Givón 1975) had a progressive shift like Indo-European—falling to rising
and head-last to head-first. Tibeto-Burman, given the prefixing character of
proto-Sino-Tibetan (Benedict 1972), may have had a regressive shift like
Munda—rising to falling and head-first to head-last. A regressive shift en-
tails the construction of an inflectional system (section 3.3), and surely takes
far longer than a progressive shift. Judging from the time depth of the far
less complete reversal of type in Indo-European, Munda must have a time
depth of several millenia.

The recorded histories of Indo-European languages show that reversals
of grammatical structure proceed gradually, construction by construction,
hingeing on local analogies and ambiguities. Even where we can find the grammatical function of a given change, it is often clear that alternative changes were available. To understand why local changes taking many generations can result in a consistent global reversal of word order requires a factor both persistent and pervasive, namely a reversal of phrase rhythm.

5. Phrase Rhythm and Word Rhythm

Munda and most South Asian languages, with falling phrase rhythm, also have falling word rhythm, while Mon-Khmer and most South-East Asian languages, with rising phrase rhythm, also have rising word rhythm. Some languages with falling phrase rhythm (and head-last order) are described as having word-final accent, for example the Turkic languages, but those we have heard put the beginning of the word on the beat, and the “accent” that is described is merely a terminal rise in pitch. Korean has a rather similar rhythmic system.

“Accent” usually coincides with the beat, but in some languages it has no rhythmic relevance whatever. For example, the pitch accents of Vedic or Homeric Greek or of Japanese seem to play no role in the rhythm even of their verse. By falling and rising word rhythm we refer only to whether the beginnings or ends of words come on the rhythmic beats, even if this does not coincide with other “accents” in the language.

Just as falling and rising phrase rhythms do not necessarily put the very first or last word of a phrase on the beat, word rhythms do not necessarily put the very first or last syllable of a word on the beat. Some languages skip an initial or final syllable, particularly prefixes or suffixes.

And even if only a root or stem is eligible, its very first or last syllable may not be. Beats are not pulses but divisions of time, sufficient for a long syllable (like English 'stead') or two or perhaps three short syllables ('steady' or 'steadier', the latter spoken as a triplet) of which the first is the most prominent. We use English examples here because our readers will know the rhythm of English, and because these examples were carefully measured by Lehiste, who found that they are spoken isochronously by “temporal compensation” of their syllables (1971, 1977). A stress accent, as in English, foregrounds a stressed syllable by lengthening it at the expense of unstressed syllables. To use more precise notation, 'stead, 'steady, 'steadier take a dotted rhythm, \(\overline{\underline{\text{.}}\underline{\underline{\text{.}}}}\), \(\overline{\underline{\text{.}}\underline{\underline{\text{.}}}}\) respectively. The duration of any syllable varies inversely with the durations of the other syllables in the beat. This was a structural fact of early English, where long vowels shortened phonemically before two syllables in the same beat ('sāne : 'sānity), and both vowels shortened in two-beat compounds that were reduced to one beat ('waistcoat : 'weskit). Beats and syllables are not only the domains
of timing but also they and their natural parts (beginning, rise, peak, fall, end) are the domains of phonological processing (Donegan and Stampe 1978). For example, sonorant nasalization is limited in English to one beat (deˈlɪr.i.əm) or even just one syllable (deˈlɪr.i.əm).

In many languages a short anacrustic syllable may be prefixed to the beat, like a musical grace note, as in inˈstead. Like a grace note, such an anacrustic syllable is temporally inert: it is not part of the following or the preceding beat, and its presence does not perceptibly shorten nor does its absence lengthen the following or preceding syllables. It is the “rhyme” of a word that determines its timing, from the most prominent syllabic to the end of the word. Mappings of words and phrases onto beats or measures may be iambic, like the word inˈstead, or the verse line andˈmiles toˈgoˈ beforeˈ Iˈsleep, but as in western music notation, the beats and measures of the rhythmic score itself are always front-prominent.19

To fit into a beat, which is universally bimoric, the word should begin either with two light syllables like Sora ˈura ˈmango’ or one heavy like ˈyəŋ ˈmother’ or ˈsinˈdi ˈdate palm’. In a word consisting of a light plus a heavy syllable, the light syllable is ignored: Sora ˈerˈel ˈironwood’, toˈrib ˈcloud’, which is rhythmically equivalent to eliminating the short syllable, trib.20

Mon-Khmer and other mainland South-East Asian languages put the word-final syllable on the beat. To fit the bimoric duration of the beat, short-voweled open final syllables may be extended either by lengthening the vowel or by closing it with a glottal stop.21

5.1. Word rhythm and compound structure

The accentuation of compounds also exemplifies the principle that heads are rhythmically subordinate to modifiers. Mon-Khmer compound nouns are head-first, with a rising rhythm as in Mon-Khmer phrases and words:

\[(14) \text{Khmer: } ˈsac - ˈmoən ˈbaay - ˈprik ˈlaan - ˈcnuəl} \]
\[\text{flesh - chicken food - morning car - hire} \]
\[\text{‘chicken meat’ ‘breakfast’ ‘rental car’} \]

In Munda, the picture is more complex. Sora, for example, has three patterns of compounds. There is a productive pattern exactly opposite the Mon-Khmer pattern:

\[(15) \text{Sora: } ˈkənsim - ˈjel ˈəbəb - ˈsu 'kənsim - ˈsəŋ} \]
\[\text{chicken - flesh head - pain chicken - feces} \]
\[\text{‘chicken meat’ ‘headache’ ‘chicken manure’} \]
But head-last compounds are fairly recent in Munda. Older compounds, such as Sora ədrē₁-im₂ ‘chicken egg (lit. egg₁-chicken₂)’ or əmboh₁-si₂ ‘biceps muscle (lit. rat₁-arm₂)’ have head-first structure like those of Mon-Khmer. The Munda falling rhythmic pattern has been imposed even on these older compounds—ədrē-im, əmboh-si—so that the rhythm no longer fits the old head-modifier order.

In the formation of Sora verb stems, however, the rising rhythm is still intact, and the head-first structure still remains productive, e.g. gəd₁-im₂-‘sacrifice a/the chicken’ (lit. cut₁-chicken₂). This is in contrast with the less idiomatic expression of this in separate words: kənsim₂-ən₃ gəd₁- (lit. ‘chicken₂ ART₃ cut₁’), which must be head-last.

5.2. Word rhythm and affixation

Most Mon-Khmer languages, like other South-East Asian languages, lack suffixes entirely; only prefixes and infixes occur. Munda languages have some prefixes and infixes, but many more suffixes. The suffixes are not reconstructable as suffixes to proto-Austroasiatic, and only a minority of them reconstruct as suffixes even to proto-Munda. So suffixation must have been an ongoing tendency in Munda languages. This has often been attributed to contact with the suffixing Dravidian languages, but the Munda suffixes are not borrowings or even calques of Dravidian suffixes.

Instead, prefixation vs suffixation reflects rising vs falling word rhythm. Exclusively prefixing languages, like the languages of South-East Asia, have rising word rhythms. Exclusively suffixing languages, like Dravidian, Finnic, and Turkic, have falling word rhythms. The reason must be to background affixes by putting them at the far end of the word from the beat. Rising rhythm backgrounds prefixes; falling rhythm backgrounds suffixes. In Mon-Khmer, new affixes are prefixed; in Munda, they are suffixed.

6. Timing

It should be clear from Table 1 that it is not only grammatical traits that are opposite in Munda and Mon-Khmer and their areas; phonological traits are opposite, as well. We are not referring here to phoneme inventories and morphophonological alternations, but to the living prosodic and featural processes that distinguish and polarize the two language areas, and to the word forms that result. The rhythmic type of a language is a pervasive influence in its living phonology, and since phonological processes apply to rhythmic domains, they are strongly linked.

In our 1983 paper, we attributed the divergent phonological typologies of Munda and Mon-Khmer to Munda’s syllable rhythm (isosyllabic or
isomorphic, depending on whether short and long syllables are distinguished) and falling accent, versus Mon-Khmer’s word rhythm (isoaccentual, in bimoric beats) and rising accent. But just as all speakers have the same phonetically motivated processes, but must inhibit them differently to speak different languages, so too all speakers are motivated to give moras equal time, and syllables, and words, but they are forced by the structure of their languages to yield on one or more of the principles.

In monosyllabic languages like those of the Vietnamese-Mường group, the rhythmic principles do not conflict: each simple word is one syllable, and each syllable is heavy, so that any sequence of words is a sequence of bimoric beats. But there are two conditions on this kind of word-perfect rhythm: First, there should be hiatus at word boundaries: languages with liaison do not keep words rhythmically discrete and thus tend to time by moras (Greek, Latin) or syllables (Italian, French), not by words. Second, most words must be sufficiently short to fit into a beat: languages with front accent and multiple suffixes (Dravidian, Uralic, Altaic) have words of highly variable duration, and find it easier to time by moras or syllables.

Mon-Khmer languages, with hind accent, hiatus, short words, and no suffixes, can have word timing. Munda languages, with front accent and a great accumulation of suffixes, must live with syllable or mora timing. These differences, as is evident to the ear of any traveler, are true also of the distinct linguistic areas where Munda and Mon-Khmer are spoken.

7. Rhythm and Phonology

Real-time rhythm is as central to phonology as it is to syntax. Beats and measures are the domains into which speech material is fitted, and they are the domains to which the effects of phonological processes are restricted. When too little or too much material is fitted into a beat or measure, the phonological processes that the language has not inhibited apply to fill out the timing or to trim the excess. These processes create the syllable types, consonant formations, tonal patterns, and vowel inventories of languages. In this section, we will consider how the dominant rhythmic principles of each Austroasiatic branch have created opposite phonological types.

7.1. Rhythm and syllable canon

Proto-Austroasiatic had isochronous words of one or two syllables. The disyllable had a rising rhythm, like *bəlju ‘thigh’; its final syllable got a full beat, like a monosyllabic word, and could contain a full long or short vowel plus consonant, while the initial syllable, called “minor” (Shorto 1960), had only a ə-like vowel (Pinnow 1959; Shorto 1976).
In Mon-Khmer, a distinctively short vowel in the final syllable was kept short by inserting a glottal stop *bɔlʊʔ, but otherwise could be merged with the corresponding long vowels bɔlʊ. The short initial syllable invites vowel reduction or deletion, and the long final syllable invites diphthongization, as in Khmer ʼpliw ʼthighʼ. Vowel deletion creates the complex initial clusters typical of Mon-Khmer, but such consonant clusters may be reduced (Khmer slaap-ʼprio ʼspoonʼ ~ sɔpɨo). Since minor syllables are non-moric, the initial consonant clusters that result from vowel deletion do not include geminates; and any consonant that is completely assimilated simply disappears, since it lacks any moric value, e.g. Khmer pram₁-bɔy₂ ʼeightʼ (lit., five₁-three₂) ~ mbɔy. Fusions of adjacent morphemes like this favor a fusional morphology, and in extreme cases, like Vietnamese, they have led to a complete loss of affixation.

In Munda, the disyllable was given a falling rhythm, *bɔlu ă, fitting the final syllable into the beat by shortening its vowel (proto-Munda seems not to have had vowel length distinctions), and giving the initial syllable a full though short vowel—often, by harmony, ʼbulu. The shift to falling accent encouraged enclitization and suffixation in Munda, e.g. Sora ʼbulu₁-len₂-jĩ3 ʼour₂ thigh₁s₃ʼ. Word rhythm became impracticable; the languages shifted to syllabic rhythm, which because of the inherited distinction between open and closed syllables is of the isomeric variety. This rhythm supports geminate consonants in the Munda languages: a syllable-final consonant completely assimilated to an adjacent consonant retains its moric value, as in Sora bɔtɔŋ ʼfrightenʼ < bɔ{bʉ}tɔŋ₂ ʼcause₁ to fear₂ʼ. Where consonants retain their presence, even if not their full identity, the morphemes of which they are part retain their separate identities, as is typical of agglutinative morphology.

7.2. Rhythm and consonants

Austroasiatic onsets had a stop voicing distinction, which was universally preserved in Munda; this conservation of phonation type in consonants seems typical for India, with only sporadic exceptions. But in Mon-Khmer and South-East Asia, consonant shifts are commonplace (Haudricourt 1965). One of the main causes of this is stress (word) timing, as also in Germanic. Also it may also be encouraged by the dissimilation of initial consonant clusters, which for reasons already explained are commonplace in Mon-Khmer (Khmer pdouv ʼto exchangeʼ, tmyəv ʼnewʼ). Such clusters are susceptible to assimilation and if the assimilation is complete, to loss. Since assimilation favors more-similar sounds, dissimilation can block it, and such strengthenings may extend to initial consonants in general.
A prosodic characteristic of languages that is often overlooked because it is not “distinctive” is whether or not final consonants are pronounced with a vocalic release or are unreleased. This is a very important feature in the phonological typology of languages. A final release is typical of Indo-Aryan and Dravidian languages and helps preserve voicing, aspiration, and affrication in final consonants. In Orīya (Indo-Aryan), consonant-final words apparently were pronounced with a release that became identified with a vowel, so that Orīya words all end in vowels (Masica 1991: 197). In Dravidian, the final release also has created an “enunciative” vowel (Bright 1975). One result of this tendency is that released final consonants may become continuants since they are between continuants (the preceding vowel and the following release), as in Tamil, or in Europe in the lenitions of Celtic, Spanish, Danish, etc.

Austroasiatic, Sino-Tibetan, and the South-East Asian language groups pronounce final consonants without release (rather like the /t/ in English right now). This prevents final consonants from becoming continuant, but it eventually limits final obstruents to voiceless stops with simultaneous glottalization, and in many languages of this type it has resulted in the loss of oral articulation in some final stops, leaving only the glottal stop behind. In Mandarin this has happened to all final stops. In Munda it happens in several languages to velars, e.g. South Munda *ɔlaŋ ‘leaf’, Juang ɔlaŋ, but Kharia ɔlaʔ, Gorum ɔlaʔa, Gutob ɔlaʔ (in Sora ɔla, even the glottal stop was lost), etc., and in some to other positions of articulation as well, e.g. to coronals in Remo pineʔ, Gutob pineʔ ‘flute’, Gtaʔ pini ‘horn’ (cf. Sora p{on}eˈd, nominalization of ped ‘to blow a flute’), and to labials in Gtaʔ ɡtaʔ ‘ethnonym’ (Gutob gutoˈb), slaʔ ‘tree’ (Gutob sulob).

Consonant release/nonrelease is a remarkably stable feature historically. If it is related to the distinction of falling/rising rhythm, the relationship is not clear to us. None of the languages of either area seem to have switched from releasing to nonreleasing, or vice versa. We have argued elsewhere, in fact, that one very odd characteristic of Munda—that it has only voiced stops morpheme-finally even though word-finally they are pronounced as checked and voiceless, as in Sora pɔtɔd [ˈpɔtoːt] ‘a hole’ beside the form with the article [pɔtɔd-ɔn]—is due to the voicing of word-final checked stops at the moment that proto-Munda first began to suffix vowel-initial suffixes. There were voiceless as well as voiced stops nonfinally, as in Sora bɔtɔŋ ‘fear’ vs podab ‘mushroom’, so all morpheme-final stops had to be interpreted as phonemically voiced (b d j g). This innovation is not found elsewhere in Austroasiatic, or apparently in the world, and it strengthens the widely held view that Munda (North and South) is indeed a single genetic family in Austroasiatic (Donegan and Stampe 2002).
7.3. Rhythm, tone, and register

Consonant phonations which are neutralized may have reflexes in tonal distinctions, as Haudricourt (1954) demonstrated for Vietnamese, and as others (e.g. Matisoff 1973) have observed elsewhere in South-East Asia. The tones of Mon-Khmer languages, like those of other South-East Asian languages, include many contour tones, which reflect the typical bimoric structure of the stressed syllables on which they occur. Distinctions of voice-register (Henderson 1952) in Khmer and several other Mon-Khmer languages have similar origins (Huffman 1976, Gregerson 1976). So tone and register are the reflexes of consonantal phonation distinctions that have been lost in the consonant shifts typical of South-East Asian languages.

Phonation types are more stable in isomoric and isosyllabic languages, so rephonologization of consonant phonation as tone is rare in India. Where it has occurred, as in the Munda language Korku, the resulting tones are level rather than contour (Zide 1966b).

7.4. Rhythm and vowels

Mon-Khmer languages show vowel reduction, but Munda languages often show vowel harmony. The difference results from their opposite rhythms.

In the Mon-Khmer rising word rhythm, the unaccented initial syllable is anacrustic, and there is pressure to minimize it. Since it is not in the beat with the rest of the word, its vowel can suffer a fairly context-free reduction—shortening, narrowing, and loss of color (labial, palatal or velar). This is a perpetual tendency, producing synchronic variation as in Khmer prəˈlim ~ prəˈlim ‘dawn’, prəˈhæl ~ prəˈhæl ~ prəˈhæl ‘similar’, baŋˈrɪən ~ baŋˈrɪən ‘to teach’, etc., even in borrowed words like French cravat > Khmer kraaˈwat ~ kraˈwat ~ kraˈwat ‘necktie’. Indeed the vowel can be lost entirely, as in *bɔəlu: > Khmer ˈplɪw ‘thigh’, cited earlier, or baˈzaːr > Khmer ˈpsaa. In the Viet-Muông group, this resulted in monosyllabism. Other language families of South-East Asia, since they share the same iambic word rhythm as Mon-Khmer, show a similar treatment of their unaccented vowels. Chamic languages, for example, shifted the penult-accented words in their inherited Austronesian lexicon to final accent, and then reduced the rhythmically demoted vowels (Thurgood 1999).

In the Munda falling word rhythm, on the other hand, the whole word is usually part of a single beat or measure, and in its syllable- or moratimed rhythm even unaccented syllables get at least one mora of time. They are less apt to be reduced (narrowed, bleached) than harmonized to features of other vowels in the word. Harmony can involve color, as in the *bɔəlu: > Munda *bʊlu ‘thigh’ example, or height, as in the o/u alternation
of Korku khor ‘person’ with the plural ˈkur-ku, or the a/ə and o/u alternations in Santali ˈānda, ˈundyi ‘anxiously’. Every Munda subgroup shows evidence of synchronic or diachronic vowel harmony. See Donegan (1993) for examples, and Boding (1930: 18–34) for a discussion of the association of harmony in Santali with its two-syllable stress-unit (our beat). Harmony also occurs in Dravidian (Bright 1966) and Indo-Aryan (e.g. Majumdar 1970: 118–119 on Oriya, Chatterji 1926: 387–402 on Bengali), as well as in remote falling-rhythm language families like Altaic and Uralic.

The typical South-East Asian vowel system has a back or central unrounded series. These vowels can be reconstructed in every subgroup of Munda (Munda 1969, Norman Zide 1965, 1966b, Stampe 1978, Arlene Zide 1982), but they have been eliminated separately in each group by fronting, rounding, or lowering, so that most Munda languages have the five-vowel systems typical of Indian languages. Sora is the only language that keeps these un-Indian central vowels, but even here they only occur in closed syllables, which suggests that their intrinsic shortness is not so compatible with a syllable rhythm. As in most Indian languages—and most languages with a syllable rhythm, Munda vowel qualities have apparently remained quite stable for centuries, except for this loss of central non-low vowels.

In marked contrast to the stable vowels of Munda, the stressed vowels of Mon-Khmer, like those of other languages with stress-timing, undergo repeated diphthongizations and vowel shifts. Many Mon-Khmer languages retain a vowel-length distinction; this was lost in Munda, probably because moving the accent off the final syllable in the change to falling rhythm caused the vowel of that syllable to shorten. And many languages reinforce the short vs long distinction with lax vs tense, and then also with in-gliding (centering) like ĭə, uə, uə, vs outgliding diphthongs like ĭə, au, aau. Register differences, as in Khmer, also can affect vowel qualities (Gregerson 1976). This multiplication of vowel qualities often leads to further diphthongization and vowel shifts (Donegan 1993 gives examples and comparisons with European vowel shifts). As a result, Mon-Khmer languages often have large vowel inventories. While the typical Munda language has five vowels (Sora is extraordinary in having nine), among Mon-Khmer languages, nine counts as a small vowel inventory. Khmer, in Huffman’s analysis (1970a and b), has thirty-one vowels (including long and short monophthongs and diphthongs); other Mon-Khmer languages have even more.

8. Rhythmic and Grammatical Convergence in Head-last Structure

We have proposed that the holistic oppositeness of Munda and Mon-Khmer linguistic structure could have been the result, after many millenia,
of a simple change of Munda from a rising to a falling rhythm. But falling rhythm imposes head-last order and synthetic structure, which are both so complicating (section 3.2) that one must ask why they persist in South Asia and nearly half the world’s languages, and indeed why they exist at all.

The answer must be that falling rhythm itself has intrinsic value. It has been noted that child speech shows a “trochaic bias” (Allen and Hawkins 1978, 1980). This bias is clearly a reflection of the fact that the division of real time into beats and measures is universally front-prominent: temporal compensation and phonetic processes operate within groupings of strong–weak, never weak–strong. Only words and phrases spoken in a falling rhythm fit neatly into these universal divisions of time.

In ‘A new knife is hard to sharpen’, as spoken in Sora (16), dependents go on the main beats, so that phrases fit into measures, and words into half-measures. (The prefix in ō-‘taji-ıs is squeezed in by anacrusis.)

(16) Falling (Sora):

$$\begin{align*}
\frac{4}{4} & \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \\
[t_{ob\text{-}me} \quad k_{on\text{-}di\text{-}n}] & \quad \text{new}_{D} \quad \text{knife}_{H} \quad \text{to\text{-}sharpen}_{D} \quad \text{hard}_{H}
\end{align*}$$

But words and phrases spoken in rising rhythm, as in the Khmer translation (17), never fit into the rhythmic divisions. Putting the final syllables of dependents on the main beats, the result is that phrases straddle measures, two-syllable words straddle half-measures, and many rests are needed:

(17) Rising (Khmer):

$$\begin{align*}
\frac{4}{4} & \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \\
[k_{\text{m}\text{-}b\text{a}t} \quad t_{\text{m}\text{o}y}] & \quad \text{knife}_{H} \quad \text{new}_{D} \quad \text{hard}_{H} \quad \text{sharpen}_{D}
\end{align*}$$

Reducing minor syllables to anacrases ($\hat{\mid} \quad \hat{\mid} \rightarrow \mid \hat{\mid}$) and extending major syllables over following rests ($\hat{\mid} \quad \hat{\mid} \rightarrow \mid \hat{\mid}$) fits the words into half-measures in a typically Mon-Khmer fashion,

(17’) Khmer with maximal anacrusis and legato:

$$\begin{align*}
\frac{4}{4} & \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \\
[k_{m\text{-}b\text{a}t} \quad t_{\text{m}\text{a}y}] & \quad \text{p\text{a} dobr? \text{sm}l\text{i}y\text{a}n}
\end{align*}$$

but it does not fit the phrases into the measures. To do that the words and phrases of (17) would have to be reversed from rising to falling rhythm:

(18) Pseudo-Khmer with falling rhythm:

$$\begin{align*}
\frac{4}{4} & \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \quad \hat{\mid} \\
[k_{\text{m}\text{a}l\text{b}a\text{t}} \quad t_{\text{m}\text{a}y}] & \quad \text{knife}_{H} \quad \text{new}_{D} \quad \text{hard}_{H} \quad \text{sharpen}_{D}
\end{align*}$$
But the accentuation is backward for head-first order: A knife\textsubscript{H} that’s new\textsubscript{D} is hard\textsubscript{H} to sharpen\textsubscript{D}. Falling phrase rhythm requires a head-last order:

\begin{align*}
(19) \quad \text{Pseudo-Khmer with falling rhythm and head-last word order:} \\
\frac{3}{4} | \frac{3}{4} | \frac{3}{4} | \frac{3}{4} | \\
\{ \text{tmoy} & \text{ } \text{kom,bot} \} \{ \text{sam,liø} & \text{ } \text{pi,ba?} \} \\
\text{new\textsubscript{D}} & \text{knife\textsubscript{H}} & \text{sharpen\textsubscript{D}} & \text{hard\textsubscript{H}}
\end{align*}

This is exactly how Munda diverges from Mon-Khmer, with a drift from head-first to head-last order (19) accompanying a regularizing shift from rising to falling rhythm (18).

The opposite drift to head-first in languages like English may be driven by grammatical simplicity and regularity (section 3.2), but this is achieved only with a shift from a tight, regular fit of words and phrases into beats and measures (20a) to a loose, syncopated fit (20b):

\begin{align*}
(20) \quad \text{(a) (= 13a) Old English:} \\
\frac{3}{4} | \frac{3}{4} | \frac{3}{4} | \frac{3}{4} | \\
\{ \text{störtmæs} & \text{ } \text{þær} \} \{ \text{stánclifu} & \text{ } \text{béótán} \} \\
\text{storms} & \text{there} & \text{stone-cliffs} & \text{beat}
\end{align*}

\begin{align*}
(20) \quad \text{(b) (= 13b) Modern English:} \\
\frac{3}{4} | \frac{3}{4} | \frac{3}{4} | \frac{3}{4} | \\
\{ \text{alönγ} & \text{ } \text{câme} \} \{ \text{a spider} & \text{ } \text{and sät down beside her} \} \\
\text{along} & \text{came} & \text{a spider} & \text{and sat down beside her}
\end{align*}

It does not seem unreasonable, then, to suppose that a head-last, synthetic drift, as in Munda, might be driven by rhythmic simplicity and regularity.

9. Conclusion

The divergent typologies of the Austroasiatic languages of South vs mainland South-East Asia, and of the several other language families in either area, are not limited to synthetic and head-last vs analytic and head-first grammatical structure, but pervade every level of structure down to phonetics and prosody (section 1). The two areas are not only different, but opposite at every level, even in falling vs rising rhythms (2). Since the Munda languages of South Asia and the Mon-Khmer languages of South-East Asia are genetically related, one of them must have changed. Munda shows rich evidence of an earlier head-first analytic structure, and there is little evidence of earlier synthetic structure in Austroasiatic (3.1). Munda therefore must have changed, becoming synthetic and head-last in spite of the problems of that structural type (3.2). But the opinion that such a shift was due to areal influence does not stand up to close scrutiny (3.3).
We propose that Munda had a genuine independent drift to synthetic and head-last structure due to a shift from rising to a falling rhythm. Rising vs falling rhythm go with head-first vs head-last syntax because of the backgrounding of heads relative to their dependents (section 4). And they go with prefixing vs suffixing morphology due to the backgrounding of affixes relative to their stems (5). Their effects extend to timing as well: word (stress) isochrony is optimal, but languages must settle for mora or syllable isochrony if suffixing makes their words too variable in length (6). These timing differences deeply affect the phonology of syllables (7.1), consonants (7.2), tone and register (7.3), and vowels (7.4). While the shift from rising to falling rhythm in Munda might have been due to contact, it might instead be due to the fact that grammatical and rhythmic structure are in phase only with falling rhythm (8).

The better-known drift of Indo-European from head-last to head-first structure is well attested in Celtic, Romance, and other western languages. That drift was reversed in India as Indo-Aryan was adopted by Mundas and Dravidians with their falling rhythms, and by the time of the Prakrits, Indo-Aryan was Indo-European in little but etymology. Munda structures are far more various and cognates far fewer than in Dravidian, and likewise than in eastern Austroasiatic. This suggests that the Austroasiatic people may have dispersed from South Asia rather than South-East Asia, and that the shift of Munda from rising to falling rhythm, after the eastern languages had moved eastward, may have been the cause rather than the effect of the profound polarization of South and South-East Asian language structures.

Notes

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1. ‘In honor of our old friend Stanley H. Starosta’, who joked with us in Sora, the language used to represent Munda in this paper, and one of the many languages in which he was wittier, and about which he was wiser, than anyone else we know. A memorial for Stan is at http://www.ling.hawaii.edu/faculty/Stanley/.

2. On the divergent structures of Munda and Mon-Khmer, see Pinnow 1960; for a brief overview and maps, see Diffloth (1978), Parkin (1991, ethnography only), and http://fling.lil.hawaii.edu/austrasiatic/. The only etymological dictionary and comparative phonology of Austroasiatic is Pinnow (1959), despite its modest title, Versuch einer historischen Lautelehre der Kharia-Sprache. Articles, reviews, and bibliography on Munda are now included in Mon-Khmer Studies.

3. Table 1 is simply a table of contents, not a tabulation of invariable associations in these languages nor in languages of the world. Any theories here are in the text, not in the table. The column headings of the table, Munda and Mon-Khmer, reflect the custom in South-East Asian forums of calling all non-Munda Austroasiatic languages Mon-Khmer. This is an areal rather than a genetic grouping. In fact the genetic subgroupings of Austroasiatic are mostly undemonstrated.

4. Our Sora phonemic transcriptions differ from IPA usage mainly in that $y$, $j$, $r$, $d$ are used for IPA $\text{j}$, $\text{r}$, $\text{I}$, $\text{d}$. The vowel transcribed $u$ is a high unrounded (compressed) labial, as in Japanese and Finnish Swedish, for which there is no IPA symbol. The IPA-based transcription that christianized Soras use, adapted from one devised by Ramamurti (1931, 1933, 1938) after he heard Daniel Jones lecture on the new IPA in Madras in 1911, is unreliable for vowels, as is Ramamurti’s, who inconsistently transcribed Sora vowel qualities in terms of accent and length, which led Pinnow (1959) wrongly to reconstruct vowel length for proto-Munda.

Norman Zide’s Munda project briefly revived linguistic work on Sora: in 1962 by Stampe and the late H. S. Biligiri with Monṣi Raika and Damanṣo Buyo, then in 1963 by Starosta, Bijoy P. Mahapatra, and K. Ranganayaki [later K. Mahapatra] with Raika and Tabanso Saora. Later work has been done by Arlene R. K. Zide, Khageswar Mahapatra, Piers Vitebsky, Stampe and Donegan with various guides. Besides their works in the reference list, all contributed to a new dictionary of Sora which continues to grow (a link is at http://fling.lil.hawaii.edu/austrasiatic/).


6. The term linguistic area, Harry V. Velten’s translation of N. S. Trubetzkoy’s term Sprachbund, has geographic as well as typological reference. But in fact the Indian linguistic area, as Masica (1976) pointed out, actually extends far northwest of India and Pakistan. And it also includes the Tibetan-Burman languages, which
extend north through Tibet and east—in the case of Burmese and Karen—to overlap the typologically South-East Asian languages (Mon, etc.) of Burma. On the other hand, the language area called (mainland) South-East Asia—just in the case of Khasi (Mon-Khmer) and Khamti (Daic)—overlaps the typologically South Asian languages of north-eastern India, and it extends north into China to include Chinese (at least in its southern varieties), and south to include the Mon-Khmer languages of the Malay Peninsula (Aslian) and of the Nicobar Islands.


On the traits of the South-East Asian area, see Henderson (1965), Huffman (1973), Matisoff (1973), and Gregerson (1976). The STEDT web site lists as forthcoming a volume Languages of Mainland Southeast Asia, edited by Matisoff, in the Cambridge [University Press] Language Surveys series.

7. On the reasons for the irreversibility of “grammaticalization”, see, for example, Hopper and Traugott (1993).

8. Zide and Anderson (2001) describe Donegan and Stampe (1983) as connecting polysynthesis to falling rhythm in Munda, but if we had done that we couldn’t have explained why Munda polysynthetic constructions are head-first! The explicit links to falling/rising in our article did not include polysynthesis, which begins as compounding, and as we showed, Sora has both older rising and newer falling patterns in compounds. (On compounds in this paper see section 5.1.)

9. Head-first vs head-last order, or right-branching vs left-branching structure, have been called progressive vs regressive (e.g. Yngve 1960). These are just technical terms (cf. their use in labeling perseveratory vs anticipatory assimilation), but in the present section, quoting Jespersen’s evaluative use of the term progressive, their ambiguity seemed irresistibly apt. We argue in defense of regressive structure in section 8.

10. Kieckers (1931), Schmidt (1926), and Meillet and Cohen (1924) (the first edition, where the Munda section (385–403) was written by J. Przyluski).

11. There are Dravidian loanwords in languages in contact with Oraon (Kurukh) in Chota Nagpur or with Telugu in Andhra Pradesh, but these look recent.

12. Ironically, there is abundant evidence of early lexical influence of Indo-Aryan (Sanskrit and Pali) on Mon-Khmer, as can be seen in the dictionaries of inscriptions in Mon (Shorto 1971) and in Khmer (Pou 1992).

13. There is one group of Dravidian languages with some head-marking, incorporating pronominal objects, namely the South Central group, including Telugu and tribal languages spoken around the Koraput Munda area. But Steever’s excellent study of analysis-to-synthesis in those languages (1993) shows little that is like Munda.

15. This applies of course to gestural language as well, and also to the coordination of speech and gesture. Jim McCawley once remarked in conversation that not only must both pronouns in *He ate his lunch* be deictic for both to be accented but also for both to be accompanied by pointing. The word, the gesture, and the accent are simultaneous. To a singer or dancer or comedian, there is nothing mysterious about this: the accent is a beat in the tacit real-time rhythmic stream to which we put the words and the movements. We linguists get this the wrong way around and speak of putting the accent on a certain syllable or word. That is like saying that Fridays come on payday! A rhythmic accent is not an “accentuation”: *every* complete utterance, even a one-syllable word, is fitted into real time on a main beat (and thus takes a “primary accent”), even if it is swallowed as in the very British example ['kɪkju] 'Thank you’ of Daniel Jones (Abercrombie [1964a] 1965: 20). The view that syllables are put on accents, just as words are put to music, and not vice versa, brings together the insights of Lashley on serial behavior (1951), Lehispe on speech rhythm (1970 etc.), Longuet-Higgins and Lee on musical rhythm (1984), and a long tradition in verse metrics.

16. The correspondence of dependents and interrogatives is an ancient observation. Starosta argued in a Tuesday linguistics seminar at the University of Hawai’i that the *modi significandi* of medieval grammar correspond to dependents in modern grammar. The modes of signifying (predicating) were based on the categories of Aristotle, which corresponded to the Greek interrogative pronouns.

17. We are grateful to Frans Plank for making us clarify that we do not of course mean that the dependent is always the newer information, but only that it is the default locus of newer information, and therefore that the grammatical association of the main beat with the dependent is a con*ventionalization* of the pragmatic association of the main beat with new information.

18. The unglossed Sora inflections in Table 3 are the verbal affixes -t ‘present tense’, -e ‘third person singular subject’ and the nominal affixes dny- ‘dative/accusative’ (which is suffixed to noun objects), and -n ‘article’.

In the examples in the final row of the table, Sora and Khmer differ in a way that is typologically characteristic. Head-first Khmer embeds a relative clause with a finite verb, but head-last Sora avoids the finite verb and reduces the relative clause to a postpositional phrase.

19. The incompatible use of the term *foot* in verse metrics and in musicology (Cooper and Meyer 1960) makes us reluctant to follow Abercrombie (1964a) and many others in using *foot* to refer to beats. In the past we have sometimes used *measure*, but that traditional term is best reserved for larger structures built up of beats, e.g.

\[
\frac{\text{el.e.vat.or} \text{'op.e.rat.or}}{\text{in'tell.i.gence}} \text{'test cram', session}\]

We view pauses (junctures) as phrase or word edges mapped onto rest beats, as in the contrast of meaning and phrasing in this traditional minimal pair:

\[
\frac{\text{old}}{\text{men and 'wom.en}}\]

vs
Often rest beats are realized in legato fashion, filled by speech material prolonged from preceding stronger beats, such as men and women in the preceding example, resulting in what linguists call “final lengthening”:

```
\[ \text{old 'men and 'women } \]
```

Viewing accents and junctures as levels of rhythmic duration rather than merely as prominences vs silences accounts for the four levels of accent and juncture that have traditionally been recognized as distinguishable in English words (Newton \( \text{\textasciitilde} \)), vs compounds (Newton \( \text{\textasciitilde} \)), vs phrases (new town \( \text{\textasciitilde} \text{\textasciitilde} \) or legato \( \text{\textasciitilde} \text{\textasciitilde} \)), vs coordinates (eggs, oil, and lemons \( \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \) or legato \( \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \)). It explains the mutual shortening vs lengthening (temporal compensation) of the parts of tighter vs looser constructions, as in and their mutual levels of susceptibility to assimilation vs dissimilation. And finally, while it distinguishes rhythm from tempo, it explains why the phonological and phonetic effects of rhythmic brevity parallel those of quick tempo.

20. Ignoring a short syllable before a long is not unusual in falling word rhythm, e.g. in Oriya (Majumdar 1970: 213) and Malayalam (Mohanan 1986: 111–115).

Because of the high frequency of “iambic” words in Munda, impressionistic descriptions have characterized some languages as having word-final accent, even languages like Sora and Remo, whose very names have initial accent.

21. This is paralleled in Japanese: one-mora words like ke \( \text{\textasciitilde} \) ‘hair’ are extended utterance-finally as ke? \( \text{\textasciitilde} \) in the Tokyo standard and as ke? \( \text{\textasciitilde} \) in other dialects.

22. The universal falling character of beats and measures is reflected in temporal compensation not only in speech but also in music. The non-anacrustic divisions of musical time begin with one prominent element and end before the next equally prominent element, whether it is beats being divided (\( \text{\textasciitilde} = \text{\textasciitilde} = \text{\textasciitilde} \)) or measures (\( \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \text{\textasciitilde} \)). The harmonic structure is mapped onto these front-prominent divisions, so that, in \( \text{\textasciitilde} \) time, a harmonic change on the second half of a division entails one on the first half. (That is true even in syncopated styles as in rock or jazz that put an “accent” on the even or “back” beat.) And exactly parallel to rising speech rhythms are rising musical rhythms, in which the most prominent note in a melodic phrase is the final one: the phrase does not end in the measure where it began, but at the beginning of the next measure. This is why the final note is usually lengthened: to fill that measure.

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