Research Article

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# Verb placement and accentuation: Does prosody constrain the Estonian V2?

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**Abstract:** The paper contributes to the understanding of the variation in finite verb placement in Estonian, a verb-second language, by establishing two descriptive facts. First, it identifies a previously undescribed finite verb position in Estonian declarative main clauses, which will be referred to as 'clause-medial'. The clause-medial position is located between clause-medial sentence adverbials on the one hand, and VP adverbials and the complements of the verb on the other hand. Secondly, the paper reports two empirical studies providing evidence in support of the hypothesis that the occurrence of a finite verb in the proposed clause-medial position, as opposed to its occurrence in the second position, correlates with its accentuation. While clause-medial verbs tend to bear a nuclear pitch accent, second-position verbs don't. Finally, the paper briefly discusses some broader implications of the existence of the clause-medial finite verb position and of the interaction between verb placement and prosody.

**Keywords:** Estonian; Finite verb; Word order; V2; Nuclear pitch accent

## 1 Introduction

The paper aims to establish two descriptive facts concerning the position of the finite verb in Estonian declarative main clauses, which is generally described as the second position (V2) (e.g. Tael 1988, Lindström 2017). First, it will identify an additional finite verb position that has previously not been explicitly mentioned in the literature and that constitutes an exception to the verb-second property; it will be referred to as the 'clause-medial' position. Secondly, the paper will present two empirical studies that demonstrate a link between verb placement and prosody. More specifically, the studies provide evidence in support of the hypothesis that the occurrence of the verb in the proposed clause-medial position, as opposed to its occurrence in the second position, correlates with its accentuation: second-position verbs do not tend to bear a nuclear pitch accent, while clause-medial verbs do. Acknowledging a relationship between verb placement and prosody will contribute to the understanding of the variation in finite verb placement in Estonian, as well as of the nature of the V2 phenomenon and the syntax-phonology relationship in general.

The paper is structured as follows. Section 2 reviews the descriptions of finite verb placement in Estonian declarative main clauses and introduces the clause-medial position. Section 3 presents the sentence accent assignment model assumed in the study, and the implications and assumptions for verb accentuation. Section 4 presents the hypothesis that the placement of the verb in the second vs. medial position correlates with its accentuation. Sections 5 and 6 describe two empirical studies that aim to test the hypothesis: a written corpus study and a spoken production study. Section 7 discusses the results and further perspectives, and Section 8 presents the conclusions.

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# 2 Finite verb positions in Estonian declarative main clauses

This section starts with an overview of the finite verb positions described in the literature (Section 2.1), and proceeds with a characterisation of the proposed clause-medial finite verb position (Section 2.2).

## 2.1 The finite verb positions described in the literature

Estonian declarative main clauses[1] are generally recognised as being verb-second (e.g. Tael 1988, Lindström 2017). This means that the finite verb tends to be preceded by exactly one syntactic constituent, as evidenced by the fact that when a non-subject constituent appears at the beginning of a clause the usually clause-initial subject, cf. (1a), tends to appear post-verbally, cf. (1b).

(1) a. Mari **küpseta-b** iga-l pühapäeva-l kooki.
Mary.NOM bake-3SG every-ADE Sunday-ADE cake.PAR
'Mary bakes a cake every Sunday.'

b. Iga-l pühapäeva-l **küpseta-b** Mari kooki.
every-ADE Sunday-ADE bake-3SG Mary.NOM cake.PAR
'Every Sunday, Mary bakes a cake.'

However, literature describes three **exceptions to V2**. Interestingly, all of these have been associated with a prosodic motivation. The first can be described as **'verb-third' (V3)** and has been associated primarily with spoken language and with the prosodic properties of the subject. More specifically, the fronting of a non-subject constituent to the beginning of a clause need not induce the inversion of the order of the subject and the verb if the subject is a weak pronoun with a given referent, as in (2) (Tael 1988, Lindström 2002).

(2) Täna ma **tõus-i-n** juba kell viis. (Lindström 2017:554)
today 1SG.NOM get.up-PST-1SG already clock.NOM five.NOM
'Today I got up already at five o'clock.'

The second exception is the **clause-final** position, which has been associated with the accentuation (Remmel 1963) or focusing (Tael 1988, Lindström 2017) of the verb; see example (3).

(3) Viienda-l aasta-l asi **pööra-s**. (Lindström 2017:554)
fifth-ADE year-ADE thing.NOM turn-PST.3SG
'On the fifth year things changed.'

The third exception described in the literature is the **clause-initial (V1)** position, which has been associated with (i) an emphatic accentuation and (contrastive) focusing of the verb, illustrated in (4a), and (ii) narration, illustrated in (4b) (Lindström 2017).

(4) a. **Sõltu-b** ju tükitöötasu otseselt teh-tav-a töö
depend-3SG indeed piecework.remuneration.NOM directly do-IMPERS.PTCP-GEN work.GEN
hulga-st. (Lindström 2017:555)
quantity-ELA
'Indeed the remuneration of piecework directly depends on the amount of work that will be done.'

1 For finite verb placement in subordinate clauses and non-declarative main clauses, as well as for the placement of non-finite verbs, see Lindström (2017).

b. **Lähe-n** mina hommiku-l kanu sööt-ma (Lindström 2017:557)
go-1SG 1SG.NOM morning-ADE chicken.PAR.PL feed-INF
'So there I go one morning to feed the chicken...'

## 2.2 The 'clause-medial position'

We propose to identify a fourth exception to the V2 property of Estonian declarative main clauses: a 'clause-medial' finite verb position. Similarly to the clause-final position, Remmel (1963) associates the position with the accentuation of the verb: "An accented main clause predicate occurs generally at the end of the clause, or at least later than its usual position" (Remmel 1963:321).[2] If we assume that the 'usual position' referred to in the citation is the second position, Remmel should mean a position that is linearly later than the second position but not completely final. We suggest that this can be identified as a position that follows clause-medial (i.e. non-fronted) sentence adverbials (e.g., *tavaliselt* 'usually'), but precedes any VP adverbials or complements of the verb, as in (5b). This position stands in contrast with the second position, which precedes sentence adverbials, as in (5a). The clause-medial position also contrasts with the clause-final position, where the finite verb follows any verb complements or VP adverbials, as in (5c).

(5) a. V2 (verb-adverbial):
Filmimine **kesta-b** **tavaliselt** umbes nädala. (etTenTen13)
shooting.NOM last-3SG usually about week.ACC
'The shooting period usually lasts for about a week.'

b. Clause-medial (adverbial-verb, verb-complement):
Politseinik **tavaliselt** **esitle-b** **ennast**. (etTenTen13)
police.officer.NOM usually introduce-3SG self.PAR
'A police officer usually introduces himself/herself.'

c. Clause-final (complement-verb):
Tavaliselt ta **ennast** **ei** **esitle**. (Internet)
usually 3SG.NOM self.PAR NEG introduce.CNG
'Usually he/she does not introduce himself/herself.'

Declarative main clauses with a clause-medial finite verb are further characterised by the fact that, unlike V2 and V3 clauses, they are not restricted in terms of the number and prosodic weight of the constituents that precede the finite verb. When a finite verb occurs in the clause-medial position, it may be preceded both by a fronted non-subject constituent and a subject, which need not be pronominal. Examples (6a)-(6c) present three examples (from etTenTen13), where the finite verb is preceded by a fronted adverbial, a non-pronominal subject, and one or more non-fronted sentence adverbials, and followed by a VP adverbial or a direct object.

(6) a. Tema hinnangu-l EVP hind lähiaja-l ilmselt **tõuse-b** pisut.
3SG.GEN estimate-ADE EVP.GEN price.NOM near.future-ADE probably rise-3SG a.little
'According to his estimates the price of the EVP will soon probably rise a little.'

b. Pingelise-s situatsiooni-s inimene tavaliselt **mobiliseeri-b** ennast.
tense-INE situation-INE person.NOM usually mobilise-3SG self.PAR
'In a critical situation a person usually pulls himself together.'

2 English translation by Heete Sahkai and Anne Tamm.

c. Ligi sõn-u-l valitsusliit ilmselt **aruta-b** Koonderakonna pakkumist.
L.GEN word-PL-ADE coalition.NOM probably discuss-3SG K.GEN offer.PAR
'According to Ligi the coalition will probably discuss the Koonderakond's offer.'

The constructed examples in (7a)-(7e) summarise the possible finite verb positions in Estonian declarative main clauses and their suggested motivations.

(7) a. **V2**: the 'default'
Pühapäeviti **küpseta-n** ma tavaliselt kooki.
on.Sundays bake-1SG 1SG usually cake.PAR
'On Sundays I usually bake a cake.'

b. **V3**: weak pronominal subject with a given referent
Pühapäeviti ma **küpseta-n** tavaliselt kooki.
on.Sundays 1SG bake-1SG usually cake.PAR
'On Sundays I usually bake a cake.'

c. **Clause-final**: accented or focused verb
Pühapäeviti ma tavaliselt kooki **ei** **küpseta.**
on.Sundays 1SG usually cake.PAR NEG bake.CNG
'On Sundays I usually do not bake a cake.'

d. **V1**: emphatically accented and (contrastively) focused verb or narration
i. emphatically accented and (contrastively) focused verb
**Ei** **küpseta** mina pühapäeva-l kooki.
NEG bake.CNG 1SG.NOM Sunday-ADE cake.PAR
'I will not bake a cake on a Sunday!'
ii. narration
**Küpseta-n** mina ühe-l pühapäeva-l kooki, kui...
bake-1SG 1SG one-ADE Sunday-ADE cake.PAR when
'So there I am, baking a cake one Sunday, when...'

e. **Clause-medial**: accented verb (as this paper will hypothesise)
Pühapäeviti ma tavaliselt **küpseta-n** midagi.
on.Sundays 1SG.NOM usually bake-1SG something.PAR
'On Sundays I usually bake something.'

In summary, all the exceptions to V2 have in some way been associated with prosody in previous literature: either the prosodic weakness of the subject, or the accentuation of the verb. However, the same exceptions have been attributed to information structure, in particular, givenness (of the subject) and focus (on the verb) (Tael 1988, Lindström 2002, 2017). The goal of the present study is to give substance to the intuition that it is the accentuation of the finite verb, rather than its information structural status, that determines its occurrence in the second or clause-medial position. This will be achieved by a systematic comparison of verb-second and verb-medial clauses. Simultaneously, this will permit to get a clearer picture of the newly proposed clause-medial finite verb position. In the present study, a second-position finite verb will be operationalised as a finite verb that precedes a non-fronted sentence adverbial. A clause-medial finite verb, in turn, will be operationalised as a finite verb that follows a non-fronted sentence adverbial and does not follow any verb complements or VP adverbials. Before formulating a concrete hypothesis on the relationship between the placement and the accentuation of the verb (Section 4), we will give an overview of our assumptions and earlier findings concerning sentence accent assignment and verb accentuation in Estonian (Section 3).

# 3 Sentence accent placement in Estonian

This section first presents our general assumptions concerning the sentence accent placement in Estonian (Section 3.1), and then details the conditions of the nuclear accentuation of a finite verb (Section 3.2).

## 3.1 General assumptions

We assume the sentence accent assignment model proposed by Féry (2011) for German, because it includes the notion of adjunct subordination, which is relevant for Estonian, as explained below. Féry's model is cast in optimality theoretic terms. Below, we summarise the basic aspects of the model that are relevant to the present study.

According to the model, accent assignment is defined in terms of prosodic phrases. The model posits two levels of prosodic phrases: the lower level is termed 'p-phrase' and the higher 'i-phrase'. The prosodic phrases, in turn, are determined by syntactic structure. A grammatical **sentence** is parsed exhaustively into i-phrases. A **clause** generally corresponds to an i-phrase. An i-phrase may contain p-phrases, but it need not be exhaustively parsed into p-phrases. Every syntactic **maximal projection** that includes at least a prosodic word is contained in its own prosodic domain (a p-phrase or an i-phrase). I-phrases and p-phrases are recursive. For example, a clause may correspond to an i-phrase containing the topical subject and a second i-phrase containing the VP, both contained in a larger i-phrase, as illustrated in (8a). Likewise, a p-phrase may be embedded into a larger one, for example, the p-phrase of an argument is usually embedded into the p-phrase of the VP; this is illustrated in (8b).

(8) German (based on Féry 2011)

a. $[[\text{MARIA}]_{i}$ [hat [ein $\text{BUCH}]_{P1}$ gekauft$]_{i}]_{i}$.
Maria has a book bought

b. $[[\text{MARIA}]_{P1}$ [hat [ein $\text{BUCH}]_{P2}$ gekauft$]_{P1}]_{i}$.
Maria has a book bought
'Maria has bought a book.'

The prosodic structure of a sentence determines its accentuation. Every p-phrase and i-phrase has a head, realised by a pitch accent. If a p-phrase is embedded into a larger one, they share their head: for example, in (8b), the pitch accent on the word *Buch* 'book' serves as the head of the p-phrase corresponding to the argument (P2) as well as of the p-phrase corresponding to the VP (P1). At the i-phrase level, the strongest stress is assigned to the rightmost constituent of an i-phrase, i.e., the right boundary of every i-phrase is aligned with its head. The pitch accent realising the head of an i-phrase is the nuclear accent.

The model includes an (optional) constraint called AdjunctSubordination: the p-phrase of an adjunct is subordinate to the p-phrase of an argument-predicate complex. The effect of the constraint is illustrated in sentence (9).

(9) German (based on Féry 2011)

... $[[\text{dass}$ ein $\text{JUNGE}]_{i}$ $[[\text{eine}$ $\text{GEIGE}]_{P1}$ [im $\text{Supermarkt}]_{P2}$ $\text{kaufte}]_{i}]_{i}$.
that a boy a violin in-the supermarket bought
'that a boy bought a violin in the supermarket'

In (9), the p-phrase formed by the adjunct (*im Supermarkt*) is prosodically subordinate to the phrase of the argument-predicate complex (*eine Geige kaufte*) and, because of its postnuclear status, its accent is deleted by the constraint PostnuclearDeaccenting. Fig. 1 illustrates the same phenomenon for Estonian. The figure represents the sentence in (10), produced in a broad focus context. The adjunct (*hoovi* 'into the courtyard') occurs between the verb (*kandnud* 'carried') and its argument (*laua* 'table'). Both the verb and

the adjunct are deaccented, while the argument receives the accent that heads the entire integrated phrase (as well as the i-phrase corresponding to the entire clause).

(10) Naabri-d on laua hoovi kand-nud.
neighbour-NOM.PL be.3PL table.ACC courtyard.ILL carry-PST.PTCP
'The neighbours have carried a table into the courtyard.'

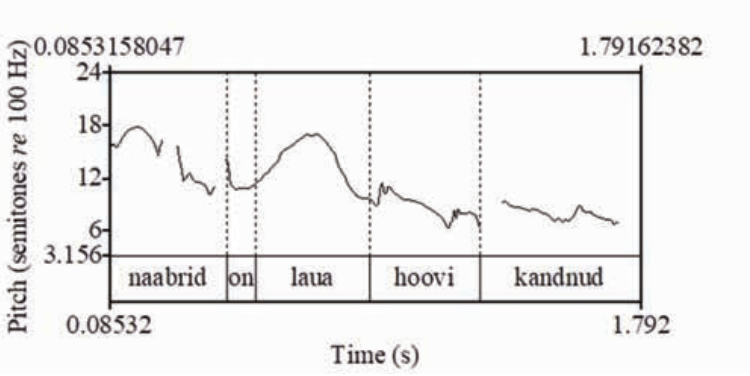


**Figure 1:** The pitch contour of the sentence in (10), produced in a broad focus context (from Sahkai and Veismann 2015)

The constraint AdjunctSubordination also permits to describe a difference between Estonian and German. While in German the p-phrase of an adjunct is prosodically subordinate to an argument-predicate complex, in Estonian it is also subordinate to the prosodic phrase of a VP that does not include an argument, as shown in Fig. 2. The figure represents the sentence in (11), produced in a broad focus context. Both the verb *maalib* 'paints' (the single constituent of the VP) and the adjunct *ateljees* 'in the studio' represent maximal projections, which correspond to separate prosodic domains. However, only the verb receives an accent, and the adjunct is deaccented. The prosodic phrase of the adjunct can be interpreted as being integrated into and subordinate to the prosodic phrase of the VP, with its accent deleted. Consequently, while in German an adjunct is subordinate to a verb-argument complex, in Estonian it is also subordinate to a VP that does not contain an argument. To account for the Estonian situation, AdjunctSubordination could be reformulated in the following way: the p-phrase of an adjunct is subordinate to the prosodic phrase of a predicate(-argument complex).

(11) Linda maali-b ateljee-s.
Linda.NOM paint-3SG studio-INE
'Linda is painting in the studio.'

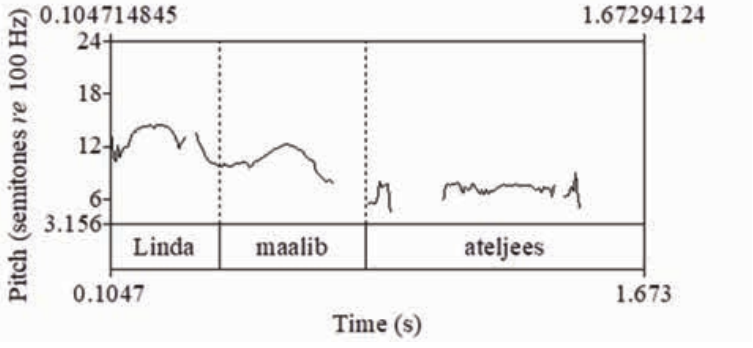


**Figure 2:** The pitch contour of the sentence in (11), produced in a broad focus context (from Sahkai and Veismann 2015)

According to the model, information structure affects accent strength, but not necessarily prosodic phrasing. Narrow focus receives the nuclear accent, accompanied by postnuclear deaccentuation; given material is less prominent than new material.

## 3.2 Implications for verb accentuation in Estonian

With respect to the finite verb, the model implies that it does not correspond to a prosodic phrase and consequently does not receive its own accent, because it is a head and not a maximal projection. It is the entire VP that corresponds to a prosodic phrase. The latter may include an embedded p-phrase corresponding to an argument. In this case, the pitch accent that heads the phrase of the argument is also the head of the prosodic phrase corresponding to the entire VP. This is illustrated in Fig. 3, which represents the sentence in (12). The VP *maalis laeva* receives a single pitch accent located on the argument *laeva* (and serving also as the nuclear accent of the i-phrase), the verb *maalis* is deaccented.

(12) Triinu maali-s laeva.
Triinu.NOM paint-PST.3SG ship.ACC
'Triinu painted a ship.'

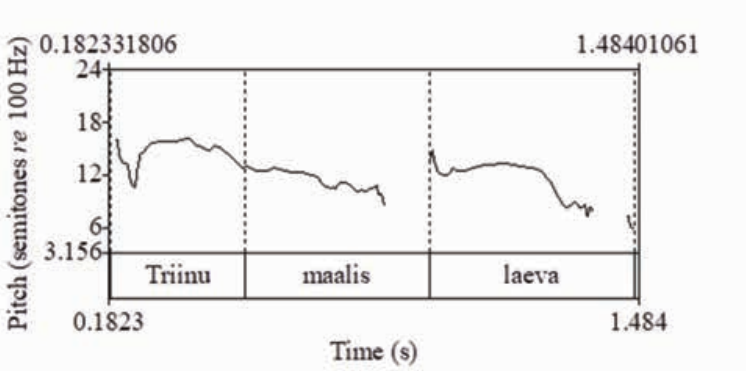


**Figure 3:** The pitch contour of the sentence in (12), produced in a broad focus context (from Sahkai and Veismann 2015)

However, the verb may be accented if it is narrowly focused, or if it is the only prosodic word in its prosodic phrase. The finite verb is the only prosodic word in its prosodic phrase in the following situations:

(a) The VP consists only of an intransitive verb and is phrased into a separate i-phrase from the subject, as illustrated in (13).

(13) German (based on Féry 2011)
[[weil MARIA$_{TOP}$]$_i$ [GETANZT hat]$_i$]$_i$.
because Maria danced has
'because Maria danced.'

(b) The argument does not constitute a prosodic word, as in (14), where the entire VP constitutes a single prosodic word (PW).

(14) German (based on Féry 2011)
[[MARIA]$_i$ [hat es GEKAUFT$_{PW}$]$_i$]$_i$.
Maria has it bought
'Maria bought it.'

When the verb is narrowly focused or when its accent is the rightmost of its i-phrase, the verb receives the nuclear accent, i.e., it constitutes the head of the i-phrase.

The finite verb cannot receive an accent when it does not constitute a prosodic word, e.g. when it is an auxiliary (except when the auxiliary is an exponent of narrow focus on a category like tense, aspect, mood, or polarity).

If the accented verb is a complex predicate, the accent can be assumed to fall on the non-finite component, as indicated in (15a). An exception is again constituted by a polarity or TAM focus, which in Estonian is expressed on the finite verb, as in (15b).

(15) a. Focus on a VP consisting of a single lexical verb, the particle verb *ära minema* 'go away': accent on the particle
(Kus Mari on? 'Where is Mary?')
Mari läks ÄRA.
M.NOM go.PST.3SG away
'Mary went away.'

b. Focus on tense: accent on the finite verb
(Kas Mari läheb ära? 'Will Mary go away?')
Mari (juba) LÄKS ära.
M.NOM (already) go.PST.3SG away
'Mary (already) did go away.'

In summary, a finite verb receives an accent when it is a simplex predicate that is in focus without an accentable (i.e. non-pronominal) argument. This accent is the nuclear accent when it is the rightmost accent of an i-phrase. This assumption will serve as the basis for the annotation of data in the study presented in Section 5.

## 4 Verb position and nuclear accent placement: the hypothesis

In order to pin down and to test the intuition that the second and clause-medial verb position are associated with a difference in the accentuation of the verb, we formulate the hypothesis in (16).

(16) A second-position verb tends to be deaccented or to bear a pre-nuclear accent, whereas a clause-medial verb tends to bear a nuclear accent.

The accentuation of a transitive verb serves as a suitable illustration. Consider a focused VP containing a full NP argument. This VP is assumed to correspond to an integrated prosodic phrase headed by the pitch accent on the argument. The pitch accent on the argument also constitutes the nuclear accent of the i-phrase corresponding to the entire clause (cf. Fig. 3 above). Thus, the nuclear accent is not on the verb but on the argument. The verb, if finite, is predicted to occur in the second position by virtue of the argument receiving the nuclear accent, as in (17a). For a contrast, consider a focused VP containing a pronominal argument instead of a full NP. Now it is the verb that is accented, because pronouns, including indefinite pronouns, do not constitute prosodic words and tend to be deaccented; cf. Ladd (2008:236-7) on the deaccentuation of indefinite pronouns. Consequently, the verb is predicted to occur in the clause-medial position, as in (17b).

(17) (Mida sa nädalavahetustel teed? 'What do you do on week-ends?')
a. V2: nuclear accent on the argument

| | | | | |
|---|---|---|---|---|
| Pühapäeviti | **küpseta-n** | ma | tavaliselt | KOOKI. |
| on.Sundays | bake-1SG | 1SG.NOM | usually | cake.PAR |

'On Sundays I usually bake a cake.'

b. Clause-medial: nuclear accent on the verb

| | | | | |
|---|---|---|---|---|
| Pühapäeviti | ma | **tavaliselt** | **KÜPSETA-N** | midagi. |
| on.Sundays | 1SG.NOM | usually | bake-1SG | something.PAR |

'On Sundays I usually bake something.'

The hypothesis implies that, concomitantly, the patterns in (18) are less preferred:

(18) a. V2 with a nuclear-accented verb

| | | | | |
|---|---|---|---|---|
| Pühapäeviti | **KÜPSETA-N** | ma | **tavaliselt** | midagi. |
| on.Sundays | bake-1SG | 1SG.NOM | usually | something.PAR |

b. verb-medial clause with a non-nuclear accented verb

| | | | | |
|---|---|---|---|---|
| Pühapäeviti | ma | **tavaliselt** | **küpseta-n** | KOOKI. |
| on.Sundays | 1SG.NOM | usually | bake-1SG | cake.PAR |

In the following passages we answer some questions that the hypothesis could raise.

Firstly, why formulate the hypothesis in terms of nuclear pitch accent vs. prenuclear pitch accent/deaccentuation, rather than for instance in terms of accentuation vs. deaccentuation? Earlier descriptions suggest different possible formulations: Remmel (1963) considers the second position to disprefer any kind of accentuation, while Tael (1988) and Lindström (2017) consider it to disprefer only emphatic nuclear accents signalling narrow focus. We formulate the hypothesis in terms of the nuclear pitch accent for the sake of concreteness and testability: nuclear accents are easier to identify than deaccentuation, prenuclear accents or emphatic nuclear accents.[3]

Secondly, why not reduce the hypothesis to a formulation in terms of information structure, in particular, focus? The hypothesis that a clause-medial verb will bear a nuclear accent automatically amounts to the hypothesis that it will be part of focus (or at least the exponent of focus, in case of polarity or TAM focus). However, the hypothesis that a second-position verb will not bear a nuclear accent does not amount to the hypothesis that it will not be part of focus: for instance, it can be in focus together with a lexical argument (in which case the argument receives the nuclear accent), or it can be the finite component of a narrowly focused complex predicate (in which case the nuclear accent falls on the non-finite element). Consequently, a difference in accentuation cannot be reduced to a difference in information structure.

Thirdly, could the hypothesis be reduced to a formulation in terms of syntax, for instance, transitivity, given that the accentuation of a verb depends on the presence of an argument? The prediction that a clause-medial verb will bear a nuclear accent amounts to predicting that it will be in focus without an accentable argument. However, this does not imply that it does not have a syntactic argument. A clause-medial verb can be a transitive verb whose argument is given or pronominal, or fronted as a contrastive topic and hence not part of focus. Likewise, predicting that a second position verb will not bear a nuclear accent does not imply the prediction that it will have an argument. For instance, the verb can be the finite component of an intransitive particle verb, or an intransitive verb in a sentence with a narrowly focused adjunct. Consequently, a difference in accentuation cannot be reduced to a difference in transitivity.

In sum, these three considerations indicate that while nuclear accent placement is influenced both by syntax and information structure, it cannot be completely reduced to either of them.

Yet a fourth question may arise: why hypothesise that verb placement correlates with accentuation rather than with focus or transitivity? A hypothesis in terms of accentuation is suggested in previous literature as well as by our own preliminary observations. We illustrate the grounds for preferring the accentuation account with minimal pairs that differ in verb placement and accentuation, but not in terms of syntax or information structure. For instance, examples (19a) and (19b) (found in the web) illustrate a V2

3 Nuclear accents are easier to identify because they constitute a phonological category, unlike emphasis, and because they are defined positionally, unlike deaccentuation and pre-nuclear accentuation.

sentence and a verb-medial sentence respectively that can be interpreted as identical in terms of syntax and focus structure but different in accentuation.

(19) a. V2

| | | | | | | |
|---|---|---|---|---|---|---|
| Lootuse | Festival | **tutvusta-b** | tavaliselt | erineva-s | stiili-s | muusikat. |
| hope.GEN | festival.NOM | present-3SG | usually | different-INE | style-INE | music.PAR |

'The Hope Festival usually presents different music styles.'

b. Clause-medial

| | | | |
|---|---|---|---|
| Uurija | tavaliselt | **tutvusta-b** | end. |
| detective.NOM | usually | introduce-3SG | self.PAR |

'A detective usually introduces himself.'

More specifically, examples (19a) and (19b) form a minimal pair that consists of the same verb and its argument. Information structurally, both sentences are compatible with an interpretation in terms of VP focus. For instance, example (19a) could be an answer to a question like 'Tell me about the Festival of Hope', and example (19b) to a question like 'How do I recognise a detective?' or 'How does a detective proceed?'. Prosodically, however, example (19a) would be expected to be pronounced with a nuclear accent on the object, whereas in example (19b) the nuclear accent can only fall on the verb, since the object is a weak pronoun.

The superiority of the accentuation account can be illustrated with the constructed examples in (17a)-(17b) above as well. Both sentences can be produced as VP-focus answers to the question 'What do you do on week-ends?' and thus have identical information structure. The two sentences also do not differ syntactically, since both are headed by the same verb complemented by a direct object. However, the sentences are predicted to differ in the accentuation of the finite verb because of the different accentability of lexical nouns and pronouns. The sentences thus differ in verb placement and accentuation, but not in terms of syntax or information structure.

The next two sections describe two empirical studies, (a) a written corpus study and (b) a spoken production study. The studies aim at testing the hypothesis that the occurrence of the verb in second versus clause-medial position correlates with nuclear accent placement.

# 5 The corpus study

This section presents a corpus study that had two goals. The first goal was to explore the previously undescribed verb-medial declarative main clauses in comparison with V2-clauses, relying on the diagnostic of the respective placement of the finite verb and a clause-medial sentence adverbial. The study was therefore conducted on a large written corpus, which permitted to extract a sufficiently large dataset. The second goal was to test the hypothesis that the second versus medial position of the verb correlates with the absence vs. presence of a nuclear accent on the verb. This was accomplished by predicting the placement of the nuclear accent on the basis of the assumptions presented in Section 3. The following sections present our data (Section 5.1), the hypothesis and the method (Section 5.2), and the results (Section 5.3).

## 5.1 Data

The data come from the corpus Estonian Web 2013 (etTenTen13, size 330,045,196 tokens), via the Sketch Engine corpus query interface (https://www.sketchengine.eu/). The data were extracted by querying for adverb-verb and verb-adverb sequences composed of the adverbs *ilmselt* 'probably', *tavaliselt* 'usually' and *juba* 'already', and a 3rd person (affirmative indicative present tense) verb form. A dataset was compiled with each order by manually retaining complete declarative main clauses, where the adverb was not

**Table 1:** The composition of the dataset (the numbers in parentheses reflect the total number of results returned by each query)

| | Verb-adverb (V2) | Adverb-verb (clause-medial) | Total |
|---|---|---|---|
| ***Ilmselt* 'probably'** | 300 (10,073 hits) | 300 (4014 hits) | 600 |
| ***Tavaliselt* 'usually'** | 95 (4798 hits) | 95 (2434 hits) | 190 |
| ***Juba* 'already'** | 300 (55,204 hits) | 300 (4740 hits) | 600 |
| Total | 695 | 695 | 1390 |

fronted and functioned as a sentence adverbial. We excluded clearly verb-final clauses (where the verb was preceded by a complement or a VP adverbial) from the verb-medial dataset but kept the ambiguous clauses where the verb was clause-final, but there were no complements or VP adverbials. We chose to include the ambiguous cases because the accentuation of a verb is often predicted to result precisely from the absence or fronting of an argument. Clauses with a nuclear accented finite verb are therefore expected often to be ambiguous between the verb-medial and verb-final order. Furthermore, the ambiguous sentences do not hinder the testing of the hypothesis that verb placement correlates with the accentuation of the verb. Both clause-medial and clause-final finite verbs are hypothesised to be accented. In contrast, second position verbs are hypothesised to correlate with the absence of a nuclear accent on the verb. As for the goal of exploring the newly-proposed clause-final finite verb position, this will be done by examining the number of the unambiguous sentences where the finite verb precedes an existing verb complement or VP adverbial. In the description of the study, we will nevertheless maintain the two-way categorization of the data into verb-adverb and adverb-verb sentences. Adverb-verb sentences subsume the unambiguous verb-medial sentences and the ambiguous sentences.

In the sentences of the data, the verb is often the third word. However, these sentences differ from the order that we termed V3 or verb-third in Section 2. We assume V3 clauses to differ from V2 clauses only in terms of the respective order of the subject and the verb in clauses with a fronted constituent, but not with respect to the respective placement of the verb and sentence adverbials. Also, as explained in Section 2.2, V3 clauses, unlike verb-medial clauses, are constrained in terms of the number and prosodic weight of the constituents that precede the verb.

The resulting datasets consisted of the following subsets: the first 300 instances that met the criteria for the adverbs *ilmselt* and *juba*, all 95 verb-medial instances and the first 95 V2 instances that met the criteria for the adverb *tavaliselt*. The datasets are described in Table 1.

## 5.2 Hypothesis and method

The method consisted in predicting for every sentence in the data whether the nuclear accent would fall on the finite verb or not, given the assumptions presented in Section 3. The assumptions can be summarised in the formula in (20).

(20) The finite verb receives a nuclear accent when it is a simplex predicate that is in focus without an accentable argument.

More specifically, the finite verb receives a nuclear accent under the following conditions: (a) the verb must be in focus, because the nuclear accent must fall in the focus domain; (b) it must be a simplex predicate, because a complex predicate would be accented on the non-finite component; and (c) it cannot be in focus

together with an accentable (non-pronominal) argument, because in this case the argument would receive the nuclear accent.

We hypothesised that the verbs in the V2 dataset would be predicted not to receive a nuclear accent, while the verbs in the verb-medial dataset would be predicted to receive one.

In order to predict whether the finite verb receives a nuclear accent, we applied a seven-step decision procedure to each sentence.

Step 1. Is the finite verb marked with the focusing clitic *-ki/-gi*?

If yes, it was judged as being explicitly marked as (the exponent of) narrow focus and hence receiving a nuclear accent. The *-ki/-gi*-marked verbs are illustrated in example (21): in example (21a), a *-ki/-gi*-marked verb occurs in the clause-medial position (following the adverb) and in example (21b) in the second position (preceding the adverb). In both cases the verb was judged as receiving a nuclear accent.

(21) a. adverb-verb

| | | | | |
|---|---|---|---|---|
| See | ilmselt | **on=gi** | edu | alus. |
| this.NOM | probably | be.3SG=FOC | success.GEN | basis.NOM |

'This is probably what success is based on.'

b. verb-adverb

| | | | | | |
|---|---|---|---|---|---|
| Euroopa | Liidu-s | **hakka-b=ki** | ilmselt | nii | ole-ma. |
| Europe.GEN | union-INE | start-3SG=FOC | probably | so | be-INF |

'This is probably how it will be in the European Union.'

If the verb was not marked with *-ki/-gi*, we proceeded to Step 2.

Step 2. Is the verb the finite element of a complex predicate, such as a particle verb or an auxiliary construction?

If yes, it was judged as not receiving the nuclear accent, since a potential nuclear accent on a complex predicate was assumed to fall on the non-finite element. We did not attempt to judge from the context whether the verb could be an exponent of polarity or TAM focus, in which case the accent would fall on the finite verb. Example (22a) illustrates a sentence with a particle verb, where the finite verb is clause-medial. Example (22b) illustrates an auxiliary verb in the second position. In both cases the finite verb was assumed not to receive a nuclear accent.

(22) a. adverb-verb

| | | | | | | |
|---|---|---|---|---|---|---|
| Tallinn | ilmselt | **võta-b** | nüüd | ennast | **kokku** | . |
| Tallinn.NOM | probably | pull-3SG | now | itself.PAR | together | |

'Tallinn will probably pull itself together now.'

b. verb-adverb

| | | | | | | |
|---|---|---|---|---|---|---|
| Kahe | naabermaa | suhte-d | **on** | ilmselt | taas | |
| two.GEN | neighbouring.country.GEN | relationship-NOM.PL | be.3PL | probably | again | |
| **normaliseeru-nud**. | | | | | | |
| normalise-PST.PTCP | | | | | | |

'The relationship of the two neighbouring countries has probably normalised again.'

If the verb was not a complex predicate, we proceeded to Step 3.

Step 3. Is another constituent marked as narrow focus, either with the focusing clitic *-ki/-gi*, a focus particle, or word order as in the case of a clause-final subject?

If yes, the verb was judged as not receiving the nuclear accent, which would fall on the narrow focus. Example (23a) illustrates a verb-medial clause with a clause-final subject that is in the scope of the focus particle *ka* 'also'. Example (23b) illustrates a V2 clause with a clause-final subject. In both cases the verb was judged as not receiving a nuclear accent.

(23) a. adverb-verb

| | | | | |
|---|---|---|---|---|
| Seal | ilmselt | **peitu-b** | ka | vastus . |
| there | probably | lie-3SG | also | answer.NOM |

'This is probably where also the answer lies.'

b. verb-adverb

| | | | |
|---|---|---|---|
| Vastu | **hääleta-b** | ilmselt | Süüria. |
| against | vote-3SG | probably | Syria.NOM |

'Syria will probably vote against.'

If no other constituent was marked as narrow focus, we applied Step 4.

Step 4. Does the verb have an internal argument? We excluded unaccusative subject arguments.

If not, it was judged as receiving a nuclear accent.[4] Example (24a) illustrates a clause-medial and example (24b) a second-position intransitive verb. In both cases we judged the verb as receiving a nuclear accent.[5]

(24) a. adverb-verb

| | | |
|---|---|---|
| Valitsuskoalitsioon | ilmselt | **lagune-b.** |
| coalition.NOM | probably | disintegrate-3SG |

'The coalition will probably break up.'

b. verb-adverb

| | | | | | |
|---|---|---|---|---|---|
| Järgmine | graafiku | täiendamine | **toimu-b** | ilmselt | maikuu-s. |
| next.NOM | schedule.GEN | updating.NOM | take.place-3SG | probably | May-INE |

'The next update of the schedule will probably take place in May.'

If the verb had an internal argument, we applied Step 5.

Step 5. Is the argument fronted as a contrastive topic?[6]

If yes, the verb was judged as receiving the nuclear accent, because the argument is not part of focus. Examples (25a) and (25b) illustrate a clause-medial and a second position verb with a fronted complement, respectively.

(25) a. adverb-verb

| | | | |
|---|---|---|---|
| Nii | see | ilmselt | **on.** |
| so | it.NOM | probably | be.3SG |

'This is probably how it is.'

**4** It is well known that thetic intransitive clauses may receive a single accent on the subject. However, this has been found to obtain if the sentence only consists of a subject and a verb (see e.g. Ladd 2008:248). Since all the sentences in the data at least also contained an adverb, we assumed that this possibility was not available. Also, the subjects of the intransitive sentences in the data were usually topical, i.e. pronominal, marked with a demonstrative determiner or previously mentioned, i.e. the sentences were not thetic.

**5** Example (24b) could be interpreted as having narrow focus and hence a nuclear accent on the temporal adverbial; however, we avoided basing the judgments on our intuition and judged as narrow foci only the constituents that were explicitly marked as such (see Step 3).

**6** Fronting has been found to primarily signal contrastive topics, but not foci in Estonian, cf. Sahkai and Tamm 2018. Fronted constituents were therefore not analysed as narrow foci.

b. verb-adverb

| | | | | | | |
|---|---|---|---|---|---|---|
| Krediit-i | **saa-b** | tavaliselt | kolme-ks | kuni | kuue-ks | kuu-ks.[7] |
| credit-PAR | get-3SG | usually | three-TRA | to | six-TRA | month-TRA |

'One usually gets a loan for three to six months.'

If the argument was not fronted, we applied Step 6.

Step 6. Is the argument a clause with no resumptive element in the main clause? If a resumptive element was present, it was considered to receive the nuclear accent.

If yes, the verb was judged as receiving the nuclear accent. A clausal argument was predicted to constitute a separate i-phrase from the i-phrase including the verb, cf. e.g. Feldhausen 2011. Examples (26a) and (26b) illustrate the relevant situation for a verb-medial and a verb-second clause, respectively.

(26) a. adverb-verb

| | | | | |
|---|---|---|---|---|
| Lammers | ilmselt | **tea-b**, | mida | räägi-b. |
| Lammers.NOM | probably | know-3SG | what | say-3SG |

'Lammers probably knows what he's saying'

b. verb-adverb

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| see | **tähenda-b** | ilmselt, | et | partei | pea-b | end | laiali_saat-ma. |
| this.NOM | mean-3SG | probably | that | party.NOM | must-3SG | self.PAR | disband-INF |

'this probably means that the party must disband itself'

If the argument was not clausal, we applied Step 7.

Step 7. Is the argument a pronoun, marked with a demonstrative determiner, or mentioned in the previous context (and hence either unaccentable or not part of focus)?

If yes, the verb was judged as receiving the nuclear accent. Examples (27a) and (27b) illustrate respectively a clause-medial and a second position verb whose argument has been mentioned in the preceding context.

(27) a. adverb-verb

(Allik kinnitas eile õhtul sellist kolmikliidule tehtud pakkumist 'Allik confirmed last night that the coalition had indeed received such an offer ...')

| | | | | | | |
|---|---|---|---|---|---|---|
| Ligi | sõn-u-l | valitsusliit | ilmselt | **aruta-b** | Koonderakonna | pakkumist |
| Ligi.GEN | word-PL-ADE | coalition.NOM | probably | discuss-3SG | Koonderakond.GEN | offer.PAR |

'According to Ligi the coalition will probably discuss Koonderakond's offer.'

b. verb-adverb

(2000. aastal esimest korda mõnes Euroopa riigis tähistatud holokausti mälestamise päeva eraldi tähtpäevaks võtmine oleks lahtisest uksest sissemurdmine. 'It would be pushing an open door to introduce a dedicated holocaust memorial day, which was first celebrated in some European countries in 2000.')

| | | | |
|---|---|---|---|
| Eesti-l | **on** | juba | leinapäev. |
| Estonia-ADE | be.3SG | already | mourning.day.NOM |

'Estonia has a day of mourning already.'

If the argument was neither fronted, clausal, pronominal, marked with a demonstrative or previously mentioned (and hence was judged to receive the nuclear accent), the verb was judged as not receiving the nuclear accent. This is illustrated for a verb-medial clause in (28a) and for a V2 clause in (28b).

7 Cf. note 5.

(28) a. adverb-verb

| | | | | |
|---|---|---|---|---|
| See | käik | ilmselt | **vihasta-b** | USA-d. |
| this.NOM | move.NOM | probably | anger-3SG | USA-PAR |

'This move will probably anger the US.'

b. verb-adverb

| | | | |
|---|---|---|---|
| Video | **on** | ilmselt | ehtne. |
| video.NOM | be.3SG | probably | authentic.NOM |

'The video is probably authentic.'

The procedure is summarised in Figure 4. As a result of the procedure, every sentence received either a judgment 'nuclear accent on the finite verb' or 'no nuclear accent on the finite verb'.

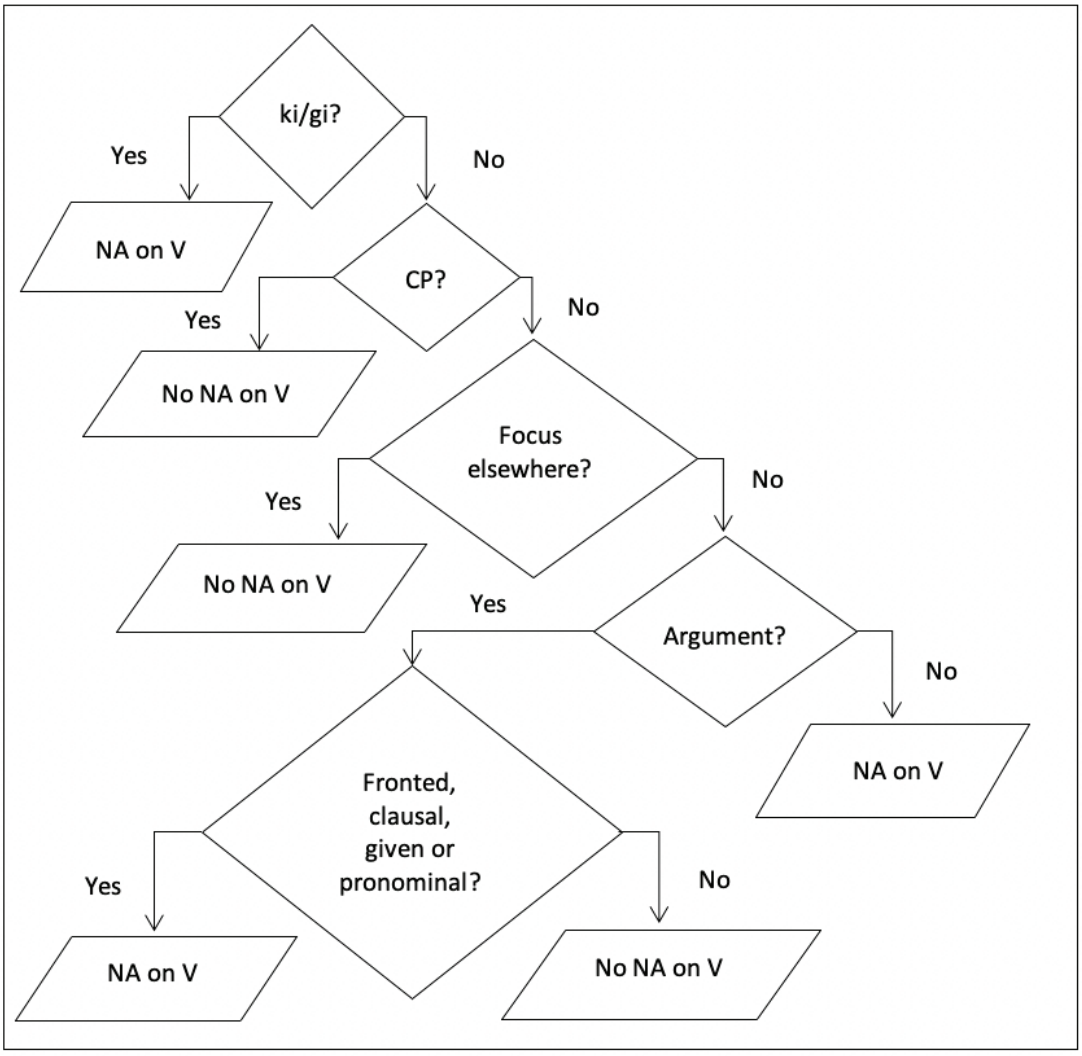


**Figure 4.** The decision procedure. Abbreviations: CP - complex predicate, NA - nuclear accent, V - finite verb

## 5.3 Results

The results of the decision procedure support the hypothesis: 92% of second-position verbs were judged as not receiving a nuclear accent, and 75% of clause-medial verbs were judged as receiving a nuclear accent. The results are presented in Table 2.

**Table 2.** The results of the decision procedure

| | **Verb-adverb (V2)** | **Adverb-verb (verb-medial)** |
|---|---|---|
| Nuclear accent on the verb | 54 (8%) | **524 (75%)** |
| No nuclear accent on the verb | **641 (92%)** | 171 (25%) |
| Total | 695 | 695 |

Table 3 shows the number of judgments made at each step of the decision procedure.

**Table 3.** Reasons for judging the verb as receiving or not receiving a nuclear accent

| **Reason for judging the verb as receiving a nuclear accent** | **Verb-adverb (V2)** | **Adverb-verb (verb-medial)** | **Total** |
|---|---|---|---|
| Verb marked with *-ki/-gi* (Step 1) | 18 | 81 | 99 |
| No internal argument (Step 4) | 26 | 263 | 289 |
| Internal argument is fronted (Step 5) | 1 | 63 | 64 |
| Internal argument is clausal (Step 6) | 6 | 48 | 54 |
| Internal argument is given/pronominal (Step 7) | 3 | 69 | 72 |
| Total | 54 | 524 | 578 |
| **Reason for judging the verb as not receiving a nuclear accent** | **Verb-adverb (V2)** | **Adverb-verb (verb-medial)** | **Total** |
| The verb is the finite element of a CP (Step 2) | 286 | 36 | 322 |
| Another constituent is marked as narrow focus (Step 3) | 100 | 40 | 140 |
| The verb has an accentable internal argument (Step 7) | 255 | 95 | 350 |
| Total | 641 | 171 | 812 |

Table 3 demonstrates that the main reason for judging that a verb is nuclear-accented was the absence of an internal argument, accounting for 50% of the data. A typical sentence with a nuclear-accented finite verb in the data is thus a verb-medial sentence with an intransitive verb, as illustrated in (29).

(29) a. Öösiti inimene tavaliselt **maga-b.**
at.nights person.NOM usually sleep-3SG
'At night people usually sleep.'

b. Kasv ilmselt **pidurdu-b** aasta lõpu-ks.
growth.NOM probably slow.down-3SG year.GEN end-TRA
'The growth will probably slow down by the end of the year.'

c. Poeg juba **õpi-b.**
son.NOM already study-3SG
'Their son is already studying.'

There were two equally frequent reasons for judging a verb as not receiving a nuclear accent: either the verb was the finite component of a complex predicate, or it had an accentable internal argument. A typical sentence with a non-nuclear accented verb in the data was a V2-sentence where the verb was either the auxiliary *olema* 'be', as in (30a), or the copula *olema* 'be' complemented with a predicate nominal or adjective, as in (30b). Still, the non-nuclear accented second position verbs are not limited to the clitic-like auxiliary or copula 'be', cf. (30c).

(30) a. Ülemkohtuniku-d **on** tavaliselt ol-nud sõnavabaduse
supreme.court.justice-NOM.PL be.3PL usually be-PST.PTCP speech.freedom.GEN
kaitsja-d.
defender-NOM.PL
'Supreme court justices have usually been defenders of free speech.'

b. Ta **on** ilmselt haige.
3sg.NOM be.3SG probably ill.NOM
'He/she's probably ill.'

c. See **kuulu-b** ilmselt kohustuslikku loetellu.
it.NOM belong-3SG probably obligatory.ILL list.ILL
'It probably belongs to the obligatory list.'

The frequency of the auxiliary or copular verb *olema* 'be' in the two datasets can be taken as a further indication of their difference. Both in the V2 and the verb-medial dataset *olema* is the most frequent verb, which can be explained by the fact that it is the most frequent lemma in the corpus. However, its proportion varies greatly in the two datasets. The proportions are shown in Table 4. In the verb-medial dataset *olema* was usually judged as accented, generally because it was affixed with the focusing clitic or because its argument—the predicate nominal or adjective—was fronted. In the V2 dataset it was usually judged as not receiving a nuclear accent. Given that *olema*, being an auxiliary or a copula, is expected to be typically deaccented, its different association with the two verb positions supports the hypothesis that the positions differ with respect to accentuation.

**Table 4.** The proportion of the verb *olema* 'be' in the datasets

| | Verb-adverb (V2) | Adverb-verb (verb-medial) |
|---|---|---|
| **The verb is the auxiliary or copula *olema* 'be'** | 455 (65%) | 125 (18%) |

In summary, the results support the hypothesis that second-position verbs tend not to be nuclear-accented and that verb-medial clauses tend to be of a type that require a nuclear accent on the verb. However, the method that was used to determine the nuclear accent placement was indirect and applied to written data; therefore, the study needs to be complemented with a spoken corpus study.

The results of the study also provide ample evidence for the existence of a further finite verb position in Estonian declarative main clauses, a clause-medial position. A considerable proportion of the adverb-verb sentences in the data are ambiguous between the clause-medial and the clause-final position. In these adverb-verb sentences, the verb is the last word of the clause, but there are no complements or adjuncts that could follow it, or they are fronted to the clause-initial position. However, the data also contain a

considerable number of verb-medial clauses where the verb is followed by a complement or adjunct: 369 instances, which make up 53% of all verb-medial clauses.

# 6 The production study

The production study aimed to test how strongly the clause-medial position is associated with accentuation. It consisted in a reading task that aimed to answer the following research question: without any contextual, lexical or syntactic cues, are the verb-medial sentences more likely to induce an interpretation that calls for a nuclear accent on the verb than the V2 sentences? In other words, can the clause medial position of a verb alone prompt a nuclear accent on the verb? Section 6.1 will present our materials, section 6.2 will present the hypothesis and the analysis, and section 6.3 will present the results.

## 6.1 Material

The material consisted of minimal pairs of sentences differing in the respective placement of the verb and the adverb, illustrated in (31a)-(31b).

(31) a. VERB-ADVERB (V2):

| | | | |
|---|---|---|---|
| Noore-d | **taha-vad** | **tavaliselt** | muutusi. |
| young-NOM.PL | want-3PL | usually | change.PAR.PL |

'Young people usually want changes.'

b. ADVERB-VERB (clause-medial):

| | | | |
|---|---|---|---|
| Noore-d | **tavaliselt** | **taha-vad** | muutusi. |
| young-NOM.PL | usually | want-3PL | change.PAR.PL |

'Young people usually want changes.'

All the sentences consisted of four words: subject - {verb, adverb} - direct object. The sentences were constructed in a way that was compatible both with (i) readings inducing a nuclear accent on the object, and with (ii) readings inducing a nuclear accent on the verb. The possible readings and their possible contexts for the sentences in (31) are illustrated below.

(i) Possible readings inducing the nuclear accent on the object:
- Narrow focus on the object (What do young people usually want?)
- VP focus (What are young people like?)
- Sentence focus (What will the future bring?)

(ii) Possible readings inducing the nuclear accent on the verb:
- Verb focus (What will the young people's attitude to these changes be?)
- Polarity or TAM focus (I don't think young people want these changes.)

The sentences were constructed with verbs belonging to different lexical classes: verbs of existence and non-existence, of causation of existence, of causative change of state, of transfer of possession, of manipulation, mental verbs (such as 'consider'), modal verbs, and saying verbs.

The sentences were presented to the informants without any context in a randomised order. The speakers were told that they are asked to read aloud isolated sentences from longer texts. In order to encourage the speakers to imagine more marked and context-bound interpretations, and to prompt more variable accentuation, the task included filler sentences containing discourse connectives, focus-associated words or marked word order.

There were seven speakers and 20 sentence pairs, which resulted in 280 recorded sentences. The sentences were recorded at a recording studio, segmented using the forced aligner of the Tallinn University of Technology,[8] and manually checked.

## 6.2 Hypothesis and analysis

We hypothesised that the verb-medial sentences will be more often produced with the nuclear accent on the verb than the V2 sentences.

In order to identify whether the verb receives the nuclear accent, we conducted an acoustic as well as a perceptual analysis.

The acoustic analysis could not be carried out directly in the verb, since the position of the verb differed in the two conditions, which could have affected its prosodic properties. Therefore, the analysis was carried out in the object, which was always the last word of the test sentences. If the verb receives the nuclear accent, the following post-nuclear object is expected to be deaccented; otherwise, the object is expected to receive the nuclear accent. Consequently, determining the accentuation of the object will indirectly permit to determine the accentuation of the verb.

The acoustic correlates distinguishing a nuclear-accented word from a deaccented word in Estonian have been found to be a higher F0 maximum, a larger F0 range, lengthening and a higher maximal intensity (Mihkla and Sahkai 2017). Duration was chosen as the examined correlate of accentuation because the F0 parameters are affected by factors like pitch accent type[9] and final lowering, and intensity has been found to be a weaker correlate than duration. We predicted thus that the object tends to shorten in the ADVERB-VERB (verb-medial) condition (because it may be deaccented).

For the purposes of the measurements, first the sentence pairs where one of the sentences contained a pause were excluded. The final dataset contained 116 sentence pairs. For each speaker and sentence pair, the average normalised duration of the object was calculated and deduced from the normalised duration of the object in each of the sentences in the pair. This measure permitted to determine the relative shortening or lengthening of the object with respect to the average.

The perceptual analysis consisted in identifying the location of the last accent in each sentence by listening to the sentences and by analysing their F0 contour visualised using Praat (Boersma and Weenink 2016). To identify the accents we relied on the inventory of Estonian pitch accents in Asu (2004).

## 6.3 Results

The results of the acoustic analysis confirm the prediction that the object tends to be relatively shorter in the verb-medial sentences, suggesting that it may be deaccented. The relative shortening/lengthening of the object in verb-medial and V2 sentences is represented in Figure 5. A single factor ANOVA showed that the difference is significant (p-value 0.000178).

However, this does not directly prove that the nuclear accent is on the verb: it is in principle possible that it is on the subject or the adverb. The result would also be compatible with the object being more often interpreted as narrow focus in the V2 condition, because lengthening also distinguishes an emphatic nuclear accent from a non-emphatic one.

**8** https://phon.ioc.ee/dokuwiki/doku.php?id=projects:tuvastus:est-align.et.

**9** Estonian possesses two types of nuclear pitch accent (see Asu 2004, Asu and Nolan 2007): the H*+L accent, where the stressed syllable of the accented word receives a high tone and the following unstressed syllable receives a low tone, and the H+L* accent, where the stressed syllable of the accented word receives a low tone and the preceding unstressed syllable (in the preceding word, because Estonian words have initial stress) receives a high tone. Consequently, the stressed syllable of an accented word may receive either a high or a low tone. Therefore, the F0 values of a word cannot be used to determine whether it is accented or not.

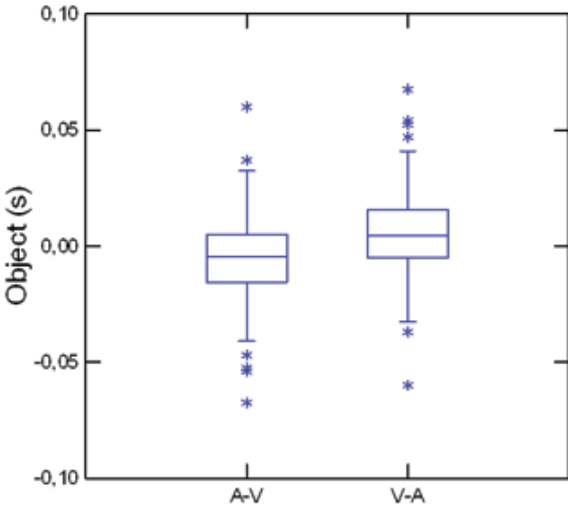


**Figure 5.** The relative shortening or lengthening of the object in verb-medial (A-V) vs. V2 (V-A) sentences

The results of the perceptual analysis, i.e. the distribution of the perceptually identified nuclear (last) accent in the V2 vs. verb-medial sentences, are presented in Table 5.

**Table 5.** The distribution of perceptually identified nuclear accents in the V2 and verb-medial sentences

| | **VERB-ADVERB (V2)** | **ADVERB-VERB (verb-medial)** | ***Total*** |
|---|---|---|---|
| Nuclear accent on V | 11 | 40 | 51 |
| Nuclear accent on O | 105 | 76 | 181 |
| Total | 116 | 116 | 232 |

The perceptual analysis confirmed that there were indeed two possible locations for the nuclear accent: on the object and on the verb. It also confirmed that the verb is more often nuclear accented in the verb-medial condition (40 instances) than in the V2 condition (11 instances).

However, the results also show that in both conditions, the nuclear accent falls mostly on the object. The nuclear accentuation of objects can partly be explained by the experimental settings: the readings associated with the nuclear accentuation of the object, such as VP focus or sentence focus, are less context-bound and thus easier to produce when reading isolated sentences.

Additionally, the results show that in 11 instances the verb received the nuclear accent in the V2 condition. This can be related to two factors. Firstly, three nuclear-accented second-position verbs occur in a test sentence where the object was a 'semantically empty' noun that tends to be deaccented (*teised* 'the others': *Inimene arvestab tavaliselt teistega* [person.NOM.SG consider.3SG usually other.PL.COM] 'A person usually shows consideration for other people', cf. Ladd 2008:238). Secondly, the nuclear accent on the second position verbs occurs with a distinct lexical class of verbs. The verbs that received nuclear accent in the V2 condition were mainly causative change-of-state verbs (degree achievements such as 'increase', 'deepen', 'degrade'). A degree of change is likely to be predicated of a referent that is known from previous context and hence not part of focus. This group of verbs that predicate a degree of change on a discourse-old referent was balanced in the data by a group of verbs that very strongly imply that the referent of the object is discourse new. These were verbs of causing to come into existence ('generate', 'cause', 'initiate'), which typically introduce discourse-new objects.[10] These verbs were deaccented in both conditions, with

**10** Tamm and Vaiss (2019: 172-173) provide a batch of typical examples of an Estonian verb class (exemplified by *õppima* 'learn') that constrains the discourse properties of the object. See also Bende-Farkas (2001) for Definiteness Effect verbs.

two exceptions in the verb-medial condition. The accentuation pattern of verbs according to their lexical classes is presented in Table 6.

**Table 6.** The distribution of the perceptually identified nuclear accents with respect to verb meaning

| Verb meaning | Accent on V | | Accent on O | | *Total* |
|---|---|---|---|---|---|
| | V-A | A-V | V-A | A-V | |
| (Non-)existence | 0 | 3 | 12 | 9 | 24 |
| Causation of existence | 0 | 2 | 17 | 15 | 34 |
| Causative change of state | 6 | 13 | 10 | 3 | 32 |
| Transfer of possession | 0 | 2 | 12 | 10 | 24 |
| Manipulation | 0 | 0 | 7 | 7 | 14 |
| Mental | 3 | 12 | 31 | 22 | 68 |
| Modal | 0 | 3 | 7 | 4 | 14 |
| Saying | 2 | 5 | 9 | 6 | 22 |
| Total | 11 | 40 | 105 | 76 | 232 |

Table 6 shows that the verbs that favour the nuclear accent receive it more frequently in the clause-medial condition, and that more types of verbs receive the nuclear accent in the clause-medial condition.

In conclusion, the production study shows that, to some extent, the clause-medial position favours interpretations that induce a nuclear accent on the verb. However, the relationship between the position and the accent is not strong enough to induce accentuation without semantic support from the lexical properties of the verb or from a context determining an appropriate information structure. Conversely, appropriate semantics can induce a nuclear accent on the verb also if the verb is in the second position, although to a smaller extent than in the clause-medial position. In sum, the position has an effect on accentuation, but it is weaker than the effect of lexical semantics.

# 7 Discussion

The study reported in this paper had two goals: to explore a clause-medial finite verb position in Estonian declarative main clauses, and to test the hypothesis that the placement of a verb in the second or clause-medial position tends to correlate with the absence or presence of a nuclear accent on the verb. The two aspects of the study are discussed in Sections 7.1 and 7.2 respectively.

## 7.1 The clause-medial finite verb position

The results of the study confirm the existence of a further exception to V2 in Estonian declarative main clauses. More specifically, in addition to the V1, V3, and clause-final positions previously described in the literature, we demonstrated a clause-medial position located between non-fronted sentence adverbials and any complements of the verb or VP adverbials.

The corpus study showed that clauses where the finite verb follows a clause-medial sentence adverbial are relatively frequent, since hundreds of examples could easily be retrieved from a corpus. Nevertheless, many sentences in the data were ambiguous between the *verb-medial* order, where the verb precedes its complements and any VP adverbials, and the *verb-final* order, where the verb follows the complements and VP adverbials. The ambiguities emerged because of the lack of complements or adjuncts, or because the complement or adjunct was fronted to the clause-initial position. The ambiguous instances were included in

the corpus study, since the verb-medial order was hypothesised to correlate with the nuclear accentuation of the finite verb, and the absence of a non-fronted complement was assumed to be one of the primary factors of the accentuation of the verb. Nevertheless, in 53% of the sentences that displayed the adverb-verb order, the verb was not the last word. The corpus study thus confirmed that the clause-medial finite verb position is distinct from the clause-final position. A question for future study is how to interpret the availability of these two positions, and what the difference between them is.

The verb-medial order is also distinct from the so-called V3 order. The V3 order arises when a non-subject constituent is fronted to the beginning of a clause, but there is no inversion of the weak pronominal subject and the finite verb. Consequently, the V3 order, unlike the verb-medial order, does not differ from the V2 order in terms of the respective placement of the finite verb and non-fronted sentence adverbials. Also, verb-medial clauses, unlike V3 clauses, were assumed not to be constrained in terms of the number of constituents that can precede the verb, and the prosodic weight of the subject. Indeed, in the verb-medial dataset, the verb is frequently preceded by more than two constituents, and the subject is usually not pronominal.

## 7.2 Verb placement and accentuation

The main hypothesis of the study was that the occurrence of a finite verb in the second position as opposed to the clause-medial position correlates with its accentuation: second-position verbs do not tend to bear a nuclear accent, while clause-medial verbs do.

We developed an indirect method for testing the hypothesis on written corpus data. Using the diagnostic of the respective placement of the finite verb and a non-fronted sentence adverbial, we constructed comparable datasets of V2 and verb-medial declarative main clauses. On the basis of the sentence accent assignment model in Féry (2011), we developed an algorithm for determining for each sentence in the data whether the finite verb would receive a nuclear accent or not. The algorithm led to some counter-intuitive annotation decisions, as it was based on strictly observable and uniform criteria (cf. footnotes 5 and 7). Nevertheless, the method gave very clear results: in 92% of the V2 sentences the verb was judged not to receive a nuclear accent, as opposed to only 25% of the verb-medial sentences. Furthermore, the results of the application of the algorithm were supported by the fact that the proportion of the auxiliary or copular verb *olema* 'be', which is presumably in general unaccented, was considerably larger in the V2 sentences than in the verb-medial sentences: 65% as opposed to 18%. Further support was provided by the fact that the verb-medial dataset contained 4.5 times more verbs that were marked with the focusing clitic *-ki*/*-gi* than the V2 dataset. In summary, the corpus study provided strong evidence in favour of the hypothesis that second-position and clause-medial verbs differ in whether they bear a nuclear accent or not.

The corpus study was complemented by a production study that aimed to test whether the clause-medial position calls for the nuclear accentuation of the finite verb in itself. The study confirmed that the clause-medial position can indeed induce interpretations that call for a nuclear accent on the finite verb, although the influence of the position is weaker than the influence of the semantics of the verb and the arguments.

In conclusion, the results of the two empirical studies are compatible with the hypothesis that second-position verbs tend to lack a nuclear accent, while clause-medial verbs tend to be nuclear accented. This could be interpreted in several ways: either the second position rejects the nuclear accent, or the nuclear accent is drawn to the right edge of the i-phrase. As nuclear accent placement has been found to be relatively flexible in Estonian (for instance, Figures 1 and 2 above in Section 3 demonstrate the availability of post-nuclear deaccentuation), it can be concluded that it is the second position that is incompatible with a nuclear accent.

The incompatibility of second position verbs with nuclear accentuation may have implications for the understanding of the phenomenon of V2 in Estonian and other languages. In many languages (including historical Estonian, cf. Wiedemann 1875:320-321, Neetar 1966), the second position hosts clitics. The Estonian facts thus suggest that the phenomenon of V2 may be related to prosodic second-position phenomena. A

unitary prosodic account of second position clitics and V2 was proposed already by Wackernagel (1892); an account of the Estonian V2 along these lines has been hinted at by Tael (1990:34). A unitary account of V2 and second position clitics has later been developed also by Anderson (1993), but in terms of a morphological rule and without reference to prosody. Prevailing formal accounts of V2, however, as reviewed for instance by Holmberg (2015), are purely syntactic and do not relate V2 to other second position phenomena.

The latter two types of accounts do not predict the kind of prosodically induced variation in V2 observed in Estonian. However, the Estonian second position verbs cannot be considered as enclitic either. Consider the fact that while they are often auxiliary or copular verbs, they can also be full verbs. Moreover, it seems that they can receive a prenuclear accent and be separated from the preceding word by a prosodic phrase boundary. In addition, the Estonian second position is the position after the first syntactic constituent, rather than the first prosodic word. The second position is thus a syntactically defined position that hosts a morphosyntactically defined category: the finite verb. The occurrence of the verb in the second position is therefore a syntactic phenomenon, which is subject to the prosodic constraint that fixes its incompatibility with a nuclear accent. The existence of a prosodic constraint on a syntactic phenomenon invites us to rethink the relationship between syntax and phonology. The exact consequences of the findings of the present study for the nature of V2 and the syntax-phonology relationship remain a promising topic for future study.

A theoretical account of the relationship between verb position and nuclear accent placement in Estonian declarative main clauses also remains a question for future study. The results of the production study suggest that the association between verb position and nuclear accent placement is not absolute. We saw that a second-position verb could be produced with a nuclear accent if the lexical meaning of the verb evoked by default a discourse given argument. Conversely, a clause-medial verb could be produced without a nuclear accent if the verb semantics or context did not support a reading calling for a nuclear accent on the verb. The optionality of the relationship between verb position and accentuation suggests an account in terms of a ranking of violable syntactic and prosodic constraints.

# 8 Conclusion

The present study has demonstrated (a) that the Estonian declarative main clause has a distinct clause-medial finite verb position, and (b) that clause-medial finite verbs tend to bear a nuclear accent, while second position verbs tend to be incompatible with nuclear accentuation.

A written corpus study has revealed that declarative main clauses display relatively frequently the verb-medial order where the finite verb follows a clause-medial sentence adverbial and precedes any complements or VP adverbials.

A systematic comparison of verb-medial and V2 sentences in the written corpus data has demonstrated that clause-medial verbs tend to receive a nuclear accent, whereas second position verbs are incompatible with nuclear accentuation. The correlation between the position and the accentuation of a finite verb was demonstrated by applying an algorithm that permitted to predict for every sentence in the data whether the verb would receive a nuclear accent or not. The algorithm was based on a sentence accent assignment model proposed by Féry (2011). The results from the application of the algorithm have further been supported by a greater frequency of the—usually deaccented—auxiliary or copular verb *olema* 'be' in the V2 sentences, as well as by the greater proportion of verbs marked with the focusing clitic *-ki*/*-gi* in the verb-medial sentences.

The results of the written corpus study have been supported by a spoken production study. The results of the production study have shown that, by itself, the clause-medial position can induce interpretations that call for a nuclear accent on the finite verb. However, the study has also demonstrated that the verb position affects the interpretation of a sentence considerably less than the lexical semantics of the verb and its arguments do.

The discovery of the clause-medial finite verb position and of the correlation between the verb position and accentuation has opened up a series of questions for future research: how to interpret the clause-medial finite verb position, especially in relation to the simultaneous availability of the clause-final position? What

determines the occurrence of a verb in the medial or final position? How to account for the relationship between Estonian V2 and nuclear accent placement? What are the implications of this relationship for the phenomenon of V2 and the syntax-phonology relationship in general?

These questions and alternative methodologies for cementing the facts constitute promising research avenues.

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## Abbreviations

ACC – accusative (the case of total objects); ADE – adessive; CNG – connegative; COM – comitative; ELA – elative; GEN – genitive; ILL – illative; INE – inessive; INF – infinitive; IMPERS – impersonal; NEG – the negative particle; NOM – nominative; PAR – partitive; PL – plural; PST – past; PTCP – participle; SG – singular; TRA – translative

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