

## Limits of Umlaut in Sinhala

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We investigate the patterns of verbal umlaut in Sinhala (Indo-Aryan, Chandralal 2010), which, on the surface, seems to be restricted by an intricate combination of (i) lexical, (ii) morphosyntactic and (iii) phonological factors. We account for these restrictions by only using morphosyntactic locality domains and derivational timing of operations. We defend the following claims:

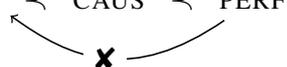
**Claims:** ① Despite initial impression and occasional claims that Sinhala is a non-concatenative or fusional language (e.g. Garland 2005), we show that verbal umlaut patterns clearly indicate that, underlyingly, the language is fully concatenative. ② We argue that the word-internal locality domains that restrict the application of verbal umlaut stem from syntactic locality domains (i.e. phases) and their interaction with word-formation processes (i.e. head-movement and cliticization). The limits of umlaut shed light on mismatches of locality domains between different modules, and we connect them to other instances of morphological domain extension (Embick 2010, Bobaljik 2012, Bobaljik and Wurmbrand 2013, Calabrese 2015). ③ Due to its rich morphological inventory, Sinhala provides an ideal testing ground to differentiate between various approaches of umlaut and we show that the nature of umlaut is fundamentally different from other non-concatenative processes such as stem-suppletion.

**Background:** A subset of the large inventory of suffixes in Sinhala trigger umlaut on the verb stem, which, similar to Germanic, is realized as a fronting of vowels on the stem. In (1), the verb is only followed by suffixes that do not trigger umlaut (e.g. CAUS, NPST, IND) In (2) and (3) we see two umlaut-triggering suffixes, namely PAST and PERF(ECT) and thus the verb stem has a front vowel. (All data for this project come from original fieldwork)

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|-----|-----------------------|-----|-----------------|-----|-----------------|
| (1) | ad-ə-wə-nə-wa         | (2) | æd-ø-d-a        | (3) | æd-ə-la         |
|     | pull-CL-CAUS-NPST-IND |     | pull-CL-PST-IND |     | pull-CL-PERF    |
|     | ‘causes to pull’      |     | ‘pulled’ (Past) |     | ‘pulled’ (Perf) |

Other umlaut triggers include PASS(IVE), PROG(RESSIVE) and the I(NFORMAL) IMP(ERATIVE). The nature of the umlaut cannot be reduced to the phonological properties of the affix in any obvious way—in (3), the trigger itself has a back vowel (Parawahera 1990, Letterman 1997).

**Two Puzzles:** At first sight, umlaut does not seem to be a coherent phenomenon. Amongst the umlaut-triggers, we find two classes: Some triggers (PAST, PASS) can trigger umlaut on the stem across intervening morphemes such as the causative (4), whereas others (PERF, PROG, I-IMP) cannot (5). For those affixes, the causative acts as an intervener.

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|-----|----|---|-----|----|---|
| (4) | a. | æd-ø-də-u-wa  | (5) | a. | ad-ə-wə-la  |
|     |    | pull-CL-CAUS-PST-IND  |     |    | pull-CL-CAUS-PERF   |
|     |    | ‘made X pull’   |     |    | ‘have made X pull’  |
|     | b. | V < CAUS < PAST   |     | b. | V < CAUS < PERF   |
|     |    |  |     |    |  |

Similarly, PAST and PASS trigger umlaut in both verb classes but PERF, PROG and I-IMP only do so in class 2 (not illustrated). However, a rigorous phonological investigation shows that the difference between the two classes can be reduced to the fact that class 1 has a class-suffix after the stem whereas class 2 does not. Apparent instances of class-2 suffixes (1, 3) are merely epenthetic (see Letterman 1997 for the same conclusion on completely independent grounds).

**Generalization:** This allows us to reduce the two puzzles to one: PAST and PASS can trigger umlaut across intervening material while PERF, PROG and I-IMP cannot. We argue this can be made sense of by assuming that [I] umlaut is a process that can only apply when [II] it is part of the same extended projection as the verb stem.

[I] Umlaut is morphophonological, and not purely morphological (i.e. suppletion): Sinhala

has verbs that undergo stem suppletion in PAST and PERF, including the verb *ya-* (‘to go’), which becomes *gi-* in the past ((6)). Crucially suppletion disappears with an intervening causative (7).

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|-----|----|-----------------|----|-------------|-----|---------------------|---------------------|
| (6) | a. | <i>ya-nə-wa</i> | b. | <i>gi-a</i> | (7) | <i>yæ-w-w-a</i>     | (* <i>gi-w-wa</i> ) |
|     |    | go-NPST-IND     |    | go.PST-IND  |     | go.PST-CAUS-PST-IND |                     |
|     |    | ‘go’            |    | ‘went’      |     | ‘made X go’         |                     |

Thus, the stem and the trigger of suppletion must be adjacent and cannot be separated (by the CAUS). This is striking since PAST can trigger umlaut across CAUS (and also does, (7)) but it cannot trigger suppletion in the very same configuration! This shows that suppletion is different in nature from umlaut. We implement this by saying that umlaut is a phonological process triggered by specific morphemes. More concretely, we assume that umlaut-triggers introduce a floating [-back] feature, which associates with positionally underspecified vowels in the stem (Lieber 1987, Parawahera 1990, Wiese 1996, Trommer 2021). Whether the association of the [-back]-feature with the stem is successful depends on the specific locality configuration.

**[II] Locality Domains:** We assume that PAST and PASS are “strong” umlaut-triggers because they are part of the extended syntactic projection of the verb. Thus, the verb will undergo head-movement to Tense and the resulting complex head will be mapped onto a single morphophonological domain (see (8)). In the case of the “weak” umlaut triggers (e.g. PERF), the verb only moves as high as *v* (and T is expressed as an auxiliary). The combination of V+PERF arises not through head-movement but through a late cliticization process. The result is that PAST and PASS will always be located in the innermost cycle together with the verb (see (8)), even if separated from the verb by CAUS whereas PERF will typically not be (9). However, we assume that there is one exception to this: If nothing intervenes between the root and PERF, the innermost cycle will not be triggered and PERF will count as belonging to the stem-cycle (10).

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|-----|---|-----|---|------|---------------------------|
| (8) | $\boxed{V - v - \text{caus} - \text{Pass} - T}$ | (9) | $\boxed{V - v - \text{caus}} - \text{Perf}$ | (10) | $\boxed{V - \text{Perf}}$ |
|-----|---|-----|---|------|---------------------------|

While possibly surprising at first sight, observations of this sort have been proposed in various guises. The intuition that ‘high’ affixes when root-adjacent exceptionally count as belonging to the innermost cycle or that absence of a low intervener such as a theme vowel (or *v*) facilitates morphophonological processes is found in proposals by i.a. Embick (2010), Bobaljik (2012), Calabrese (2015), Moskal (2015), Embick and Shwayder (2017), Fenger (2020). The result of this mapping procedure is that a [-back]-feature on PASS or PST will always be in the same domain as the stem and therefore be able to associate with the vowels on the stem. A [-back]-feature on PERF will only be able to associate when adjacent to the stem. This is the correct result (cf. 3 vs 5; recall that CL in (3) is not a morpheme but merely epenthetic.).

**Implications:** ① Even though many morphophonological processes (allomorphy, gemination, deletion) obscure the underlying concatenative character of the language, we argue the umlaut patterns in Sinhala can only be described adequately by means of a morpheme-based approach that includes word-internal locality domains and therefore demonstrate the underlyingly concatenative nature of word formation. ② We argue that locality domains in phonology are inherited from the syntactic derivation and that mismatches between them in different modules can be accounted for by the concept of domain suspension, proposed for syntactic processes (den Dikken 2007, Bobaljik & Wurmbrand 2013, Fenger 2020, i.a.). We argue that this concept also allows for a uniform treatment of morphological locality effects, which have received very different explanations in the literature (see refs. above). ③ While umlaut patterns in other languages like German(ic) are amenable to different accounts (see e.g. Embick & Shwayder 2017 for discussion), Sinhala provides clear evidence that umlaut is different from ‘pure’ morphological processes such as stem suppletion. That is, based on the different locality restrictions, (5) vs (7).

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