Towards a DM account of verbal morphophonology in Udmurt

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Aims & claims

- Goal of this talk: to derive the **stress properties** of verbs in Udmurt from their **morphosyntactic structure**, within the **Distributed Morphology** framework (DM; Halle & Marantz 1993)

- DM approaches to stress placement:
  - stress placement derives from the positioning of **category-defining heads** like v^0, n^0, and a^0 (Embick 2010; Marvin 2013).
  - **non-cyclic functional heads** may determine stress placement (Oltra-Massuet & Arregi 2005 on Spanish).

Claims

- Our analysis of stress distribution in different kinds of verbs in Udmurt (indicative, imperative, negated) supports the latter approach: in Udmurt, a **non-cyclic functional head, T^0,** determines stress placement.

- We rely on the instrumental evidence that comes from Borise & Georgieva (2021) and adopt and elaborate upon the existing syntactic analysis of negated verbs in Udmurt (Georgieva et al. 2021).

Outline

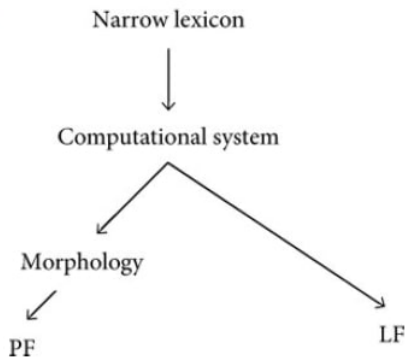# Background

Word stress in Udmurt

- Udmurt (Uralic, Permic) is described as having fixed **final** stress (Yemelyanov 1927; GSUJa I 1962; Denisov 1980; Winkler 2001)

    - indicative verbs: *valá* 'understand.PRS.3SG'

- Morphologically conditioned exceptions with **initial** stress:

    - imperative verbs: *vála* 'understand.IMP.2SG'
    - negated verbs: *uz vála* 'NEG.FUT.3SG understand'
    - (reduplicated adjectives, etc.)

Word stress: instrumental work

- Our instrumental study (Borise & Georgieva 2021):
  Udmurt has initial and final metrical stress.

  - as opposed to, e.g., the final, default stress being a non-metrical phrase-edge effect; cf. Jun & Fougeron (1995) for French.

- These conclusions are based on acoustic evidence like vowel quality and alignment with pitch accents.

Distributed Morphology: background

- A **"syntax-all-the-way-down"** approach to morphological structure building

- Organisation of grammar: **morphology is postsyntactic**

  (1) DM architecture

Narrow lexicon

Computational system

Morphology

PF

LF

Distributed Morphology: background (cont.)

- DM set of **morphological operations**: Lowering, Fusion, Fission, Impoverishment, etc.
  These operations modify the output of syntax.

- **Late Insertion Hypothesis**: morphology operates with abstract morphosyntactic features; the phonological content of abstract morphemes is inserted at PF, Vocabulary Insertion (VI).
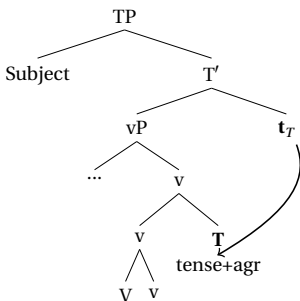
Verbal morphosyntax in Udmurt

- Georgieva et al.'s (2021) analysis: T and Neg in Udmurt undergo **Lowering** to form a complex head with v.

- Lowering displaces a head to the head of its complement; operates on hierarchical structures, i.e., before Vocabulary Insertion (Embick & Noyer 2001).

- This analysis is supported by:
  - the order of morphemes within the complex head
  - adjacency between Neg and V
  - word order facts

Verbal morphosyntax in Udmurt (cont.)

In non-negative contexts, T (T+Agr) undergoes Lowering to and is linearized to the **right** of v, as in (2):
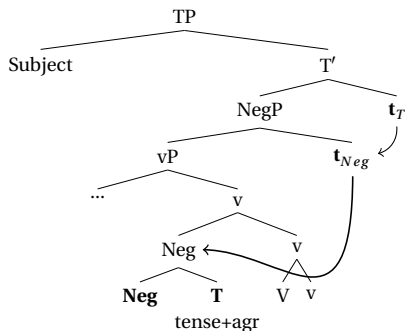
(2) **Indicative verbs**

→ **Linearization**: V-v-T+Agr

In negative contexts, Neg is picked up by T (T+Agr) under Lowering and the resulting complex head is linearized to the **left** of v, as in (3):

(3) **Negated verbs**

→ **Linearization**: Neg-T+Agr-V-v

Stress placement in DM

Existing DM analyses of stress placement

- In Distributed Morphology, lexical categories are assumed to consist of an **acategorial root** and a **category-defining head/categorizer**:

$$\rightarrow \sqrt{\text{ROOT}} + v^0 = V$$

- Categorizers are **cyclic**: they trigger Spell-Out, while other heads (e.g., T^0) do not (Embick 2010).

- When a categorizing head is merged, the cyclic domains in its complement are sent to the interfaces.

Approach 1: cyclic X^0s determine stress placement

Marvin's (2013) account of English stress placement:
If a word contains **several categorizing heads**, Spell-Out is triggered for **each** phrase.

(4)
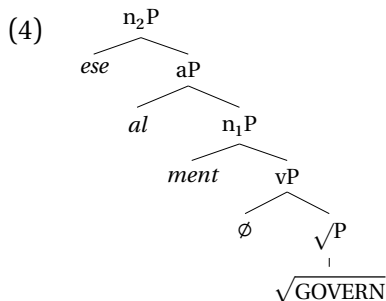
The Main Stress Rule of English (Halle 1998) applies at:
vP, aP, n_2P, and at the next higher phrase.

Stress assigned within previous Spell-Outs is **preserved** (as secondary stress).

→ *góvernméntalése*

Approach 2: non-cyclic X^0s may, too

Oltra-Massuet & Arregi (2005): stress assignment in Spanish verbs is determined by the position of **T** – stress targets the vowel immediately (linearly) preceding the T node:

- T is preceded by a right bracket that closes the metrical foot to the left of T:
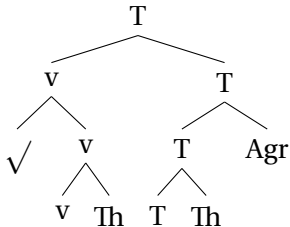
$$… x) \, T$$

- stress is assigned to the rightmost vowel of the foot:

$$… x́) \, T$$

Approach 2: non-cyclic X^0s may, too (cont.)

(5) **Spanish verbs**

(6) a. $[\sqrt{} \ [v \ Th]] \ [[\textbf{T} \ Th] \ Agr \ ]$
      cant $\emptyset$ **á**   b a mos
      'we sang' (1st conjugation)

   b. $[\sqrt{} \ [v \ Th]] \ [[\textbf{T} \ Th] \ Agr \ ]$
      tem $\emptyset$ **í** $\emptyset$ a mos
      'we feared' (2nd conjugation)

Approach 1 & Approach 2

- Both approaches tie stress assignment to morphosyntactic structure, but crucially differ with respect to which syntactic heads determine the domains for stress assignment:
    - cyclic heads, i.e., categorizers (Embick 2010; Marvin 2013)
    - certain non-cyclic heads (Oltra-Massuet & Arregi 2005)

We show that stress assignment in Udmurt **makes reference to non-cyclic functional heads**.

Proposal

Proposal

- In line with Oltra-Massuet & Arregi (2005), the main tenet of our analysis is that **T plays the crucial role in stress assignment**.

- The Udmurt T differs from its Spanish counterpart, though: it can be linearized **to the right or to the left of v**, cf. (2)–(3).

Implementation

(7) **Stress assignment algorithm for Udmurt verbs**:

a. Insert a **left bracket** to the right of T, indicating the left edge of the metrical foot:

T (x …

b. Align stress with the **left edge** of the foot:

T (x́ …

c. If no stress-bearing material is available to the right of the T, move the left bracket **one stress-bearing unit to the left**, then back to (b): align stress with the left edge of the foot.

(T …

Further assumptions

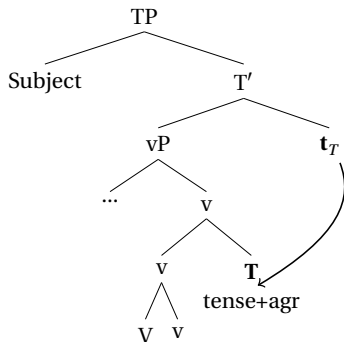- The Stress Placement Algorithm in Udmurt applies to the actual exponents of Neg, T, and agreement.

- Thus, the ordering at PF is as follows:

  (8)   Lowering > Vocabulary Insertion > Stress assignment

- The linearized complex heads form a single prosodic domain (for the purposes of stress assignment).

Indicative verbs: order of operations at PF

T is linearized to the right of v after Lowering (9a,b) (=(2)):

(9) **Indicative verbs**

a. Lowering:

```
                    TP
          ┌─────────┴─────────┐
       Subject               T′
                      ┌───────┴───────┐
                     vP              t_T
                  ┌───┴───┐           │
                ...       v           │
                       ┌──┴──┐        │
                       v    T    ◄────┘
                     ┌─┴─┐ tense+agr
                     V   v
```

b. Linearization:
V-v-T+Agr

c. Vocabulary Insertion

d. Stress assignment

Indicative verbs: stress assignment

Depending on the actual exponents of Tense and Agreement, three cases are to be distinguished:

1. in verbs that contain overt material to the right of T, i.e., overt Agr morphology, default stress placement, (7b), applies and stress is realized on that morpheme: **T (x́ ...**

   (10) vetl-**o**-z**í**
         go-FUT-3PL
         'they will go'   [Exponents: V+**T**+**Agr**]

   NB: But see Implications for discussion of dialectal variation

Indicative verbs: stress assignment (cont.)

2. Leftward movement of the bracket, (7c), applies in two cases:

   (i) in verbs that contain an overt exponent of T but no overt / syllabic material to the right of T:

   (11) a. vetl-**í**
   go-PST[1SG]
   'I went'

   b. vetl-**í**-z
   go-PST-3SG
   's/he went' [Exponents: V+**T**+**Agr**]

   (ii) in verbs that contain no overt exponent of T or Agr:
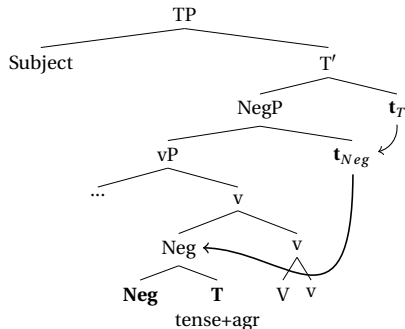
   (12) ver**á**
   'say.PRS.3SG'
   's/he says' [Exponents: **V**+**T**+**Agr**]

Negated verbs: order of operations at PF

Neg and T undergo Lowering to v, and due to the special linearization
requirement of Neg are ordered to the left of v (13a,b) (=(3)):

(13) **Negated verbs**

a. Lowering:

b. Linearization:
   Neg-T+Agr-V-v

c. Vocabulary Insertion

d. Stress assignment

Negated verbs: stress assignment

- The linearized structure of negated verbs is as follows: Neg-T+Agr-V-v.

- Negation and Tense are exponed by a single morpheme: /ę/ in the past tense, /u/ in the non-past; the exponent of Agr is not syllabic.

- The left bracket is inserted to the right of T: **T (x …**

- Stress is correctly placed on the syllable following T, i.e., the first syllable of the verb as per (7b): **T (x́ …**

  (14) **u**-z   v**é**ra
        NEG.FUT-3 say.CN.SG
        's/he will not say'   [Exponents: Neg.**T**+Agr **V**]
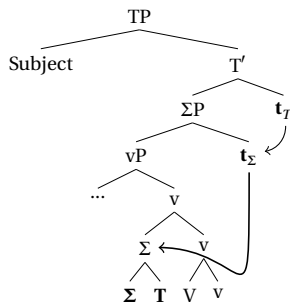
Imperative verbs: order of operations at PF

We propose that in imperative verbs, the (phonologically zero) Σ head (cf. Laka 1994) also undergoes Lowering with T, in a parallel fashion to Neg in (3), yielding Σ-T-V-v (15a,b):

(15) **Imperative verbs**

a. Lowering:

b. Linearization:
   Σ-T-V-v

c. Vocabulary Insertion

d. Stress assignment

Imperative verbs: stress assignment

- The Σ and T heads have no overt exponent.

- The left bracket to the right of T places the left edge of the metrical foot: **T (x ...**

- Stress is placed on the syllable following T, i.e., the first syllable of the verb: **T (x́ ...**

  (16) v**é**ra
       say.IMP.2SG
       'say!'   [Exponents: **Σ**+**T V**]

Implications

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Our proposal makes correct predictions for stress assignment in verb clusters containing **clitics**.

- Aspectual (en)clitics *ńi* 'already, anymore' and *na* 'still, yet' encliticize to the verb, yielding **V-cl**.

- In the context of negation, these clitics attach either to the lexical verb or to negation, giving rise to **Neg-V-cl** or **Neg-cl-V** (Arkhangelskiy 2014).

Implications: clitics

Georgieva et al. (2021) propose that these clitics are **phrase-structurally ambiguous**, i.e., they can be either heads or phrases:

- If the clitic is a **head**, it undergoes Lowering and thus becomes part of the complex head linearized as Neg-T+Agr-cl-V-v.
  → word order: **Neg-cl-V**

- If the clitic is a **phrase**, it is skipped by Lowering, and simply 'leans onto' the complex head, as an enclitic, without being part of it.
  →word orders: **Neg-V-cl**

Implications: clitics

Our analysis predicts that stress will target the **clitic** in **Neg-cl-V** word orders.

- Here, the clitic is part of the complex head Neg-T+Agr-cl-V-v and the right-most element in the foot:

$$\textbf{T (}\acute{\textbf{cl}} \textbf{ ...}$$

- This prediction is borne out (based on speaker intuitions):

  (17) ę-z   n**á** valale
        NEG.PST-3 CL say.CN.PL
        'they haven't understood yet'

Implications: clitics

In **Neg-V-cl** and **V-cl** orders, clitics are not part of the complex head: they lean onto/encliticize to it.

- Accordingly, we predict that that the presence of clitics will not affect expected stress placement in indicatives and negated verbs.

- These predictions, too, are borne out (based on speaker intuitions):

    (18) ę-z válale na
         NEG.PST-3 say.CN.PL CL
         'they haven't understood yet'

    (19) valaló ńi
         say.PRS.3PL CL
         'they already understand'

Implications: dialectal variation

- Some Northern and Southern dialects of Udmurt display a different stress placement pattern in indicative verbs (Kelmakov 1998; Karpova 2005; Teplyashina 1970), as (syllabic) Agr morphology is not stressed.

  (20) a. vetl-o-z**í**
          go-FUT-3PL
          'they will go'   [Standard Udmurt]
        b. vetl-**ó**-zi̱
          go-FUT-3PL
          'they will go'   [Northern/Southern dialects]

- We tentatively propose that the stress in (20b) can be derived by the leftward movement of the bracket (7c) – on the additional assumption that Agr markers are clitics in these dialects (cf. Georgieva 2017)

A parallel with Turkish

- There are two sets of agreement markers in Modern Standard Turkish: the so-called *z*-paradigm and the so-called *k*-paradigm

- The suffixes belonging to the *z*-paradigm have been analysed as clitics, as they are not stressed, that attach to a present tense copula (see Kornfilt 1996; also Kelepir 2001), as shown in (21a). The suffixes belonging to the *k*-paradigm do bear stress (if they are syllabic), this giving rise to final stress in verbs, as in (21b).

  (21) a. git-m**í**ş-∅-siniz
       come-PERF-COP-2PL
       'you have come (reportedly)'   [*z*-paradigm]
     b. gi-ti-n**í**z
       come-PST-2PL
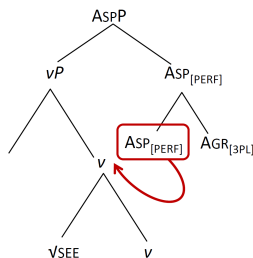   'you have come'   [*k*-paradigm]

Turkish verbs: a partial Lowering account

Alternatively, the variability in stress placement in Turkish verbs depends on whether a full complex head or its part undergoes Lowering.

(22) a. gör-müş-**lér**-i-di
       see-PERF-3PL-COP-PST
       'they have seen'
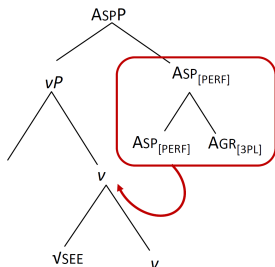
   b. gör-**múş**-ler-i-di
       see-PERF-3PL-COP-PST
       'they have seen'

(Güneş 2021, 2022)

Conclusion

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- The **stress properties** of verbs in Udmurt can be successfully derived from their **morphosyntactic structure**, within the **Distributed Morphology** framework.

- In Udmurt, a **non-cyclic head, T,** determines stress placement.

- Our analysis provides evidence in favour of an approach that allows for **non-cyclic heads** to determine stress placement (Oltra-Massuet & Arregi 2005 on Spanish).

- Our analysis makes correct predictions for stress placement in contexts that contain **clitics**, and can account for **dialectal variation** in stress placement in Udmurt.

Thank you for your attention!

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