

The role of Lowering and non-cyclic heads in Udmurt stress placement*

Lena Borise & Ekaterina Georgieva

Hungarian Research Centre for Linguistics

1. Introduction

Some of the fundamental objectives pursued within the framework of Distributed Morphology (DM; Halle and Marantz 1993) include delimiting the role of syntactic and morphosyntactic processes in word formation and identifying the morphosyntactic structures that act as domains for the application of phonological processes. The latter issue has been addressed with respect to topics like stress (e.g., Oltra-Massuet and Arregi 2005, Marvin 2003, 2013, Creemers et al. 2018, Güneş 2021), and has identified different morphosyntactic domains (e.g., syntactic phases) and individual syntactic heads (e.g. T, categorizing heads like *n*, *v*, and *a*) as relevant for this process. This paper contributes to the discussion by providing an account of stress placement in verbs in Udmurt (Uralic), based on their morphosyntactic structure. We propose that the stress distribution in different verb types in Udmurt (indicative, imperative, negated) is calculated with respect to the position a non-categorizing functional head, T, which can either precede or follow the lexical verb in the complex head. The theoretical contribution of this paper is two-fold: it (i) presents an argument for DM theories that allow for deriving stress placement from the positioning of (certain) non-categorizing heads (see Oltra-Massuet and Arregi 2005 for Spanish) rather than from the positioning of category-defining heads (see Marvin 2013, Creemers et al. 2018), and (ii) shows that the domain of stress assignment in Udmurt verbs corresponds to complex heads assembled via Lowering (building upon Georgieva et al. 2021).

The paper is structured as follows. Section 2 provides the necessary background on word stress (2.1) and verbal morphosyntax (2.2) in Udmurt as well as the theoretical framework adopted here (2.3). Section 3 lays out our analysis (3.1), which is then applied to indicative (3.2), negated (3.3), and imperative verbs (3.4). Section 4 discusses the theoretical implications of the proposal for DM approaches to stress placement (4.1) and, more gen-

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erally, for the syntax-prosody mapping, based on the additional data from Udmurt clitics (4.2). Section 5 concludes.

2. Background

2.1 Word stress in Udmurt

In the existing literature, Udmurt is typically described as having fixed final stress (Pevoshchikov 1962, Denisov 1980, Vakhrushev and Denisov 1992, Winkler 2001). The default, final stress placement applies e.g., to indicative verbs (1a). However, there are also a number of morphologically conditioned classes of exceptions to the final-stress rule; many of them have initial stress instead. These include e.g., imperative verbs (1b) and negated verbs (1c) (see Vakhrushev and Denisov 1992, Winkler 2011 for discussion). Note that negated verbs in Udmurt consist of the exponent of negation, specified for tense and person, and the so-called ‘connegative form’ of the lexical verb (glossed as CN), specified for number (see Edygarova 2015, Georgieva et al. 2021).

- | | | | | | | | |
|-----|----|-------------|----|-------------|----|------------------|-----------|
| (1) | a. | verá | b. | véra | c. | u-z | véra |
| | | say.PRS.3SG | | say.IMP.2SG | | NEG.FUT-3 | say.CN.SG |
| | | ‘s/he says’ | | ‘say!’ | | ‘s/he won’t say’ | |

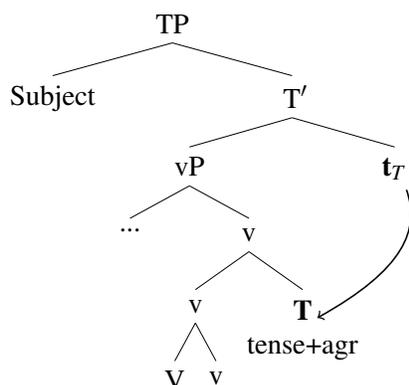
In line with the descriptive literature, instrumental results show that Udmurt indeed has initial and final metrical stress (Borise and Georgieva under review) – as opposed to final ‘stress’ representing a non-metrical phrase-edge effect; cf. Jun and Fougeron 1995 for French. The instrumental results are based on the distribution of several acoustic cues (vowel duration, intensity, vowel quality, and alignment with intonational pitch accents).

2.2 Verbal morphosyntax in Udmurt

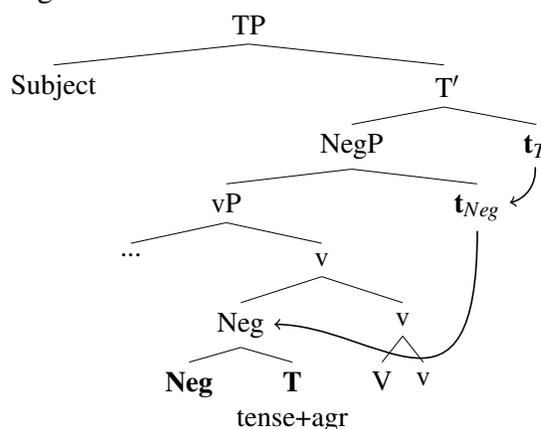
The verbal morphosyntax of Udmurt has received some attention in the recent literature. Here, we adopt and develop the morphosyntactic analysis of Udmurt indicative and negated verbs proposed by Georgieva et al. (2021). According to it, the T and Neg heads in Udmurt undergo a post-syntactic operation of Lowering (Embick and Noyer 2001), in order to form a complex head with *v*. This analysis is supported by several pieces of evidence: (i) the order of morphemes within the complex head (more on this below), (ii) the obligatory adjacency between Neg and V, and (iii) word order facts.

Specifically, Georgieva et al. (2021) propose that the structures underlying verb formation in Udmurt are the following. In non-negative contexts, T (which hosts tense and agreement; henceforth, T+Agr) undergoes Lowering and adjoins to the right of its sister V-*v*, as in (2), with the resulting complex head being linearized as in (3). In negative contexts, T also undergoes Lowering, and, on its way, picks up Neg, which is base-generated below T, as shown in (4). Due to a special linearization requirement of Neg, proposed in Georgieva et al. 2021, the combination of Neg and T+Agr adjoins to the left of the V-*v* complex, and the resulting complex head is linearized as in (5).

(2) Indicative verbs



(4) Negated verbs



(3) Linearization: V-v-T+Agr

(5) Linearization: Neg-T+Agr-V-v

2.3 Stress placement in DM and the role of non-cyclic heads

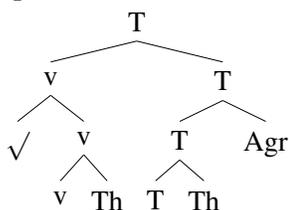
Within the DM framework, two main types of approaches to stress assignment have been recognized; both derive stress assignment from morphosyntactic structure, but crucially differ with respect to the set of syntactic heads that determine it. One family of approaches limits the set of syntactic heads in question to cyclic heads, i.e., category-defining functional heads, like *n* or *v* (e.g., Marvin 2013), while the other one allows for certain non-cyclic functional heads, like T, to determine stress placement (e.g., Oltra-Massuet and Arregi 2005).

To start with the latter approach – which is shown to be supported by the Udmurt data discussed in Section 3 – Oltra-Massuet and Arregi (2005) argue that stress assignment in Spanish verbs is determined by the position of a non-cyclic head, T: stress targets the vowel immediately (linearly) preceding the T node. The algorithm that derives this can be summarized as in (6).

- (6) a. T is preceded by a right parenthesis that closes the metrical foot to the left of T: ...x) T
- b. stress is assigned to the rightmost vowel of the foot: ... \acute{x}) T

The structure of the Spanish verbs is given in (7) with two illustrative examples in (8), which show that stress is assigned to the morpheme that linearly precedes T, regardless of whether T has a phonological exponent (8a) or not (8b). The Spanish data, therefore, show that certain stress systems make reference to non-cyclic heads, and the set of stress-defining heads cannot be limited to categorizing heads alone. The alternative approach to stress assignment in DM, which makes reference exclusively to categorizing heads, is discussed in detail in Section 4.1, in the context of Udmurt data.

(7) Spanish verbs



(8) a. [\checkmark [v Th]] [[T Th] Agr]
cant \emptyset á b a mos
'we sang' (1st conjugation)

b. [\checkmark [v Th]] [[T Th] Agr]
tem \emptyset í \emptyset a mos
'we feared' (2nd conjugation)

3. Proposal

3.1 Stress assignment algorithm

In line with Oltra-Massuet and Arregi's (2005) account of stress placement in Spanish verbs, the main tenet of our analysis is that T plays the crucial role in stress assignment in Udmurt verbs. The Udmurt T differs from its Spanish counterpart in one important aspect, though: it can be linearized either to the right or to the left of *v*, as was shown in (2) and (4), respectively. We propose that stress placement in Udmurt verbs is derived by the following algorithm:

(9) Stress assignment algorithm for Udmurt verbs:

- a. Insert a left parenthesis to the right of T, indicating the left edge of the metrical foot: T (x... .
- b. If no stress-bearing material is available to the right of T, introduce another parenthesis one stress-bearing unit to the left: (T... ; if needed, repeat until there is a stress-bearing unit to the right of the parenthesis.
- c. Align stress with the left edge of the foot: (x... .

In addition to the Stress Assignment Algorithm in (9), we adopt some further theoretical assumptions about the ordering of operations at PF. As is standardly assumed in DM, we take Lowering to apply before Vocabulary Insertion (Embick and Noyer 2001). Other morphological processes may take place after Lowering, for instance, the fusion of negation and tense, and of person and number in indicative verbs, thereby affecting the choice of exponents (on the former, see Section 3.3; on the latter, see Georgieva et al. 2021:fn. 12). We assume that stress assignment applies after Vocabulary Insertion, as it is string-sensitive.

With this in mind, in the next section we offer the derivations for indicative, negated and imperative verbs.

3.2 Indicative verbs

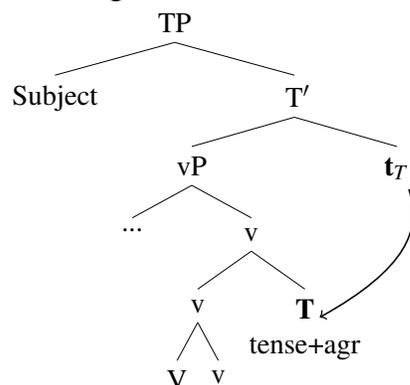
For indicative verbs, which are stressed on the final syllable, we adopt the morphosyntactic analysis proposed in Georgieva et al. 2021, according to which T undergoes post-syntactic Lowering to *v*, as shown in (10a). After Lowering takes place, T is linearized to the right

Lowering, non-cyclic heads, and stress in Udmurt

of *v*, as in (10b) (=2); the linearization is followed by Vocabulary Insertion and Stress assignment (10c,d). In what follows, we first discuss the stress properties of indicative verbs in standard Udmurt; we address some divergent dialectal facts in Section 4.2.

(10) Indicative verbs

a. Lowering:



b. Linearization:

V-v-T+Agr

c. Vocabulary Insertion

d. Stress assignment

Based on the actual exponents of tense and agreement, three types of indicative verbs can be distinguished in Udmurt. The first type is indicative verbs that contain overt syllabic material to the right of T – i.e., agreement morphology. In this case, default stress placement applies, as detailed in (9a) and (9c), and stress is realized on the morpheme that follows T: T (x... . Given that the agreement morpheme is monosyllabic, this gives rise to final stress. An example is provided in (11).

- (11) vetl-o-zǐ
 go-FUT-3PL
 'they will go'

The two other types of indicative verbs are those that contain an overt exponent of T but no overt / syllabic material to its right, as in (12), and those that contain no overt exponent of T or agreement, as in (13). In both cases, given that there is no stressable material to the right of T, additional left parentheses are introduced to the left of T, (9b). Accordingly, stress is realized on the final syllable, which might be T itself (12) or the verb stem (13).

- | | | | | | | |
|------|----|------------|----|-------------|------|-------------|
| (12) | a. | vetl-í-∅ | b. | vetl-í-z | (13) | verá |
| | | go-PST-1SG | | go-PST-3SG | | say.PRS.3SG |
| | | 'I went' | | 's/he went' | | 's/he says' |

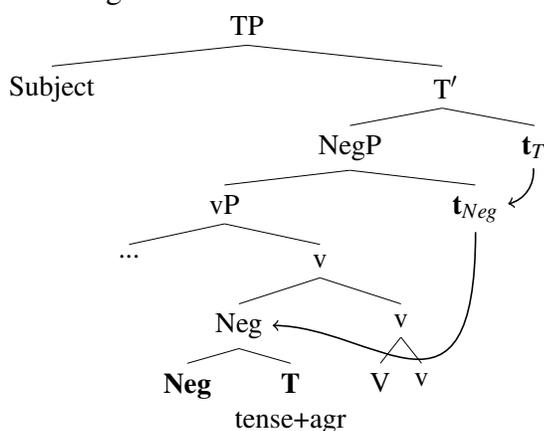
To recap, final stress in indicatives results from stress targeting the morpheme following T (i.e., the exponent of agreement), T itself (if no overt / syllabic material follows T), or the verbal stem (if T is non-syllabic), according to the algorithm in (9).

3.3 Negated verbs

In contrast with indicative verbs, negated verbs, which consist of negation and a lexical verb, carry stress on the initial syllable of the lexical verb, as was shown in (1c). With respect to the morphosyntax of negated verbs, we adopt Georgieva et al.’s (2021) analysis, which is reproduced in (14a) (=4). Here, both Neg and T undergo Lowering to ν , and crucially, are ordered to the left of the V- ν complex, as in (14b) – due to the special linearization requirement of Neg. As before, linearization is followed by Vocabulary Insertion and Stress assignment (14c,d).

(14) Negated verbs

a. Lowering:



b. Linearization:

Neg-T+Agr-V- ν

c. Vocabulary Insertion

d. Stress assignment

The key insight of our analysis is that the difference in the relative positions of T and ν between indicative and negated verbs (T linearly following or preceding ν , respectively) is responsible for the difference in stress assignment between indicative and negated verbs (final and initial, respectively).

The algorithm proposed in (9) correctly predicts stress placement in negated verbs. First, as per (9a), the left parenthesis is inserted to the right of T: T (x... . In negated verbs, Neg and T are exponed by a portmanteau morpheme: /e/ in the past tense, /u/ in the non-past. The exponent of person agreement, which accompanies T, is non-syllabic, which means that it cannot be stressed, and stress will be found further to the right. Then, as per (9c), stress is correctly assigned to the syllable following T – i.e., the first syllable of the lexical verb: T (x... . This is illustrated in (15).

(15) **e-z** véra
 NEG.PST-3 say.CN.SG
 ‘s/he did not say’

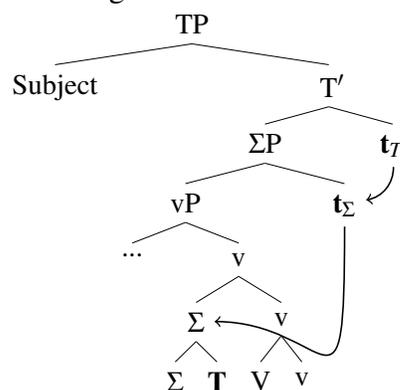
To recap, by making reference to the position of T, the algorithm in (9) correctly derives stress placement in both indicative and negated verbs.

3.4 Imperative verbs

The current proposal can also be extended to account for the stress properties of imperative verbs in Udmurt, which are stressed on the initial syllable, as was shown in (1b). Since the analysis in Georgieva et al. 2021 does not address the morphosyntax of Udmurt imperatives, we first propose that they are formed with the help of a phonologically null Σ head, which is responsible for the imperative meaning (cf. Laka 1990, 1994), and is merged below T. In a parallel fashion to negated verbs, we propose that T and Σ undergo Lowering to v , and that Σ has the same linearization requirement as the Neg head: it left-adjoins to the V- v complex, as in (16a).¹ The resulting linearization is shown in (16b). As before, the linearization is followed by Vocabulary Insertion and Stress assignment (16c,d).

(16) Imperative verbs

a. Lowering:



b. Linearization:
 Σ -T-V- v

c. Vocabulary Insertion

d. Stress assignment

The stress assignment algorithm in (9) successfully predicts initial stress placement in imperatives. According to (9a), a left parenthesis is inserted to the right of T, which marks the left edge of the metrical foot: T (x. . . . In terms of their morphological rendition, neither Σ nor T in imperatives have an overt exponent. Next, according to (9b), stress is placed on the syllable following T: T (x̣. . . . With T linearized to the left of its sister V- v , this means that stress targets the leftmost/initial syllable of the verb, similarly to what we observed for negated verbs. An example is provided in (17).

(17) véra
say.IMP.2SG
'say!'

To sum up, the algorithm in (9) correctly predicts stress placement in all three types of Udmurt verbs surveyed here: indicatives, negated verbs, and imperatives.

¹Here, we assume that NegP and Σ P are both generated below TP for the sake of uniformity, following the analysis developed for English and French in Laka 1990, 1994.

4. Discussion

4.1 Implications for DM approaches to stress placement

In the previous section, we showed that the Udmurt data provide support for the analyses that make reference to non-cyclic heads, such as Oltra-Massuet and Arregi's (2005) proposal for Spanish. An alternative would be to assume that stress is computed based on the position of cyclic heads (cf. Marvin 2013, Creemers et al. 2018). As we show below, though, the Udmurt facts cannot be accounted for if stress placement is assumed to be regulated by cyclic heads only.

In seminal work, Marantz (2001, 2007) proposes that categorial heads introduce phases in morphology, on a par with phase-based syntax (Chomsky 2000, 2001). Following this, Marvin (2003, 2013) argues that phonological phenomena like stress placement are to be accounted for with reference to the phase-based structure of words.

Specifically, Marvin (2013) proposes the following for English stress placement. If a word contains several categorizing heads, as in (18), Spell-Out is triggered for each phase. In a complex word like *governmentalese*, stress assignment, regulated by the Main Stress Rule of English (Halle 1998), applies at vP, aP, and n₂P due to a diacritic marking on the respective categorizing heads (those heads are considered to be cyclic in Marvin's proposal). The stress assigned within previous Spell-Outs is preserved in the form of secondary stress. This gives rise to *góvernmentalése*.

$$(18) \quad [_{n_2P} \textit{ese} [_{aP} \textit{al} [_{n_1P} \textit{ment} [_{vP} \emptyset [_{\sqrt{P}} \sqrt{\text{GOVERN}}]]]]]]$$

Adopting Marantz's idea that categorizers are cyclic, Embick (2010) puts forward the following proposal for a phase-based Spell-Out:

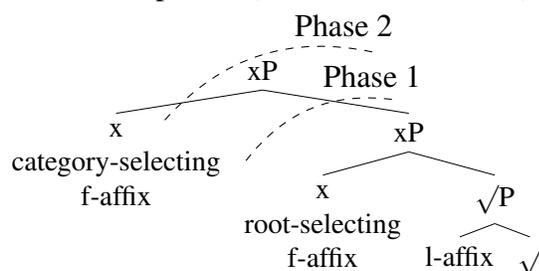
- (19) a. When cyclic head x is merged, cyclic domains in the complement of x are spelled out.
- b. Merge of cyclic y triggers Spell-Out of cyclic domains in the complement of y , by [(19a)]. For a cyclic domain headed by cyclic x in the complement of y , this means that the complement of x , the head x itself, and any edge⁺ [i.e., interphasal] material attached to x 's domain undergoes Vocabulary Insertion.
(Embick 2010:51, 53)

To illustrate, in (20), at the point when x is merged, there are no cyclic domains in the complement of x , and thus, no Spell-Out. Then, the non-cyclic heads W and Z are merged. Next, when the cyclic head y is merged, the Spell-Out of cyclic domains in y 's complement is triggered. According to this approach, certain morphophonological processes are determined by cyclic domains: for example, root-conditioned allomorphy requires for the root and the head exhibiting allomorphy to be present in the same cycle. Thus, (19) predicts that root-conditioned allomorphy is possible for x , W or Z , but not for y . Crucially, in this approach, categorizers are cyclic, while other heads (e.g., T) are not (Embick 2010).

- (20) Complex head
 $[_y [_z [_w [_x \sqrt{\text{Root } x}] W] Z] y]$

Adopting Embick's (2010) phase-based theory of Spell-Out, Creemers et al. (2018) propose an account of Dutch stress. They distinguish between three types of affixes: category-selecting f-affixes, root-selecting f-affixes, and l-affixes (Roots).² Their account makes the following predictions: (i) Phase 1 in (21) is sent to Spell-Out, and is subject to cyclic phonological rules, such as stress assignment, and (ii) category-selecting f-affixes are not part of Phase 1 and are thus invisible for the purposes of stress assignment.

- (21) Affixes and phases (Creemers et al. 2018)



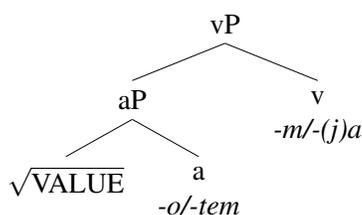
As was shown above, the head that regulates stress placement in Udmurt is the non-cyclic head T – similarly to Spanish. Furthermore, in contrast with English and Dutch, there is evidence that an analysis referencing cyclic/categorizing heads cannot account for Udmurt stress. The relevant evidence comes from indicative verbs with two categorizing heads. In (22a) and (22b), this is illustrated with deadjectival verbs, formed with the verbalizers *-m* and *-(j)a* (Perevoshchikov 1962:240–244), respectively. In both (22a) and (22b), the adjectival bases are themselves derived with the help of overt adjectivizers: *dun-o* ‘value-ADJZ; expensive, valuable’ and *dun-tem* ‘value-NEG.ADJZ; cheap’, respectively.

- | | | | | |
|------|----|--------------------------------|----|----------------------------|
| (22) | a. | dun-o-m-ó | b. | dun-tem-a-ló |
| | | value-ADJZ-VBZ-PRS.3PL | | value-NEG.ADJZ-VBZ-PRS.3PL |
| | | ‘they become (more) expensive’ | | ‘they become (more) cheap’ |

Under the phase-based Spell-Out proposed by Embick (2010) and following Creemers et al. (2018), the prediction is that when the verbalizers in (23) are merged, the cyclic domain in their complement, i.e., the aP, should be sent to the interfaces. Thus, stress is predicted to be assigned within Phase 1 (aP). However, there is no evidence for (primary or secondary) stress on any of the pre-final vowels in (22); instead, the verbs have final stress, as expected for indicative verbs.

²On derivational affixes as Roots see Lowenstamm (2014).

(23)



To recap, an analysis that only makes reference to categorizing heads makes incorrect predictions for stress placement in Udmurt indicatives, as it fails to account for the final stress in verbs that contain multiple categorizers. Similarly, accounting for initial stress placement in negated and imperative verbs with reference to the position of categorizers would not be trivial. The Udmurt data, therefore, lends support to the approaches that allow for non-categorizing heads to determine stress placement, and demonstrates that the approaches that limit the set of stress-determining heads to the categorizing ones are too restrictive.

4.2 Implications for the mapping of morphosyntactic structure to prosodic units

The broader issue that the Udmurt data has a bearing on is the relation between (morpho)syntactic structure and phonological well-formedness – in particular, the mapping of syntactic units onto domains that phonological processes operate on, which has received considerable attention in recent literature (see, e.g., Newell and Piggott 2014 on hiatus resolution; Embick 2010 on allomorphy; Fenger 2020 on stress and vowel harmony; Fenger and Weisser 2022 on umlaut).

From the analysis proposed here, it follows that in Udmurt, the complex heads built by the Lowering of T, which may be accompanied by Neg or Σ – as illustrated in (2), (4), and (16), respectively – form the domains of stress assignment. Stress placement, therefore, is closely linked to Lowering and the formation of complex heads. Importantly, our analysis makes further correct predictions for stress assignment in more complex contexts in Udmurt – namely, in verb clusters that include clitics – which provides additional support for it. In what follows, we discuss two such contexts: (i) verbs accompanied by aspectual clitics and (ii) a clitic-based analysis of agreement morphemes in certain dialects of Udmurt.

Udmurt has a sizable number of clitics that have different placement properties, which depend, among other things, on the verb type (e.g., indicative vs. negated; see Vilkuina 1998, Arkhangelskiy 2014 for a discussion). For instance, aspectual (en)clitics *ni* ‘already, anymore’ and *na* ‘still, yet’ in indicative (i.e., non-negative) contexts encliticize to the verb, yielding a verb-clitic (Verb-cl) word order: *valalo ni* ‘[they] already understand’. In the context of negation, though, both clitics have a more complex distribution: they can encliticize either to the lexical verb or to the negation, giving rise to Neg-Verb-cl or Neg-cl-Verb word orders: *ez valale na* or *ez na valale* ‘[they] haven’t understood yet’.

Georgieva et al. (2021) propose that the clitics are phrase-structurally ambiguous – i.e., they can act either as syntactic heads or as phrases – and that this structural ambiguity is responsible for the two possible positions that clitics can take relative to the negated verb. If the clitic is a syntactic head, it undergoes Lowering alongside T and Neg and thus becomes

part of the resulting complex head, linearized as Neg-T+Agr-**cl**-V-v. This gives rise to Neg-**cl**-Verb order. On the other hand, if the clitic is a syntactic phrase, it does not take part in Lowering, and simply ‘leans onto’ the complex head that results from Lowering, as an enclitic, without being part of it. This results in a Neg-Verb-**cl** word order.

With respect to the stress properties of these contexts, our analysis predicts that stress should target the clitic in Neg-**cl**-Verb word orders. This is because the clitic here is part of the complex head Neg-T+Agr-**cl**-V-v. Following the first step of our algorithm in (9a), the left parenthesis is inserted to the right of T, and the clitic becomes the leftmost element in the resulting foot. After the application of (9c), it is expected to bear stress: T (ć. . . . This prediction is borne out, according to our Udmurt consultants, as shown in (24). On the other hand, we predict that phrasal clitics should not be taken into account with respect to stress placement, since they are not part of the complex head built by Lowering but simply encliticize to it. This is the case in Neg-Verb-**cl** orders. Here, we predict that the clitic will not interfere with stress assignment, which will proceed as outlined for negated verbs in Section 3.3. This prediction, according to our consultants, is also borne out, as illustrated in (25).

- | | | | | | | |
|------|-------------------------------|---------------------|------|-------------------------------|------------------|----|
| (24) | e-z | ná valale | (25) | e-z | válale | na |
| | NEG.PST-3 | CL understand.CN.PL | | NEG.PST-3 | understand.CN.PL | CL |
| | ‘they haven’t understood yet’ | | | ‘they haven’t understood yet’ | | |

Georgieva et al. (2021) propose that clitics in indicative contexts also optionally project; thus, both structures (clitics as heads or phrases) are possible with indicatives, too. They argue that the two derivations yield the same result in terms of linearization: V-**cl**. With respect to stress, we observe that, according to the native speakers’ intuitions, indicative clusters with clitics are stressed on the final syllable of the verb, as in (26). This suggests that the clitic is a phrase and is not part of the complex head, on a par with (25). Our proposal can correctly derive this stress pattern with the application of (9).³

- | | | |
|------|---------------------------|----|
| (26) | valaló | ní |
| | understand.PRS.3PL | CL |
| | ‘they already understand’ | |

Another piece of evidence that supports our analysis comes from dialectal facts. In contrast with standard Udmurt, certain Northern and Southern dialects display a different stress placement pattern in indicative verbs (Kelmakov 1998, Karpova 2005): here, the (syllabic) exponents of agreement morphology are not stressed, yielding penultimate stress placement. This is shown in (27b), alongside standard Udmurt in (27a).

³The morphosyntactic account of Georgieva et al. (2021) states that clitics might also be heads in indicative contexts and, as such, undergo Lowering, like in negated contexts. Based on this, we might expect an alternative stress pattern in indicative verbs with clitics to be possible, with stress targeting the clitic as the final element in the complex head. However, according to our consultants, only the stress pattern in (26) is possible. This issue, therefore, requires further research.

- (27) a. vetl-o-zǐ b. vetl-ó-zǐ
 go-FUT-3PL go-FUT-3PL
 ‘they will go’ [standard] ‘they will go’ [Northern/Southern dialects]

To account for these facts, we suggest that agreement markers in these dialects are clitics (cf. Georgieva 2017). The agreement markers in question show up on verbs, (pos-
 sessed) noun phrases, converbs, postpositions and pronouns; this wide distribution is char-
 acteristic of clitics, which are typically less selective with respect to their host than suffixal
 verbal agreement (see Zwicky and Pullum 1983). For the purposes of the present analysis,
 taking the agreement markers to be clitics means that they are not part of complex head
 formed by Lowering, and accordingly, are not available for carrying stress – in a paral-
 lel fashion to the aspectual clitics in Neg-Verb-**cl** and Verb-**cl** contexts discussed above.
 Therefore, in cases like (27b), after (9a) applies and a left parenthesis is inserted, the lack
 of stressable material to the right of the parenthesis triggers the application of (9b), which
 results in (T... Finally, the application of (9c) results in stress targeting T, as in (27b),
 similarly to (12).

These Udmurt facts are reminiscent of those of Turkish, where two sets of agreement
 markers exist: the so-called *k*- and *z*-paradigms. The *k*-paradigm suffixes bear stress (if they
 are syllabic) and give rise to final stress in verbs (28a). In contrast, the *z*-paradigm suffixes
 are not stressed and have been analyzed as clitics that attach to a null present tense copula
 (Kornfilt 1996; for an alternative analysis see Güneş 2021). This is illustrated in (28b).

- (28) a. gi-ti-níz b. git-mış-Ø-siniz
 come-PST-2PL come-PRF-COP-2PL
 ‘you have come’ ‘you have come (reportedly)’ [Turkish, Kornfilt 1996]

To recap, the conclusion that the complex heads formed by Lowering correspond to the
 domains of stress assignment in Udmurt is further supported by the clitic facts, both from
 standard Udmurt and dialects.

5. Conclusion

In this paper, we propose that stress assignment in three different types of verbs in Udmurt
 (indicatives, stressed on the final syllable, and negated verbs and imperatives, stressed on
 the initial syllable) is determined by their morphosyntactic structure, and offer an account
 of these facts within the Distributed Morphology framework. Specifically, we claim that
 the position of T, a non-cyclic/non-categorizing head, determines stress placement in Ud-
 murt. Our analysis, therefore, provides evidence in favour of approaches that allow for
 non-cyclic/non-categorizing heads to determine stress placement, in line with e.g., Ultra-
 Massuet and Arregi’s (2005) analysis of Spanish verbs. The Udmurt facts also show that
 approaches that only allow for stress placement to be determined by cyclic/categorizing
 heads are too restrictive. Furthermore, the analysis proposed here also makes correct pre-
 dictions for stress placement in contexts that contain clitics.

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Borise & Georgieva

borise@alumni.harvard.edu, ekaterina.georgieva@nytud.hu