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Piia Taremaa, Anetta Kopecka

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Manner of motion in Estonian

A descriptive account of speed

Piia Taremaa and Anetta Kopecka

University of Tartu | Laboratoire Dynamique du Langage (CNRS & Université de Lyon)

Recent decades have witnessed an increasing interest in motion events resulting in thorough knowledge about expressions of manner. However, the individual dimensions of manner of motion have been investigated less extensively. In this study, we focus on one particular dimension of manner: SPEED. By analysing the Estonian language and applying corpus methods, we show that speed is one of the core dimensions of manner. In Estonian, speed can be expressed with motion verbs and various types of manner modifiers. Speed modifiers can have a function of compensation (providing information that is not present in the verb), specification (providing additional details), and/or intensification (strengthening the meaning conveyed by the verb). Moreover, compared to slow motion, the expression of fast motion in modifiers is more frequent and more diverse in terms of semantic distinctions and morphosyntactic realisations. Drawing on these results, we frame a hypothesis of the **fast-over-slow** bias.

Keywords: speed, manner of motion, verbs, modifiers, corpus analysis, Estonian

1. Introduction

Although languages differ in the types of linguistic devices they use to convey manner and the attention they pay to this dimension of motion events, manner is one of the fundamental cognitive categories that languages express. In essence, manner is a matter of **howness** in that it captures **how** something is done. As a category of interest for various fields of research on language (e.g., derivational morphology and syntax), it is the investigation of motion events that has placed the category of manner in the centre of research attention in linguistic studies (Ikegami 1969; Talmy 1985, 2000; Slobin 1996, 2004, 2006; Goschler &

Stefanowitsch 2013; Ibarretxe-Antuñano 2017; Matsumoto & Kawachi 2020; inter alia).

Previous research on motion events has resulted in (i) extensive knowledge about manner, (ii) a widely accepted understanding that manner is a highly complex and heterogeneous concept, (iii) several thorough lists of manner subcategories, particularly in the domain of motion, and (iv) numerous studies on the linguistic realisations and functions of manner expressions in individual languages and language types (Snell-Hornby 1983; Aske 1989; Slobin 1996, 2004, 2006; Özçalışkan & Slobin 2003; Narasimhan 2003; Cardini 2008; Kopecka 2010; Slobin et al. 2014; Akita 2017; Stosic 2019, 2020; Akita & Matsumoto 2020). In particular, research into motion events shows that the extent to which languages are manner-sensitive is typologically driven (Slobin 1996, 2006; Cardini 2008; Akita 2017; Łozinska 2018). In addition, the functions that manner expressions can fulfil may differ considerably across languages of different types (Özçalışkan & Slobin 2003).

Whereas several researchers have addressed the general category of manner from different angles, there have been few attempts to provide an overarching definition. Furthermore, the various dimensions of manner in terms of its subcategories have not been the subject of much study. That is, manner tends to be taken as one category, and its subcategories are usually only listed in order to define the general concept of manner. Consequently, relatively little is known about the individual subcategories of manner that languages are sensitive to and that they lexicalise and about the role that individual manner subcategories may have in relation both to the general category of manner and language types.

In this study, we zoom into the broad category of manner of motion and focus on one specific subcategory: *SPEED*. Speed itself is a broad term, but within the context of motion events, it implies “how fast something moves”.¹ As such, all motion events are speed-sensitive in that motion is always conducted with some degree of speed. This, in turn, makes this subcategory highly important for providing a comprehensive picture of motion events and manner. Thus, an investigation of morphologically rich languages is likely to provide new insight on the types and diversity of manner modifiers (i.e., manner expressions other than the verb) and their functions. This is particularly relevant for typological reasons as it has been proposed that the expression of manner is notably fine-grained and diverse in the so-called satellite-framed languages (Talmy 1985, 2000; Slobin 1996, 2006; Özçalışkan & Slobin 2003; Akita & Matsumoto 2020). However, thus far, this tendency for manner elaboration has not been discussed in the light of language-specific characteristics and the diversity of morphological means

1. <https://dictionary.cambridge.org/dictionary/english/speed> (last access 23 December 2021)

that a given language offers. Hence, our main objective in this study is to provide a descriptive account of the expression of speed-related information in motion events in a satellite-framed and morphology-rich language such as Estonian.

Thus, we aim to:

1. Identify the linguistic means by which speed of motion can be expressed.
2. Examine the semantic characteristics of speed modifiers in relation to (i) other dimensions of manner and (ii) motion verbs of different types (path vs. manner verbs; slow vs. fast motion verbs).
3. Determine the functions of speed modifiers in the encoding of motion events.
4. Provide new insight for cross-linguistic studies on manner expressions.

As a Finno-Ugric language, Estonian serves as an excellent study object for typological reasons as it is a language with rich nominal and verbal morphology. As a satellite-framed language in Talmy's (1985, 2000) terms, it is also a manner-salient language (Slobin 1996, 2004, 2006). This implies that Estonian features a rich and productively used inventory of manner expressions that manifest themselves in motion verbs and modifiers.

The structure of this paper is as follows. We first provide the background of the study with a specific focus on (i) typological issues related to the expression of manner, (ii) a possible definition and categorisations of manner, and (iii) current knowledge about the expression of speed. We then give a quick overview of the Estonian language to address questions related to the expression of speed. Then, in Section 3, we sketch the method and describe the procedure of data selection. In Section 4, we present the results of the study by (i) situating speed in the context of manner category in general, (ii) discussing the expression of speed in verbs and modifiers, (iii) analysing the morphosyntactic variety of speed modifiers, (iv) establishing the interrelations between verbs and modifiers, and (v) outlining the functions of speed modifiers. In Section 5, we discuss our findings in the light of the typology and motion events, and drawing on our data, we propose a **fast-over-slow** bias and outline future directions for this study.

2. Background

Speed is a subcategory of manner and one of its many dimensions that are more or less well-defined. Since all motion events can be characterised by how fast or slowly they evolve, speed can be taken as one of the most important subcategories of manner. Thus, as has been observed by Ikegami (1969) and Slobin et al. (2014), speed is "particularly relevant to movement" (Ikegami 1969: 61) in that it seems to be a "pervasive underlying dimension" of motion (Slobin et al. 2014: 728).

In order to discuss the specifics of speed expressions, the general category of manner needs to be detailed. This is why we first elaborate on typological aspects of manner by discussing the role of manner in lexicalisation patterns. We then give an overview of the main classifications of manner found in the research literature and discuss speed as a subcategory of manner. Finally, we summarise the current state of knowledge on how speed is expressed across languages.

2.1 Typological perspective: Manner and lexicalisation patterns

In the typology of motion events (Talmy 1985, 2000), manner and path are central concepts. As proposed by Talmy, the core component of motion is path defined as “the path followed or site occupied by the Figure object with respect to the Ground object” (Talmy 2000:25). When the path is conflated in the verb (e.g., English *exit* and *enter*), manner is typically expressed elsewhere in the sentence. However, a substantial number of motion verbs conflate manner (e.g., English *run* and *jump*), thereby specifying **how** motion is performed. In this case, the path is expressed elsewhere in the sentence by means of ‘satellites’ such as, for example, directional particles in English (e.g., *in*, *out*).

From the typological perspective, most languages fall into two broad categories based on their preferred strategies to express path (Talmy 1985; Talmy 2000:19–212): verb-framed and satellite-framed languages. In verb-framed languages (e.g., Spanish), speakers tend to describe a motion event by means of a path verb, which can optionally be accompanied by a manner expression (e.g., *She entered the house (running)*). In satellite-framed languages (e.g., English), a description of a motion event typically consists of a manner verb accompanied by some path expression (e.g., *She ran into the house*). Despite the fact that languages typically fall into either the verb-framed or satellite-framed type, they nevertheless tend to use both strategies to express motion, showing variation both within one language and within a language family (Talmy 2000; Zlatev & Yangklang 2004; Kopecka 2006; Filipović 2007; Ibarretxe-Antuñano 2009; Goschler & Stefanowitsch 2013; Hijazo-Gascón & Ibarretxe-Antuñano 2013; Fagard et al. 2017; Ibarretxe-Antuñano 2017; Matsumoto & Kawachi 2020).

As for manner, it is important to note that in verb-framed languages that rely on periphrastic expression to convey manner, such expression is not compulsory to describe the event of an entity changing its location in space. As a result, manner, if expressed at all, tends not to be thoroughly elaborated in these languages. Conversely, in satellite-framed languages, in which manner verbs are preferentially used and which are typically characterised by a large inventory of manner verbs, the notion of manner is already in focus. If an additional manner expres-

sion is added to the sentence (e.g., *She ran into the house limping*), it enhances the way that motion is conducted, and, thereby, makes it more salient.

These typological differences have led Özçalışkan & Slobin (2003) to identify two main functions of manner modifiers in motion clauses. One of the functions is to intensify or elaborate on manner information given by the verb. For instance, the manner adverbial *fast* accompanying the manner verb *run* in *She was running fast* details the speed of running. The second function of manner modifiers is to serve as the main linguistic means to convey manner information. This occurs when the verb conveys the path or neutral motion rather than the manner. In such cases, manner modifiers have a compensatory function. For example, *fast* in combination with the path verb *exit* in *She exited fast* depicts the way that exiting is performed. The data examined by Özçalışkan & Slobin (2003) in Turkish (a verb-framed language) and English (a satellite-framed language) suggests that in verb-framed languages, the expression of manner tends to have a compensatory function, while in satellite-framed languages, it tends to have an elaborative function.

Nevertheless, drawing on Japanese and English, Akita shows that “the framing typology is not the sole factor in either the repertoire or frequency of manner expressions” (Akita 2017: 45). That is, the expression of manner cannot solely be attributed to the type of language in terms of satellite- or verb-framed types. Instead, Akita (2017) proposes that manner is lexicalised in verbs if it specifies coarse-grained (e.g., *running*) rather than fine-grained (e.g., *bustling*) manner. In addition, intensified manner meanings are more readily expressed with modifiers rather than with motion verbs. He also suggests that the formal means of manner modifiers may be dependent on the type of manner in the sense that more prototypical dimensions of manner (in his wording, “manners inherent in motion events” (Akita 2017: 47)) are also expressed by means of more “tight motion constructions” (Akita 2017: 47). For instance, while a prototypical manner could be expressed in verbs as tight motion constructions (e.g., *A man walked up the stairs*),² dimensions “secondary to manner in motion events” (Akita 2017: 47) could, for example, be expressed more readily with separate clauses (e.g., *A man walked up the stairs with a slapping noise*).

As for the morphosyntactic realisation of manner, languages can use a variety of formal strategies. For example, Stosic (2019, 2020) differentiates between the following five types of means that stand for manner expressions in French: (i) lexical (i.e., verbs, non-derived forms of adverbs, and nouns), (ii) syntactic (i.e., particular morphological or clausal realisations of manner adverbials (adjuncts)),

2. Examples are taken from Akita (2017: 48). Relevant parts of the examples are underlined by us.

(iii) morphological (i.e., derivational forms of verbs or adverbs), (iv) grammatical (i.e., interrogative adverbs and pronouns), and (v) prosodic (i.e., the suprasegmental level of language). Akita (2017) further adds that depending on the language, manner is expressed not only by these means but also by complex verbs, verb phrases, preverbs, ideophones, adpositional phrases, and separate clauses.

2.2 The semantics of manner: Situating speed in the context of manner

Manner is a complex concept and covers a range of semantic dimensions that, in turn, capture the qualitative features of an action. According to Stosic (2020: 139), manner “acts as an operator of modification”. In his early study on motion events, Talmy (1985: 128) defines manner as referring “to a subsidiary action or state that a Patient manifests concurrently with its main action or state”. He later explains that “It might thus be argued that Manner should not be treated as some separate event that bears a relation to some simplified main event, but, at most, only as an aspect of a complex event, on the grounds that in reality some putative Manners cannot exist in isolation. Cognitively, however, linguistic structure attests that we at least conceptualize Manner regularly as a separate event” (Talmy 2000: 37). In essence, these definitions suggest that manner stands for qualities that describe the main event, as also suggested by a number of other authors (see Stosic 2020 for an overview). Regarding motion events, a more detailed definition of manner has been deemed necessary. Generally, the manner of motion shows **how** motion is conducted. This **howness** can be understood in terms of various characteristics, with motor pattern being perhaps the most obvious one.

Lists of possible subcategories of manner, whether applied to verbs or other expressions of manner, have been proposed by several researchers (Ikegami 1969; Snell-Hornby 1983; Narasimhan 2003; Cardini 2008; Kopecka 2010; Slobin et al. 2014; Taremaa 2017; Stosic 2019) (see Appendix A for an overview). There is considerable variation in the terminology used to label the dimensions of manner. As such, manner can be understood as a general motor pattern or characteristic body-movements (also with respect to the surface); posture, position, and physical or emotional condition of the mover; trajectory, course, or medium of motion; means, instrument, or vehicle of motion; sound of motion; speed, velocity, or rate of motion; and energy, force, continuity, harmony, effort, rhythm, weight, steadiness, or suddenness of motion. Typically, these features form bundles in that several manner features are expressed simultaneously in the same lexical unit (see also Boas 2008; Cardini 2008: 546). For instance, the verb *climb* refers to a specific motor pattern, but it also implies that motion is rather slow and somewhat difficult.

There seems to be a general consensus to consider motor patterns and speed of motion as clear instances of manner of motion (see Appendix A), and the fact that speed is always mentioned in the lists of manner of motion accentuates the importance of this specific subcategory of manner. Other subcategories are not as uniformly mentioned or defined by authors, and some concepts are subject to disagreement about their **manneriness** (e.g., the instrument of motion as expressed by the verb *pedal* or modifier *by bike*; see also Slobin et al. 2014: 704). In the following section, we elaborate on speed expressions in the light of current knowledge.

2.3 Speed of motion

Before turning to linguistic studies on speed, let us first clarify three aspects of the concept of speed. First, speed can be relative or absolute.³ If relative, speed of motion can be evaluated in relation to other movers (or to the same mover's earlier or typical speed). If absolute, speed of motion can be established as a relationship between time and space in terms of time spent traveling a distance. Second, speed of motion depends on the type of mover as, clearly, a human being when walking cannot possibly be as fast as a flying plane. Finally, speed is always a matter of degree in that it can range from the slowest to the fastest possible motion. In linguistic studies, these different conceptualisations of speed are typically not explicitly addressed and speed is discussed as a general notion of fastness. In this study, we take the same general approach and examine speed as a general concept.

Furthermore, the lexicalisation of speed of motion has been addressed mainly from the perspective of motion verbs. For example, Ikegami (1969: 57–59) devotes a separate section to motion verbs that express speed and provides examples of English verbs that are sensitive to that particular dimension of motion. These include *crawl*, *creep*, *shuffle*, *drag one's foot*, *dawdle*, *tarry*, *idle*, *ooze*, *exude*, and *sink* as verbs of slow motion and *hasten*, *hurry*, *speed*, *dart*, *fly*, *shoot*, and *rush* as verbs of fast motion. By doing so, he suggests that language seems to be “semologically unevenly structured” (Ikegami 1969: 57) even though motion can, in principle, be conducted at different speeds. That is, there seem to be many more means in English to express fast motion than slow motion. He also notes the presence of fast motion verbs, which primarily (or exclusively) express speed (e.g., *hasten*),

3. In addition, speed can be seen from two angles: as a characteristic of a process and of the length of a time span (we thank the reviewer for this observation). These aspects of speed definitely call for closer investigation, but in this paper, we only concentrate on speed as a general characteristic of motion.

whereas slow motion tends to be expressed in motion verbs being rather a consequence of a certain motor pattern (e.g., *crawl*).

Snell-Hornby (1983), in her very thorough descriptive analysis of English and German verbs, frequently describes the semantics of motion verbs in terms of the speed they express. Notably, whereas she has given special treatment to verbs indicating fast motion, such as *race* and *dash* (1983: 142–145), she discusses expressions of slow speed only as a secondary dimension of motion verbs. For example, *wander* is classified mainly as a verb of leisure and aimless motion that simultaneously tends to depict slow motion (Snell-Hornby 1983: 133–134).

Cardini (2008), in his comprehensive account of the manner of motion verbs in English and Italian, considers speed to be one of the features of manner that provides “information about aspects of motion evoking fundamental concepts” (Cardini 2008: 544). He exemplifies this feature through *zoom* and *hurtle* as fast motion verbs and *drift* as a slow motion verb. The speed of motion has also been listed in all other major categorisations of manner (Ikegami 1969; Narasimhan 2003; Cardini 2008; Kopecka 2010; Slobin et al. 2014; Taremaa 2017; Stosic 2019) (see also Appendix A).

Given that motion is always conducted with some speed, Taremaa (2017) has further investigated whether a speed estimation can be attributed to all motion verbs. For this purpose, a rating task was conducted with 95 frequent Estonian motion verbs. It was found that motion verbs form a continuum ranging from verbs of very slow motion (e.g., *lonkima* ‘stroll, saunter’) to those of very fast motion (e.g., *kihutama* ‘race, career’). No great gaps occurred in this continuum, and the verbs were evenly distributed based on their speed ratings. Not surprisingly, path verbs were assigned relatively similar speed ratings. However, some variation did occur in that goal verbs (e.g., *saabuma* ‘arrive’) tended to be associated with faster motion more frequently than source verbs (e.g., *eemalduma* ‘distance oneself’). The manner of motion verbs, on the other hand, varied to a great degree. This study shows that speed is a feature that every motion verb is sensitive to, a result that is in accord with the suggestion by Slobin et al. (2014) regarding the pervasiveness of speed in motion.

Apart from motion verbs, the expression of speed has been addressed in the context of adjectives and/or adverbs (Dixon 1982 [1977]; 2004; Plungian & Rakhilina 2013; Hallonsten Halling 2018; Schäfer 2020). Importantly, Dixon (1982 [1977]) includes the semantic domain of speed as one of the main categories that English adjectives express (e.g., *fast* and *slow*). Adverbs derived from such adjectives convey similar meanings (e.g., *fast* and *slowly*). Furthermore, his cross-linguistic data shows that speed as a concept is one way or another expressed in different languages (by adverbs, adjectives, etc.). Hallonsten Halling’s (2018) cross-linguistic study on adverbs in 41 languages further shows that most lan-

guages have speed adverbs in their inventory of simple adverbs. This led her to conclude that “SPEED is a core semantic type for adverbs” (Hallonsten Halling 2018: 29, 36) in that, if a language has simple adverbs (i.e., monomorphemic adverbs), at least some of them express speed. She also notes that adverbs of fast motion appear more frequently in her cross-linguistic data than those of slow motion (Hallonsten Halling 2018: 171).

A similar observation regarding the asymmetry of fast and slow motion was made by Plungian & Rakhilina (2013). Examining speed adjectives, they argue that in Russian, “the domain of HIGH SPEED is rich and well elaborated” (Plungian & Rakhilina 2013: 352), whereas “the domain of LOW SPEED is much more restricted” (Plungian & Rakhilina 2013: 355). While there are more than fifteen fast speed adjectives in Russian that can all be translated as ‘quick, fast, swift’ (e.g., *bystryj*, *skoryj*, and *šustryj*), there is only one main adjective for low speed (i.e., *medlennyj* ‘slow’).

To summarise, regardless of the type of study (descriptive or more theoretically oriented, investigating cross-linguistic data or one language in particular), previous studies show the central role that speed plays in motion expression. As such, speed is one of the core dimensions of manner, thereby participating in major categorisations of manner.

2.4 The Estonian language

Estonian is a Finno-Ugric language spoken by approximately one million people. Its main characteristics relevant to the expression of motion events are detailed below (see Tauli 1973, 1983; Erelt 2003; Erelt & Metslang 2017 for thorough overviews of the Estonian language).

First, Estonian has a relatively free word order, with the SVO order being the most neutral.

Second, Estonian has a rich inventory of verbs, nouns, adjectives, adverbs (including verbal particles), and adpositions (both prepositions and postpositions). Of these, verbal particles function as satellites in Talmy’s terms (e.g., *jooksis sisse* [run.PST.3SG into] ‘(s)he ran in’). Furthermore, a number of lexemes that occur as verbal particles (e.g., *jooksis alla* ‘(s)he ran down’) can also occur as adpositions (mainly as postpositions; e.g., *jooksis katuse alla* ‘(s)he ran under the roof’).

Third, and in addition to free morphemes, such as nouns and adpositions, Estonian features a large set of bound morphemes, both inflectional and derivational, occurring mainly as suffixes. Regarding noun phrases (NPs), Estonian has 14 cases, and in most cases, attributes agree with their heads in case and number (e.g., *suur-te-s maja-de-s* [big-PL-INE house-PL-INE] ‘in big houses’). Typically,

attributes precede their heads. In addition, NPs in Estonian can be rather long and complex (e.g., *selle-sse ilusa-sse kõrge-sse kauge-le paist-va-sse natuke vildaka-sse majja* [this-ILL beautiful-ILL high-ILL far-ALL stand.out-PTCP-ILL slightly leaning-ILL house.ILL] ‘into this beautiful tall, far-fetched, slightly crooked house’).

Fourth, and as for verb morphology, Estonian has present and past tenses but no future tense, and it also has two infinitive forms: suffixes *-ma* (e.g., *jooks-ma* [run-INF1] ‘to run’) and *-da/-ta* (e.g., *kõndi-da* [walk-INF2] ‘to walk’, *joos-ta* [run-INF2] ‘to run’). Verbs can also occur as participles (e.g., *jooks-nud* [run-APP], *joos-tud* [run-PPP], *jookse-v* [run-PTCP]) and gerunds (e.g., *joos-tes* [run-GER] ‘running’ and *jooks-mata* [run-GER] ‘without running’). Finally, Estonian has no grammatical gender and no articles.

3. Data & methodology

To establish how speed-related information is expressed in Estonian, corpus data of motion clauses was used. Motion clauses are clauses (i.e., a verb in a finite form and all other elements that associate with it in the sentence) that describe movement (in our data, translational self-motion) of an animate or inanimate entity. The data was collected using motion verbs (more specifically, through verbs that express self-motion). The data collection procedure is detailed in the following sections by explaining the selection of verbs, the extraction of corpus data, and the means of data analysis.

Verbs

A total of 41 Estonian motion verbs were chosen. They express translational motion and constitute the best possible sample of motion verbs in the Estonian language. The procedure for verb selection comprised four steps (also described in Taremaa 2017: 74–80). First, verbs were automatically extracted from the main monolingual dictionary of Estonian (Erelt et al. 2006), and from those, intransitive motion verbs were manually selected. This resulted in 506 motion verbs in total. Second, a frequency criterion was applied, and verbs whose frequency was above the median value⁴ were chosen, resulting in 118 verbs. Third, for the purposes of the study in Taremaa (2017), the number of verbs was then narrowed

4. Frequency information was taken from the frequency list available at: https://www.cl.ut.ee/ressursid/sagedused1/failid/lemma_kahanevas.txt (last access 23 December 2021). The list, in turn, was based on the Balanced Corpus of Estonian.

down to 95 verbs (i.e., comprising lexemes that occurred at least in 100 sentences in the corpus). Fourth, for the purposes of the current study, only the verbs that express simultaneously translational and horizontal motion were extracted, resulting in 41 motion verbs (e.g., *jooksma* ‘run’, *ujuma* ‘swim’). To do this, the results of a sorting experiment were used (Taremaa 2021) in which the participants were asked to evaluate whether the verb expresses horizontal or vertical motion. Only words that were identified as verbs of horizontal motion by at least 75% of the participants were chosen. Two verbs were excluded: the general motion verb *liikuma* ‘move’ and *käima* ‘walk, go’. *Liikuma* ‘move’ was disregarded because it can refer to very different kinds of motion, and *käima* ‘walk, go’ was disregarded because it has a very distinct constructional profile, making it unjustified to examine this verb together with the rest of the verbs in the context of this study.

These 41 motion verbs belong to the group of the 95 most frequent Estonian motion verbs that express translational and horizontal motion. However, the verbs vary in semantics. Most importantly, both the manner of motion verbs (e.g., *jooksma* ‘run’; $N=31$) and path verbs (e.g., *väljuma* ‘exit’; $N=10$) are included in order to investigate the expression of speed across the two main semantic domains in terms of lexicalisation patterns. Path verbs, in turn, include source-oriented verbs (e.g., *väljuma* ‘exit’; $N=3$) and goal-oriented verbs (e.g., *saabuma* ‘arrive’; $N=7$). The verbs also vary in speed ratings, forming a continuum from verbs of very slow motion (e.g., *lonkima* ‘stroll, saunter’) to verbs of extremely fast motion (e.g., *kihutama* ‘race, career’). A detailed semantic analysis of the verbs from the perspective of speed is provided in Section 4.2.1.

Corpus data

Corpus data was taken from the Estonian National Corpus 2019 of written language (1.5 billion words). With each of the verbs, a random selection of 300 clauses of physical motion was made, resulting in a total of 12,300 clauses. Clauses were manually inspected for their meaning. Only physical motion clauses were included to ensure that the level of concreteness of the clauses was equal across uses.

Coding procedure and variables

First, all clauses were coded for the presence (‘yes’) or absence (‘no’) of manner modifiers (variable labelled as ‘Manner’), and the formal characteristics of manner modifiers were established (‘MannerForm’; e.g., adverbs, noun phrases). Then, the main semantic dimensions of manner modifiers were established based

on manner subcategories proposed in the literature (see Section 2.2 and Appendix A) and on the bottom-up analysis of the data itself. As a single modifier can lexicalise several manner features, each subcategory was presented as an individual binary variable (values: ‘yes’ and ‘no’). Speed, the focus of this study, was also coded as a subcategory (‘Speed’) and additionally as a variable specifying the speed of motion (‘SlowOrFast’). Two values were attributed to motion verbs: the type of verb (‘VerbType’) in terms of being either a source, goal, or manner verb (although it is present in Estonian, the data did not comprise median (also known as trajectory) verbs such as *ületama* ‘cross’ and *läbima* ‘go through’) and the speed rating of the verb, indicating the speed of the motion expressed by the verb on a relative scale (‘VerbSpeed’; ratings were taken from Taremaa 2017).

Data analysis

Manner modifiers and their types were established and examined by means of qualitative, bottom-up analysis. In the examination of speed expressions and clause-internal relations, we applied simple quantitative methods (chi-square test with Cramér’s V)⁵ combined with qualitative analysis of the linguistic material.

4. Results

4.1 Speed modifiers in the context of manner modifiers

In this section, we aim to situate speed within the context of manner. For this purpose, we present the analysis of manner subcategories (of which speed is one) in our data. In the coding and classification of manner modifiers, we combined pre-defined semantic criteria and bottom-up linguistic analysis. For the pre-defined semantic criteria, we followed earlier research on manner verbs and modifiers (as described in Section 2; see also Appendix A). In this section, we will first provide a categorisation of all manner modifiers. Then, we will focus on speed modifiers and discuss their relation to other manner modifiers.

As manner is by no means a discrete category, but rather a category with extremely fuzzy boundaries, the bottom-up analysis of linguistic data led us to distinguish between three types of manner modifiers (see Figure 1).

5. For data analysis and presentation, we used the following R packages: ‘stats’ (R Core Team 2020), ‘dplyr’ (Wickham et al. 2020), ‘sjPlot’ (Lüdecke 2021), ‘ggplot2’ (Wickham et al. 2021), and ‘ggpubr’ (Alboukadel 2020). The R code and dataset can be accessed through DataDOI (Taremaa & Kopecka 2021).

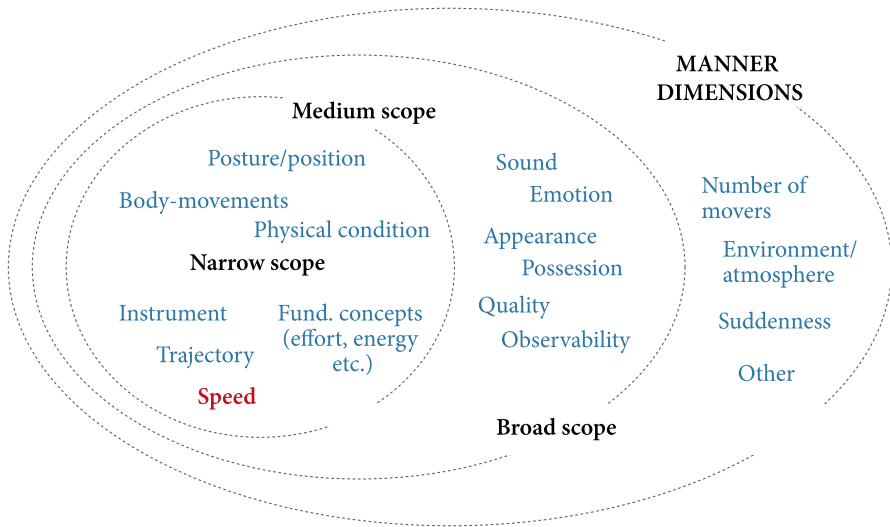


Figure 1. Classification of manner modifiers into three categories based on the bottom-up analysis of the linguistic material

In this categorisation, the modifiers that were most directly related to specifying the motor pattern of the moving entity (e.g., body-movements, instrument, speed) were deemed to be the core features of manner and termed as manner modifiers of narrow scope. Modifiers that were ambiguous in terms of specifying body-movements were classified as secondary to manner (e.g., sound of motion, appearance and emotion of the mover). These ambiguous modifiers and modifiers of narrow scope constitute a group of modifiers of medium scope. The modifiers that did not specify body-movements but nevertheless indicated **how** motion is conducted were classified as manner modifiers of the least clear type (e.g., environmental aspects expressed as manner). Together with the narrow and medium scope, they form the broad scope of manner. A detailed overview of these three types of manner subcategories is presented below.

Manner modifiers of narrow scope are expressions that clearly relate to the general motor pattern or the figure’s body-movements. One could also say that these are prototypical manners in the context of motion. This category includes not only the expressions that primarily describe motor pattern (Body-Movements, Posture/Position, and Physical Condition of the mover), but also those that indicate body-movements indirectly (Fundamental Concepts, Instrument, Trajectory, Speed; see Table 1). In Akita’s (2017: 47) words, they form “an indispensable part of a motion event”. The subcategories are presented in Table 1 alongside linguistic examples and frequencies in the data. The frequencies represent the number of clauses that contain a manner modifier of a particular

type. When a manner modifier clearly expresses two or more semantic features, it is multiple-counted. For instance, the phrase *pikal sammul* ‘with long steps’ [long.ADE step.ADE] occurs in the subcategory of BodyMovements and that of Speed. In total, manner modifiers of narrow scope occur in 1447 clauses.

Manner modifiers of medium scope include the expressions of narrow scope detailed above and those that are ambiguous in terms of describing body-movements. It can be claimed that they are “secondary to manner of motion” (Akita 2017: 47), as has been done for Sound by Akita (2017). In Talmy’s (2000: 46–47) terms, many such expressions represent Concomitance or Concurrent Result. Concomitance refers to actions performed by the mover while moving but not for the purposes of motion. Concurrent Result refers to actions that occur because of motion, and they are, as the name suggests, concurrent with motion. These ambiguous modifiers add 1,029 instances to the category of manner. Thus, the number of manner modifiers of medium scope is 2,476 occurring in 2,344 clauses in total. The subcategories include Sound, Emotion, Appearance, Possession, Quality, and Observability, all detailed in Table 2.

Manner modifiers of broad scope cover expressions of narrow and medium scope and add to the category of manner those that do not describe body-movements but the event in general, such as environment or other aspects (see Table 3). These least-clear manner modifiers occur in 477 clauses. In total, manner modifiers of broad scope have 2953 instances occurring in 2780 clauses.

In this three-tier classification, we have placed speed within the narrow scope. This is because speed is an essential part of motion and is closely related to motor pattern and to other subcategories of narrow scope. This relation can be twofold. First, a particular speed can be a result of a motor pattern, posture, physical condition, effort, instrument, and/or trajectory (all subcategories of the narrow type). For example, if one is walking with an injured leg, no instrument is used, and the trajectory is not straight (this could be expressed as *vigastatud jalaga vaevaliselt komerdades* [injure.PPP foot.COM arduously.ADV stagger.GER] ‘staggering with an injured leg while moving on’), this results in rather slow motion. Second, one can move with a particular manner because of the need to move at a particular speed. For instance, one can choose running and following a straight trajectory in order to move fast (e.g., *joostes* [run.GER] ‘running’, *otsejoones* [ADV] ‘at once, directly’), and, if in a hurry, one can use a car or a train as an instrument (e.g., *lennukiga* [plane.COM] ‘by plane’). Thus, speed may be one of the means that can, in principle, help us to identify the most typical manner expressions. That is, if a manner expression can be attributed a speed meaning, it could be considered a clear instance of manner expression (i.e., manner of narrow scope).

Table 1. Manner modifiers of narrow scope

Manner modifiers of narrow scope			
Subcategories	Definitions	Examples	N of clauses = 1447
Instrument	the vehicle or instrument of motion	<i>lennukiga</i> ‘by plane’, <i>rattaga</i> ‘by bike’, <i>kepi najal</i> ‘with a stick’, <i>ilma lestadeta</i> ‘without swim fins’	470
Speed	speed of motion or change of speed	<u>slow motion</u> : <i>aeglaselt</i> ‘slowly’, <i>vaikses tempos</i> ‘at a quiet pace’; <u>fast motion</u> : <i>kiiresti</i> ‘fast’, <i>kiiremini kui kunagi varem</i> ‘faster than ever’, <i>pikal sammul</i> ‘with long steps’, <i>250 kilomeetrit tunnis</i> ‘250 kilometres per hour’; <u>motion of variable or ambiguous speed</u> : <i>erineval kiirusel</i> ‘with varying speeds’, <i>omas tempos</i> ‘at one’s own pace’	399
BodyMovements	general motor pattern with respect to the medium; main and accompanying body-movements. This category includes expressions that imply specific body-movements alongside a rich set of semantic features expressed as comparisons	<i>pikal sammul</i> ‘with long steps’, <i>vaarudes</i> ‘staggering’, <i>jalgsi</i> ‘on foot’, <i>[ujus] konna</i> ‘(s)he swam breaststroke’, <i>kui vanainimene</i> ‘like an old man’, <i>nagu segane</i> ‘like a mad person’, <i>nagu jännes</i> ‘like a rabbit’	300
Trajectory	shape of the trajectory followed by the mover	<i>risti</i> ‘crossways’, <i>otse</i> ‘directly’, <i>suure ringiga</i> ‘not directly’, <i>peaaegu ilma loogeteta</i> ‘almost without any slopes’	114
FundConcepts	fundamental concepts evoked by motion; mainly related to energy, effort, force, continuity, steadiness, and related concepts	<i>kergelt</i> ‘easily’, <i>reipal sammul</i> ‘with brisk steps’, <i>vaevaliselt</i> ‘with difficulty’, <i>täiest jõust</i> ‘with full force’, <i>viimast jõudu kokku võttes</i> ‘summing up the last force’	108

Table 1. (continued)

Manner modifiers of narrow scope			
Subcategories	Definitions	Examples	N of clauses = 1447
Posture/Position	posture or position of the mover	<i>kummargil</i> 'leaning forward', <i>käed seljal</i> 'hands on back', <i>selg ees</i> 'back in front', <i>kõrvuti</i> 'side by side'	95
PhysicalCond	physical condition of the mover	<i>purjuspäi</i> 'drunkenly', <i>haavatuna</i> 'wounded', <i>oma vigase jalaga</i> 'with one's hurt leg', <i>surmväsinult</i> 'deadly tired'	81

4.2 The expression of speed-related information

The two main linguistic means to express speed-related information are motion verbs and manner modifiers. Not all manner modifiers carry speed meanings. To differentiate between manner modifiers that imply speed and those that do not, we term the former ones as 'speed modifiers'. When we discuss 'manner modifiers', these also include the subset of speed modifiers. It should be noted, however, that besides verbs and modifiers, speed information can also be expressed through other linguistic means or can be inferred from the general context of a motion clause. For example, attributes of NPs that describe the mover can imply speed (e.g., *kiirustav mees jooksis koju* [hurry.PTCP man.NOM run.PST.3SG home.ILL] 'the man who was hurrying ran home') (see also Hallonsten Halling 2018). However, such uses are not discussed in this paper. Furthermore, we do not aim to investigate speed in relation to the mover type (e.g., animate or inanimate). Thus, while the degree of speed is dependent on the mover, this relationship would require a separate qualitative and quantitative investigation.⁶ In the following sections, we examine the expression of speed across motion verbs and manner modifiers, explicate the interrelations between the verbs and speed modifiers, and discuss the main functions of speed modifiers.

4.2.1 Speed expressed in motion verbs

Motion verbs can be distinguished by the relative speed they express. As shown by the results of an earlier experiment in which the participants were asked

6. Note, however, that animate movers dominate in the data under study here. Animate movers are expressed in 11,583 clauses (94%), inanimate movers in 163 clauses (1.3%), and vehicles as movers in 527 clauses (4.3%). Mover type could not be established in 27 clauses (0.2%).

Table 2. Manner modifiers of medium scope

Manner modifiers of medium scope			
Subcategories	Definitions	Examples	N of clauses = 1029
Emotion	emotional state or attitude of the mover	<i>ettevaatlikult</i> ‘carefully’, <i>kurvalt</i> ‘sadly’, <i>lootusrikkalt</i> ‘being hopeful’, <i>otsusekindlalt</i> ‘being determined’, <i>rõõmsalt</i> ‘happily’, <i>unistades</i> ‘dreaming’	479
Appearance	appearance of the mover in terms of clothing, facial expressions and other observable characteristics	<i>ülikonnas</i> ‘wearing a suit’, <i>alasti</i> ‘nakedly’, <i>lahtiste juuste lehvides</i> ‘with loose hair fluttering’, <i>naeratades</i> ‘smiling’, <i>rõõmsa näoga</i> ‘with a happy face’	184
Possession	anything carried along by the mover and expressed as their possession	<i>kokteilid käes</i> ‘cocktails in hand’, <i>raamatud süles</i> ‘books in his/her lap’, <i>kohvriga</i> ‘with a suitcase’, <i>relvitutena</i> ‘unarmed’	186
Sound	sounds occurring because of motion or those produced by the mover while or because of moving	<i>vaikselt</i> ‘quietly’, <i>puujala käginal</i> ‘with the wooden leg creaking’, <i>sõnagi lausumata</i> ‘without saying a word’, <i>piiksudes</i> ‘peeping’	149
Quality	general quality of motion that affects how motion is conducted	<i>hästi</i> ‘well’, <i>korralikult</i> ‘properly’, <i>halvasti</i> ‘badly’, <i>maratonijooksja tasemel</i> ‘at the level of a marathon runner’	70
Observability	visibility or observability of the mover	<i>märkamatu</i> ‘without being noticed’, <i>salaja</i> ‘secretly’, <i>hämärase katte all</i> ‘under cover of twilight’	39

to rate how slow or fast the motion expressed by a particular motion verb is (Taremaa 2017), all motion verbs are sensitive to speed. For example, *jooksma* ‘run’ expresses faster motion than *jalutama* ‘walk, stroll’, and *jalutama* ‘walk, stroll’, in turn, expresses faster motion than *lonkima* ‘stroll, saunter’. In fact, motion verbs form a continuum ranging from high-speed verbs to low-speed verbs.

The verbs investigated in the current study ($N=41$) are a subset of the verbs examined in Taremaa (2017) (see Section 3 for further details). The subset selected for the current study is presented in Figure 2 ordered by their speed

Table 3. Manner modifiers of broad scope

Manner modifiers of broad scope			
Subcategories	Definitions	Examples	N of clauses = 477
Other	all expressions that do not fit into any other subcategories of manner but nevertheless describe how motion is conducted	<i>ebaseaduslikult</i> ‘illegally’, <i>alatlult</i> ‘foully’, <i>ebaregulaarselt</i> ‘irregularly’, <i>ilma peatusteta</i> ‘without stops’, <i>kuidas</i> ‘how’, <i>läbipääsu otsides</i> ‘looking for a passage’, <i>omavoliliselt</i> ‘without permission’, <i>raha maksmata</i> ‘without paying’	259
NumberOfMovers	the number of movers (modifiers of co-movers (e.g., <i>sõbraga</i> ‘with a friend’) do not fall into this category but constitute a separate category not discussed in this paper)	<i>üksi</i> ‘alone’, <i>omapäi</i> ‘on his/her own’, <i>kahekesi</i> ‘two of them, in pairs’, <i>üheskoos</i> ‘together’	133
Environment/ Atmosphere	specifications of the environment that create the atmosphere of motion	<i>fännide kisa saatel</i> ‘accompanied by a shout of fans’, <i>ööpimeduses</i> ‘in the dark of night’, <i>taskulambi valguses</i> ‘in the light of a flashlight’, <i>Hispaania lipu all</i> ‘under the Spanish flag’, <i>tugevas tuules</i> ‘in strong winds’, <i>turvameeste saatel</i> ‘accompanied by security guards’	62
Suddenness	expectedness of the appearance or movements of the mover	<i>ootamatult</i> ‘unexpectedly’, <i>järsku</i> ‘suddenly’	26

ratings, as documented in previous research (Taremaa 2017). They range from high-speed verbs to low-speed verbs and form a continuum. In this subset of the verbs, the fastest motion is conveyed by the verbs *kihutama* ‘race, career’, *tormama* ‘rush, dash’, and *kiirustama* ‘hurry, rush’, while the slowest motion is conveyed by *lonkima* ‘stroll, saunter’, *komberdama* ‘stumble, hobble’, and *roomama* ‘crawl’. Essentially, motion verbs can only express relative, not absolute, speed.

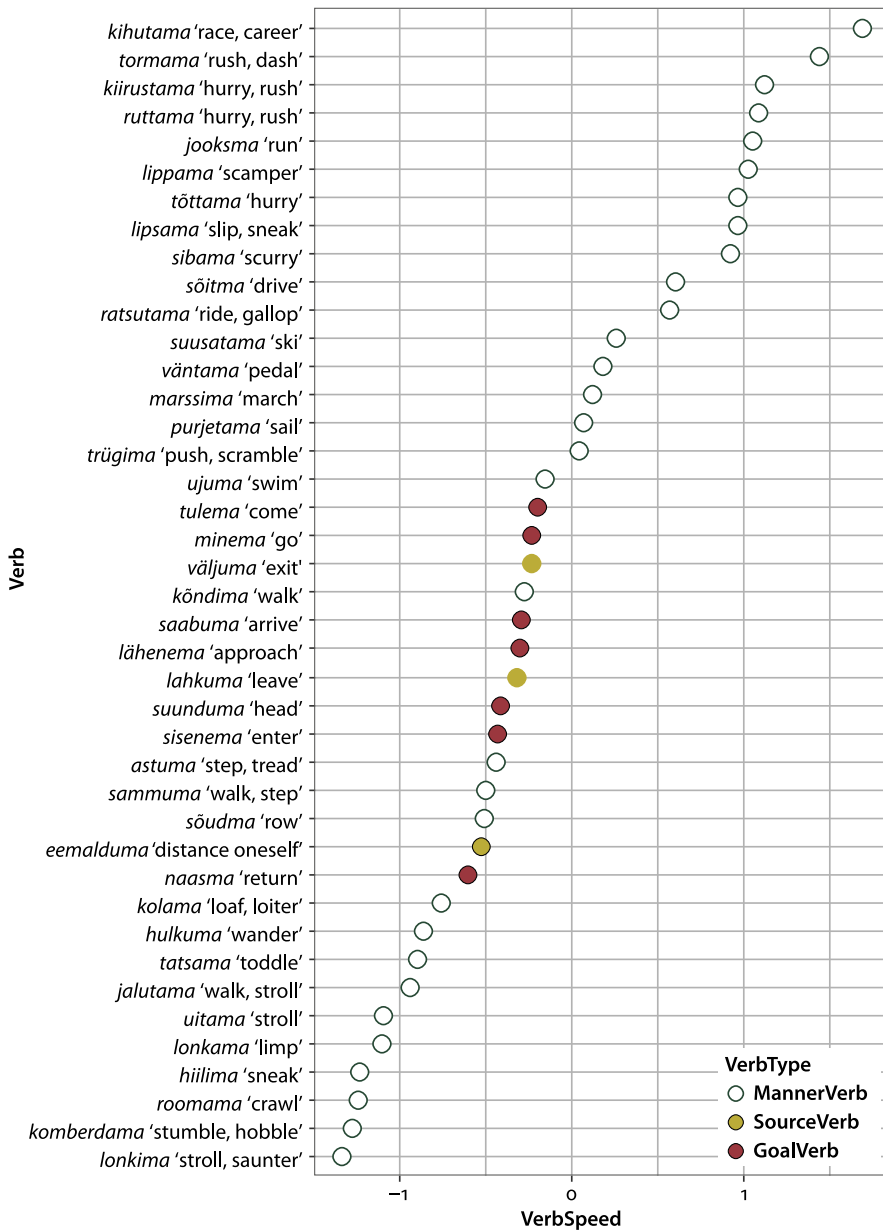


Figure 2. Standardised mean speed ratings of the verbs. The smaller the mean, the slower the verb, and the larger the mean, the faster the verb

Furthermore, among the verb types, manner of motion verbs ($N=31$; indicated in white in Figure 2) are clearly sensitive to speed as they are distributed

along the whole continuum of speed ratings (min -1.3 , max 1.7). Path verbs, including source verbs ($N=3$; indicated in yellow) and goal verbs ($N=7$; indicated in red), are much more modest in expressing speed-related information. That is, they are relatively homogeneous in their speed ratings (min -0.6 , max -0.2), and the ratings themselves fall close to zero (see Figure 2). Even so, Figure 2 indicates that some variation occurs within path verbs. For example, *tulema* ‘come’ and *minema* ‘go’ as goal verbs and *väljuma* ‘exit’ as a source verb express faster motion than the verbs *eemalduma* ‘distance oneself’ (source verb) and *naasma* ‘return’ (goal verb).

4.2.2 Speed expressed in manner modifiers

Alongside verbs, manner modifiers are the second main means to express speed-related information in motion clauses. Importantly, speed modifiers can express not only relative speed (e.g., *kiiresti* ‘fast’), but also absolute speed (e.g., *100 km/h* ‘100 kilometres per hour’). In terms of the saliency of speed information and the type of conflation with other features of manner they reveal, speed modifiers can be divided into three broad categories:

1. Manner modifiers that convey speed-related information only (e.g., *kiiresti* [ADV] ‘fast’).
2. Modifiers that conflate speed with at least one other manner feature, and both are foregrounded. For example, *kiirel sammul* [fast.ADE step.ADE] ‘with fast steps’ expresses speed and body-movements (i.e., steps).
3. Modifiers in which speed can be conceived as a backgrounded feature. For example, *longates* [limp.GER] ‘limping’ and *kepi najal* [stick.GEN ON.ADP] ‘leaning on a stick’ imply slow motion, whereas *otsejoones* [ADV] ‘at once, directly’ and *lennukiga* [plane.COM] ‘by plane’ imply fast motion.

Whereas the modifiers of the first two categories of salient speed information are comparatively easy to establish, the third type of modifiers provides a much more challenging case. On intuitive grounds, it seems almost impossible to distinguish between manner modifiers that convey backgrounded speed-related information and those that do not. For instance, an instrument expression, *autoga* [car.COM] ‘by car’, can imply motion with different speeds, whereas a similar instrument expression, *lennukiga* [plane.COM] ‘by plane’, suggests relatively fast motion and *kepiga* [stick.COM] ‘with a stick’ suggests slow motion. This is similar to the modifiers of body-movements. The expression *jala* [ADV] ‘on foot’ can imply that one walks fast or slow (although, admittedly, going somewhere on foot is obviously slower than going by plane), whereas *jooksuga* [run.COM] ‘running’ implies fast motion, and *vaarudes* [stagger.GER] ‘staggering’ implies slow motion. For modifiers in which speed is backgrounded and is instead a consequence of moving in

a particular manner, it is difficult to establish whether motion is fast or slow. For this reason, the backgrounded speed of motion in modifiers that saliently express other manner features is not established in this study.

In our data of 12,300 corpus clauses, there are 399 clauses that contain a manner modifier depicting salient information about speed. Of these, 346 clauses contain modifiers that dominantly express speed (i.e., the first category), and 53 clauses contain modifiers that convey speed information in combination with some other salient manner feature (i.e., the second category). Most frequently, speed is conflated with body movements in modifiers (in 34 clauses; e.g., *kiirel sammul* [fast.ADE step.ADE] ‘with fast steps’), followed by confluations with fundamental concepts such as force (in 7 clauses; e.g., *täiega* [ADV] ‘very fast, intensively’). In the following analyses, we focus only on modifiers in which speed is the only or one of the two main semantic components (i.e., the first and second subcategory of speed; altogether, 399 clauses).

Morphosyntactic properties of speed modifiers

As for the types of speed modifiers, we can compare the morphosyntactic realisation of speed modifiers to manner modifiers of broad scope. In Estonian, manner modifiers can have various morphosyntactic forms, and so can speed modifiers. In our data (see Panel A in Figure 3), speed is most frequently expressed by means of adverb phrases (65%; e.g., *kiiresti* [ADV] ‘fast’, *väga kiiresti* [very.ADV fast.ADV] ‘very fast’), NPs in comitative (17%; e.g., *hooga* [momentum.COM] ‘fast’), and NPs in adessive (7%; e.g., *kiirel sammul* [fast.ADE step.ADE] ‘with fast steps’). These three formal strategies are the most common ones used to express manner in general (40%; see Panel B in Figure 3), but adverb phrases are used particularly frequently for expressing speed. The figure also shows that the broad category of manner is much more diverse in terms of its formal realisations compared to the subcategory of speed. To an extent, this can be due to the low number of instances of speed modifiers in our data as compared to the total number of manner modifiers.

The morphosyntactic realisation of speed modifiers across slow and fast motion is presented in Figure 4. It shows that slow motion modifiers are somewhat biased towards adverb phrases and NPs inflected in adessive or inessive, whereas fast motion is expressed with a greater variety of formal means. However, these differences are very small. In any case, fast motion is expressed with more diverse linguistic means than slow motion.

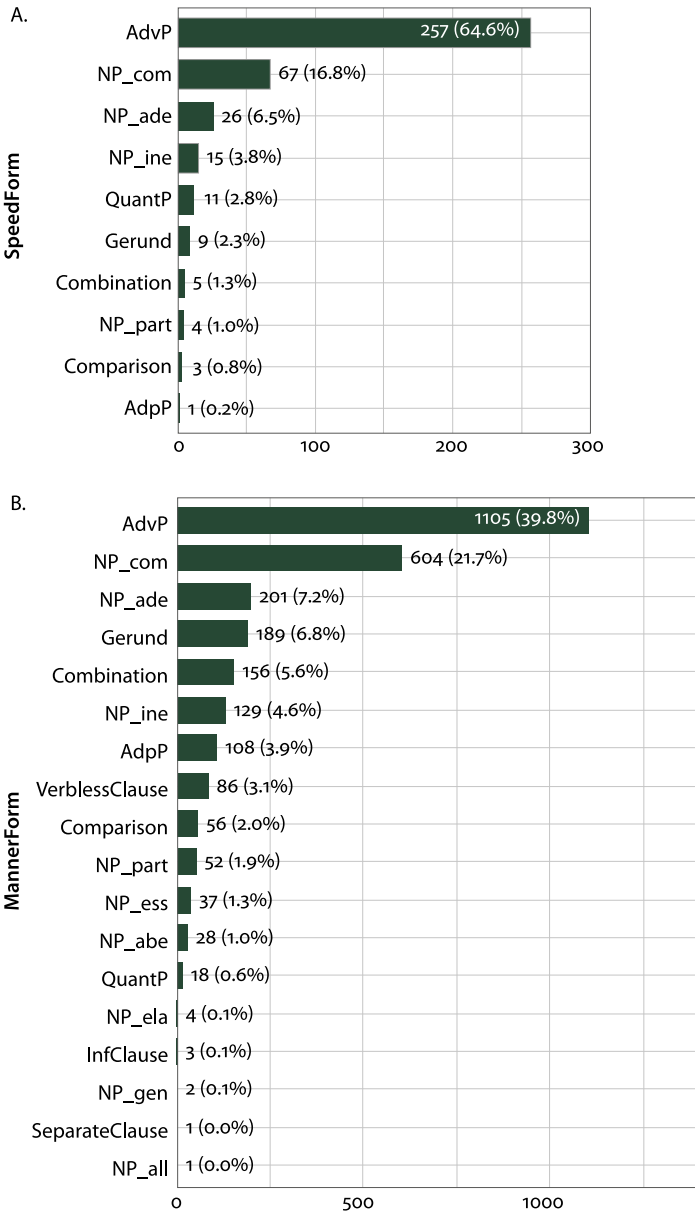


Figure 3. A: Formal realisations of speed modifiers. B: Formal realisations of manner modifiers of broad scope (speed modifiers included)

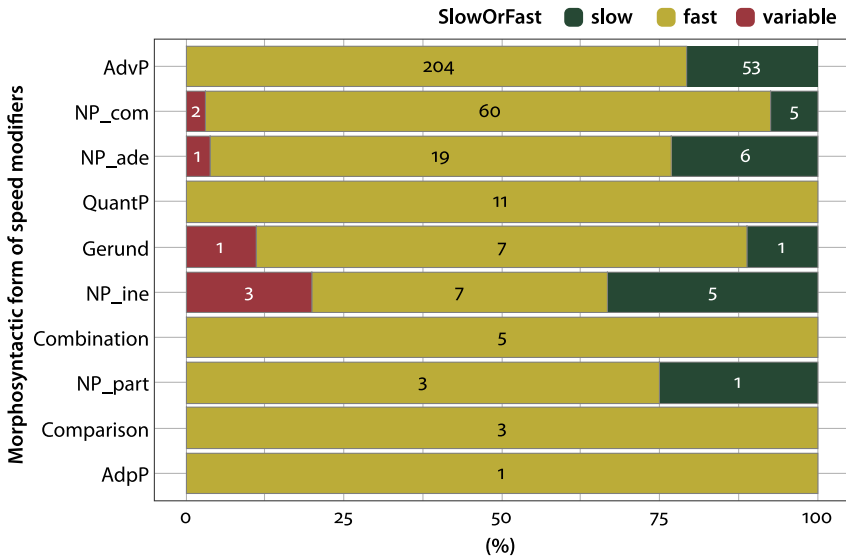


Figure 4. The morphosyntactic realisation of speed modifiers across slow, fast, and variable motion

Of the 323 modifiers of fast motion (tokens), there are 154 different expressions (types; see Appendix B for the full list of unique items). In other words, the mean frequency of a unique expression is 2.1 occurrences. The most frequent ones are adverbs that can be translated as ‘fast, quickly’: *kiiresti* [ADV] (45 occurrences), *kiirelt* [ADV] (25 occurrences), *ruttu* [ADV] (17 occurrences), *ummisjalu* [ADV] (11 occurrences), *kähku* [ADV] (10 occurrences), followed by a noun phrase, *kiirel sammul* [fast.ADE step.ADE] ‘fast paced’ (inflected in adessive; 7 occurrences), and an adverb phrase, *väga kiiresti* [very.ADV fast.ADV] ‘very fast’ (7 occurrences). 123 expressions of fast motion occur only once, which illustrates the flexibility of a morphology-rich language to apply various combinations and means to express speed-related information. It is also worth noting that of the 154 unique expressions, 29 are one-lexeme adverbs. This, in turn, is an impressive number of lexemes specialising in the expression of fast speed (see also Appendix B).

Of the 71 modifiers of slow motion, 27 unique expressions occur. This means that the mean frequency of each individual item is 2.6 occurrences, suggesting that the category of slow motion is less diverse than that of fast motion. The five most frequent expressions are three adverbs: *aeglaselt* [ADV] ‘slowly’ (22 occurrences), *rahulikult* [ADV] ‘peacefully’ (17 occurrences), and *aegamisi* [ADV] ‘slowly’ (2 occurrences) and two noun phrases: *aeglasel sammul* [slow.ADE step.ADE] ‘in slow steps’ (4 occurrences) and *rahulik tempo* [calm.INE pace.INE] ‘at a calm pace’ (4 occurrences). The rest of the expressions, 22 in total, occur only once.

Furthermore, of the 27 unique expressions, 8 are one-lexeme adverbs. Thus, the modifiers of slow motion clearly feature a less varied set of linguistic means compared to those of fast motion.

4.2.3 Interrelations between verbs and modifiers

In this section, we analyse whether the presence and semantics of speed modifiers is related to the type of verb in terms of manner and path verbs and to the speed expressed in motion verbs. To account for the behaviour of speed modifiers in a broader context, we present the analysis of speed modifiers alongside the analysis of the general category of manner. We also explicate the possible functions speed modifiers can have in motion clauses.

The use of speed modifiers across manner and path verbs

Manner and path verbs combine with speed modifiers equally well (see Panel A in Figure 5). Manner verbs occur slightly more frequently in combination with speed modifiers than source and goal verbs do, but this difference in proportions is negligible ($\chi^2(2, N=12,300)=19.3, p < 0.001^{**}$, Cramér's $V=0.04$).⁷ This differs from the behaviour of manner modifiers in general. As shown in Panel B in Figure 5, manner modifiers of broad scope (speed modifiers included) combine with manner verbs considerably more frequently than with path verbs ($\chi^2(2, N=12,300)=187.2, p < 0.001^{**}$, Cramér's $V=0.12$). This indicates that speed as a subcategory of manner behaves differently from the general category of manner in that it is not particularly biased towards manner verbs or path verbs.

The use of speed modifiers across motion verbs with different speed ratings

Motion verbs that express faster motion are more likely to be combined with speed modifiers (see Panel A in Figure 6). Manner modifiers in general do not have this tendency as there is no difference between motion verbs that co-occur with a manner modifier and those that do not (see Panel B in Figure 6). Furthermore, modifiers of fast motion are considerably more frequent than modifiers of slow motion (81% and 18%, respectively; see Panel C in Figure 6). There is also a correlation between the speed of motion as implied by motion verbs and speed modifiers (see Panel D in Figure 6). Slow motion verbs tend to combine with modifiers of slow motion, and fast motion verbs tend to combine with modifiers of fast motion, suggesting semantic congruence.

7. Cramér's V indicates how strong the association is on a 0 to 1 scale and should be interpreted as follows: 0.5 strong, 0.3 moderate, and 0.1 weak association (Cohen 1988: 224–225).

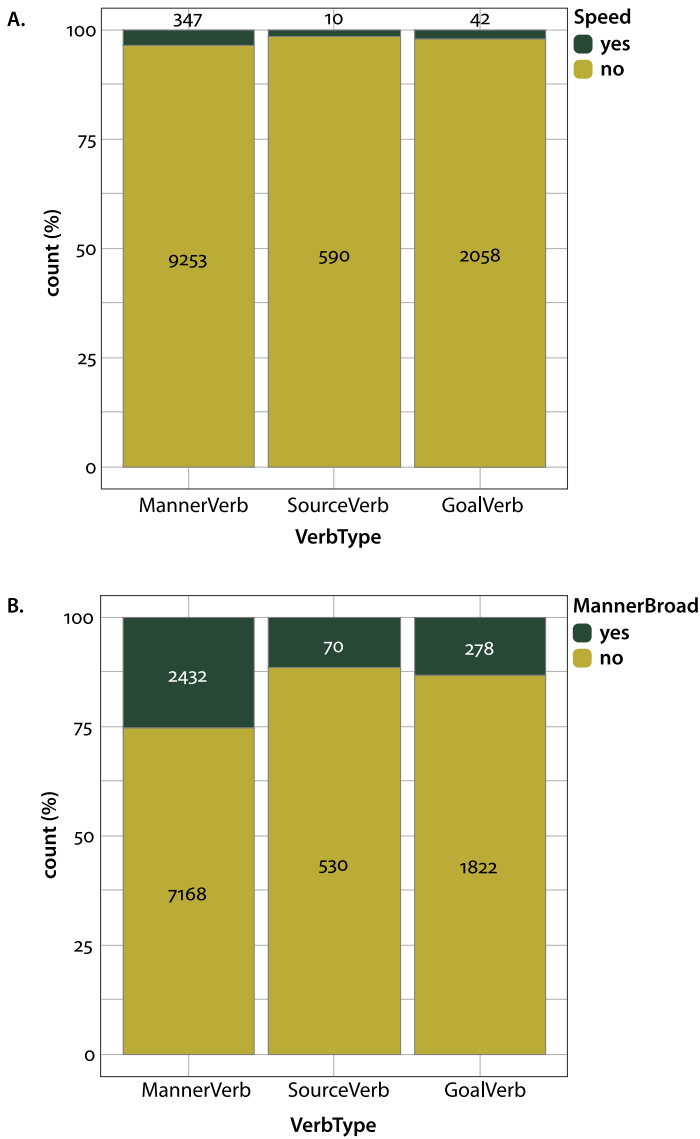


Figure 5. A: The presence (= yes) or absence (= no) of speed modifiers across verb types. B: The presence (= yes) or absence (= no) of manner modifiers (broad scope, speed modifiers included) across verb types

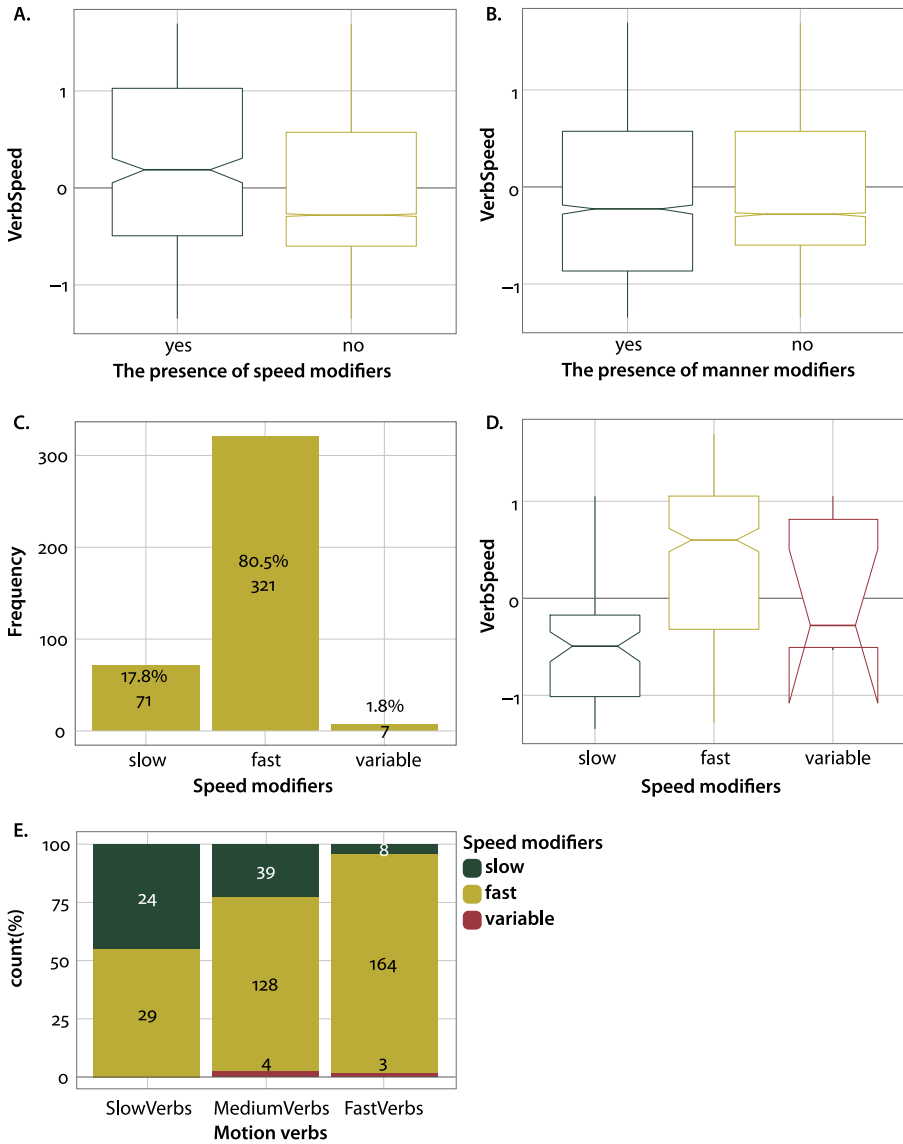


Figure 6. A: Speed ratings of the verbs across the clauses with the presence (= yes) or absence (= no) of speed modifiers. B: Speed ratings of the verbs across the clauses with the presence (= yes) or absence (= no) of manner modifiers (broad scope, speed modifiers included). C: General frequencies of speed modifiers that express fast, slow, or variable speed of motion. D: Speed ratings of the verbs across the clauses with speed modifiers that express fast, slow, or variable speed of motion. E: Speed modifiers across the verbs grouped into slow, medium, and fast motion

This latter association – that verbs of fast motion combine with modifiers of fast motion and verbs of slow motion combine with modifiers of slow motion – is not surprising, as otherwise, a semantic conflict would occur. For instance, *kihutas aeglaselt* [race.PST.3SG slowly.ADV] ‘(s)he raced slowly’ would sound somewhat odd. However, if we cluster motion verbs into three categories (slow, medium, and fast motion),⁸ we can observe that such patterns do occur (see Panel E in Figure 6; $\chi^2(4, N=12,300)=52.2, p < 0.001^{**}$, Cramér’s $V=0.3$). Whereas 94% of fast motion verbs combine with fast motion modifiers, 5% of them combine with slow motion modifiers. As speed is always a matter of degree, motion verbs that do not express extreme fastness can easily be combined with slow motion specifications (e.g., *jooksis rahulikus tempos* [run.PST.3SG calm.INE pace.INE] ‘(s)he ran at a calm pace’). Furthermore, despite the fact that in comparison to fast motion verbs, slow motion verbs are biased towards slow motion modifiers, 55% of slow motion verbs do in fact combine with fast motion modifiers, and only 45% combine with slow motion modifiers (cf. *roomas kiiresti* ‘(s)he was crawling fast’ and *roomas aeglaselt* ‘(s)he was crawling slowly’). Motion verbs of medium speed position themselves nicely between the verbs of slow and fast motion, with 75% of them co-occurring with fast motion modifiers and 23% with slow motion modifiers.

Speed modifiers of fast motion combine most frequently with the following five verbs: *kihutama* ‘race, career’ (11%), *sibama* ‘scurry’ (7%), *lähenema* ‘approach’ (7%), *eemalduma* ‘distance oneself’ (7%), and *jooksma* ‘run’ (6%). Speed modifiers of slow motion combine most frequently with the following five verbs: *lonkima* ‘stroll, saunter’ (16%), *lähenema* ‘approach’ (11%), *eemalduma* ‘distance oneself’ (9%), *sammuma* ‘walk, step’ (7%), and *jalutama* ‘walk, stroll’ (7%). Of these verbs, *eemalduma* ‘distance oneself’ and *lähenema* ‘approach’ are path verbs and occur in both lists. That is, they are less sensitive to the types of speed modifiers (fast vs. slow) and can combine with both types more easily than manner verbs, suggesting that the semantics of the verbs are flexible in terms of speed. Clear differences occur among manner verbs. The top three manner verbs that frequently co-occur with modifiers of fast motion also express fast motion. The top manner verbs combining with modifiers of slow motion, on the other hand, express relatively slow motion.

Functions of speed modifiers

Three functions emerge pertaining to speed modifiers in the expression of motion: compensation, specification, and intensification, all of which are closely related and often difficult to differentiate on intuitive grounds without taking

8. We used K-means clustering to divide the verbs into three categories based on their speed ratings.

into consideration the context in which manner modifiers occur. Compensation means that the speed modifier is the main unit of a motion clause carrying speed information, whereas the verb itself provides negligible (if any) information about speed. Specification captures the characteristic of speed modifiers to detail the general speed expressed in the verb. Intensification refers to the function of emphasising the specific speed conveyed by the verb.

In particular, compensation can be seen in cases in which a speed modifier co-occurs with a path verb. In such cases, the function of a speed modifier is to provide information about the speed of motion as the verb itself provides very little (if any) information about the speed. This is exemplified in (1) and (2) in which the path verb *lähenema* ‘approach’ combines with a fast motion modifier and a slow motion modifier, respectively.

- (1) *Ta lähene-s kiiresti pois-te-le,*
 (s)he approach-PST.3SG fast boy-PL-ALL
 ‘(S)he approached the boys fast.’

- (2) *Lähene-si-me kanali-le aeglaselt.*
 approach-PST.1PL canal-ALL slowly
 ‘We approached the canal slowly.’

When combining with manner verbs, speed modifiers have two main functions: specification and intensification. Specification implies providing more detail regarding the speed of motion expressed by the verb. As such, this function is similar to compensation in that it adds specific information that is lacking in the verb. Such specification can be observed with the fast motion verb *kihutama* ‘race, career’ in (3), with the medium speed verb *suusatama* ‘ski’ in (4), and with the slow motion verb *komberdama* ‘stumble, hobble’ in (5). Admittedly, all these modifiers of specification intensify the general speed expressed in the verb, and it might be a matter of debate whether a modifier is primarily a tool for specification or intensification.

- (3) *kui te kihuta-te 150-kilomeetrise tunnikiiruse-ga*
 when you race-PRS.2PL 150.kilometer.GEN hourly.rate-COM
 ‘When you race 150 kilometers per hour.’

- (4) *suusata-s teiste-st viis korda kiiremini*
 ski-PST.3SG other.PL-ELA five times faster
 ‘(S)he was skiing five times faster than the others.’

- (5) *Põder ka komberda-b jube aeglaselt.*
 moose.SG.NOM too stumble-PRS.3SG horribly slowly
 ‘The moose is stumbling horribly slowly too.’

Therefore, intensification overlaps with specification. Nevertheless, not all instances of intensification can be analysed as specification. In this case, the function of a speed modifier is to intensify the meaning of speed expressed in the verb and, by means of redundant patterns, draw more attention to this aspect of motion. For instance, in (6), the fast motion verb *tõttama* ‘hurry’ combines with *kiiresti* ‘fast’. In (7), the slow motion verb *lonkima* ‘stroll, saunter’ co-occurs with *aeglaselt* ‘slowly’. The two functions cannot be easily distinguished as the specification function also serves as a means to intensify speed meanings. In addition, such redundancy is clearly not specific to speed expressions but, rather, can be taken as a characteristic of manner expressions in general. For example, in (8), the manner modifier expresses speed and body-movements by repeating the information given by the verb.

- (6) *Tõtta-si-n kiiresti koju pere juurde.*
 hurry-PST-1SG fast home.ILL family.GEN to
 ‘I hurried home **fast** to my family.’
- (7) *Valdur longi-b aeglaselt kodu poole,*
 Valdur stroll-PRS-3SG slowly home towards
 ‘Valdur is **slowly** strolling home.’
- (8) *Sammu-si-me siis aga kiire-l sammu-l Greta järel...*
 step-PST-1PL then but fast-ADE step-ADE Greta.GEN after
 ‘We then took a **quick step** after Greta.’

Thus, even though we can outline three functions, the distinction between them is not categorical because compensation can also be viewed as specification, and specification, in turn, can simultaneously serve as intensification. Further research is needed to better account for the nature of these three functions and for the similarities and differences between them.

5. Discussion

In this study, we set out to examine the linguistic expression of speed in motion events and to establish the characteristics of speed expressions within the context of the general category of manner and across motion verbs and speed modifiers. Through analysing the written Estonian corpus data of 12,300 motion clauses, we obtained the following main results.

First, speed is one of the dimensions of manner that is most frequently expressed in manner modifiers and can be deemed a core category of manner.

In addition, speed is closely related to other core manner features such as body-movements, instrument, posture, physical condition, and trajectory.

Second, motion verbs form a continuum from slow motion (e.g., *lonkima* ‘stroll, saunter’) to fast motion (e.g., *kihutama* ‘race, career’) rather than discrete categories. Path verbs (e.g., *sisenema* ‘enter’, *väljuma* ‘exit’) are comparatively similar as a group in their speed ratings, and manner verbs (e.g., *lonkima* ‘stroll, saunter’, *kõndima* ‘walk’, *kihutama* ‘race, career’) are very heterogeneous as a group, ranging from very slow to very fast motion.

Third, because the speed of motion can range from extreme slowness to extreme fastness, it is mostly a matter of degree. In language, speed can be expressed as relative or absolute, and there are various ways to depict the different degrees of slowness or fastness. Motion verbs can only express relative speed, whereas speed modifiers can express both (cf., *kiiresti* ‘fast’ and *100 km/h* ‘100 km/h’). Furthermore, speed modifiers tend to be categorical in that they express either slow or fast motion, within which there is room for speed specification by means of linguistic modification (cf., *kiiresti* ‘fast’, *üsna kiiresti* ‘quite fast’, *väga kiiresti* ‘very fast’, and *ülimalt kiiresti* ‘extremely fast’).

Fourth, modifiers of fast motion tend to combine with verbs of fast motion (e.g., *kihutas ruttu* [race.PST.3SG ADV] ‘(s)he raced quickly’) and modifiers of slow motion with verbs of slow motion (e.g., *lonkis aeglaselt* [stroll.PST.3SG slowly.ADV] ‘(s)he was strolling slowly’), thereby revealing semantic congruence. In addition, verbs of slow and medium speed can also co-occur with modifiers of slow and fast motion. Fast motion verbs, on the other hand, are much more rigid and tend not to be combined with slow motion modifiers. This suggests that motion verbs of slow and medium motion are more flexible and can be used to express motion of various speeds, whereas fast motion verbs are more specialised to only express fast motion.

Finally, speed modifiers are unevenly distributed in that fast motion modifiers are almost five times more frequent than slow motion modifiers. The number of unique expressions is also larger in the domain of fast motion than in the domain of slow motion, not only in absolute terms but also based on the mean frequencies of unique modifiers.

Drawing on these results, we propose the **fast-over-slow** bias. Thus, as evidenced by the data, fast motion is more frequently expressed than slow motion, and the linguistic inventory to express fast motion is considerably more diverse and fine-grained than that of slow motion. In other words, according to this bias, we suggest that fast motion may attract speakers’ attention more than slow motion. Our findings and this general tendency are in accord with previous findings on speed lexicons. For instance, Plungian & Rakhilina (2013) report that while there are a number of fast motion adjectives in Russian, slow motion is

represented only by one main adjective. According to the authors, such asymmetries also occur in other Slavic languages. Similar observations have been made by Hallonsten Halling (2018) in her study of adverbs in the world's languages. Ikegami (1969: 57) also suggests that there are asymmetries in the English language, with many adjectives for fast motion and only one main adjective for slow motion. In addition, he argues that in contrast to verbs of fast motion (e.g., *hasten*) which typically focus on that particular information, slow motion tends to be lexicalised in verbs so that it is “a non-distinctive feature which follows automatically from the features of mode” (Ikegami 1969: 57–58). In other words, slow motion is a consequence of moving in a particular way (as in crawling or creeping), whereas fast motion is foregrounded in the verbs as such. Our finding that slow motion verbs combine more readily with modifiers of the “opposite” type, i.e., with fast motion modifiers (e.g., *roomas kiiresti* [crawl.PST.3SG fast.ADV] ‘(s)he was crawling fast’) than fast motion verbs combine with slow motion modifiers further suggests that fast motion is more salient than slow motion. Consequently, slow motion verbs (and verbs of medium speed) can be used flexibly to express relatively fast motion, but fast motion verbs are more constrained in terms of combinability and tend to be preserved only for fast motion.

It is not accidental that we have worded the **fast-over-slow** bias similarly to the **goal-over-source** bias, which was proposed and elaborated by Ikegami (1987); Bourdin (1997), and Dirven & Verspoor (1998) and later examined by a number of researchers (see Kopecka & Vuillermet 2021 for an overview). According to the **goal-over-source** bias, the goal is more prominent to speakers than the source (or trajectory) and is also expressed more frequently and in a more fine-grained fashion than the source of motion. Clearly, future crosslinguistic research is needed to investigate how (if at all) and under what circumstances these two phenomena interact and whether fast motion is cognitively more salient and attracts speakers' attention more than slow motion. Tentatively, the speed of motion might be related to spatial aspects such as the expression of the goal. For instance, to reach a goal, fast motion could be preferred over slow motion. In addition, when reaching a goal is less important, one is more likely to choose a slower pace (which could also perhaps be a more convenient mode of moving). Eye-tracking studies by Lindsay et al. (2013) and Speed & Vigliocco (2013) provide evidence for such a tight relationship. The authors report that when people hear an English sentence with a fast motion verb, they focus their eyes on the goal of the motion faster than when a slow motion verb is used. Conversely, when a sentence expresses slow motion, speakers tend to observe the trajectory of motion more closely and reach the goal slightly more slowly.

Linguistic data further suggests similarities between the two biases according to the diversity of the more prominent category. Namely, as shown by previous

studies, goal expressions tend to be more numerous and diverse than other spatial expressions (e.g., Ikegami 1987; Bourdin 1997); this is also the case with expressions conveying fast motion in our data. At the same time, as a more prominent category, the goal of motion tends to be expressed by morphologically simpler forms as opposed to the source, which tends to be expressed by morphologically more complex forms. However, based on our Estonian data, we cannot say that slow motion, as a less prominent category, is expressed by more complex means than fast motion (nor can we argue for the reverse). When comparing the two biases from the perspective of verb semantics, very little can be said at this point. Whereas the **goal-over-source** bias has been shown to be sensitive to the semantics of the verb in that goal verbs and a set of manner verbs combine with goal expressions while source verbs do not (e.g., Stefanowitsch & Rohde 2004; Nikitina 2009), the results of the current study suggest that speed modifiers combine with manner, source and goal verbs equally well. Thus, even if the expression of spatial circumstances and speed-related information is presumably closely related, other aspects of expressing motion events need to be considered as well. That is to say, more research and analyses are needed to provide a better account for the presence and/or nature of the relation between these two asymmetries in language.

Regarding the functions of manner modifiers in general and speed modifiers in particular, we suggest three closely related functions: compensation, specification, and intensification. The first two relate to providing information that is not present in the verb. The latter function reinforces meanings already present in the verb. The compensatory function of speed modifiers is apparent when the modifiers combine with path verbs (see also Slobin et al. 2014). Given that path verbs can express motion of any speed, speed modifiers seem to be used in combination with these verbs when the speaker considers speed to be relevant information (e.g., *lähenesime majale kiiresti/aeglaselt* [approach.PST.1PL house.ADE fast/slowly.ADV] ‘we approached the house fast/slowly’). Such compensation is very similar to specification in cases in which the general speed of motion, as captured in the verb semantics, is specified by a speed modifier. Such specifications can be observed when a speed modifier occurs in tandem with manner verbs (e.g., *komberdas jube aeglaselt* [staunter.PST.3SG horribly.ADV slowly.ADV] ‘(s)he was sauntering horribly slowly’; *kihutasime 150-kilomeetrise tunnikiirusega* [race.PST.1PL 150-kilometer.GEN hourly.rate.COM] ‘we were racing 150 kilometres per hour’). Nevertheless, when a speed modifier co-occurs with a manner verb, it also has another function of intensification. Typically, intensification is achieved by means of simultaneous specification of speed in the verb and manner modifier. By means of such redundancy, speed modifiers help to express salient speed-related information not only in an intensifying manner, but also in a more fine-

grained manner. To illustrate the fine line between specification and intensification, we could argue that all instances of specification could be interpreted as intensification. As a result, one might also suggest that *komberdas jube aeglaselt* [staunter.PST.3SG horribly.ADV slowly.ADV] ‘(s)he was sauntering horribly slowly’ could be analysed as an instance of intensification rather than specification. Thus, differentiating between the two might be challenging and, perhaps, not always needed. However, redundancy without further specification of the exact speed is also possible, and it is frequent that both the verb and the modifier express the same general speed of motion (e.g., *kihutasime ruttu linna* [race.PST.1PL quickly.ADV town.ILL] ‘we raced quickly to town’).

Furthermore, we found that manner specification and intensification is characteristic of fast motion in that fast motion verbs tend to combine with fast motion modifiers, whereas slow motion verbs are much more flexible and frequently occur in combination with fast motion modifiers (e.g., *komberdas kiiresti* [saunter.PST.3SG fast.ADV] ‘(s)he was sauntering quickly’). That is, fast motion seems to be conceptually more specific than slow motion. Hence, combining fast motion verbs with slow motion modifiers would be incongruent. This finding can be linked to the principle of semantic relevance as put forward by Bybee (1985: 13, emphasis in original): “A meaning element is *relevant* to another meaning element *if the semantic content of the first directly affects or modifies the semantic content of the second*”. Although it was originally suggested in the context of morphology, we can see the same principle manifesting itself through semantic congruence in the combinations of verbs and speed modifiers. That is, combinations reveal semantic relevance between types of modifiers and types of verbs. Verbs and modifiers expressing speed are relevant to each other, with fast motion in particular forcing the semantic affinity between the verbs and modifiers of fast motion. This can be extended with Akitā’s (2017) suggestion that the more mannerly (i.e., inherent to manner) an expression is, the tighter the constructions are that it forms. In our data, speed modifiers occurred primarily as adverbs, whereas manner modifiers in general had a substantially smaller proportion of adverbs and a wider set of other formal means.

The patterns and functions of speed modifiers we found provide evidence for the claim put forward by Slobin (1996, 2000, 2006) that in satellite-framed languages, the inventory of expressing manner is extensive and fine-grained, leading to a diverse inventory of manner expressions. Slobin et al. (2014) also note that in satellite-framed languages such as English and Polish, manner modifiers tend to repeat the meaning present in the verb, but languages differ as to which dimensions of manner receive such double encoding. For instance, English tends to express attitude both in the verb and modifier, and Polish tends to express walking in the verb and the exact pattern of steps in the modifier. Özçalışkan & Slobin

(2003) and Slobin et al. (2014) similarly identify the function of manner modifiers as “augmenting the manner that was already encoded by the verb” (Özçalışkan & Slobin 2003: 267), which is common in English, a satellite-framed language. They also postulate that in verb-framed languages, manner modifiers have “a compensatory function” (Özçalışkan & Slobin 2003: 267; see also Slobin et al. 2014). Based on our study, this compensatory function is not an exclusive characteristic of verb-framed languages but is also used in satellite-framed languages when the event is described by a path verb. Furthermore, the means of a satellite-framed language for manner saliency (Slobin 2006) can display a large and diverse repertoire when a language is morphology-rich.

This leads us to discuss the interplay between language-internal factors, the typological type of a language in terms of Talmyan lexicalisation patterns, and the typological type of a language in terms of the morphosyntactic inventory. Whereas the interplay between language-internal factors and Talmyan lexicalisation patterns has been addressed by a number of studies, the role of morphosyntactic characteristics in the expression of manner and in the context of lexicalisation patterns has been discussed less extensively. Thus, future studies could assess whether manner saliency associates with the richness of morphology in a satellite-framed language. It could be that morphology-rich satellite-framed languages (e.g., Finno-Ugric languages) express manner more saliently, with a wider set of devices, and in a more nuanced way than satellite-framed languages that are less diverse in their morphological inventory (e.g., Germanic languages).

6. Conclusion

In this corpus study of motion speed in the Estonian language, we showed that speed is a core dimension of the highly complex and diverse category of manner. As a satellite-framed language, Estonian is also a manner-salient language. As such, it has a rich inventory of motion verbs and modifiers through which manner, and speed in particular, is expressed. Speed modifiers, in turn, can either have a function of (i) compensation, by providing speed information when the verb does not; (ii) specification, by adding details to the main speed expressed in the verb; and (iii) intensification, by enhancing the particular speed expressed in the verb. Whereas motion verbs form a continuum from slow to fast, manner modifiers depicting speed tend to be categorical (fast vs. slow). In fact, speed modifiers of fast motion (e.g., *kiiresti* ‘fast’) are considerably more frequent and fine-grained in semantics than modifiers of slow motion (e.g., *aeglaselt* ‘slowly’). In terms of morphosyntactic realisations, fast motion modifiers are also more diverse than slow motion modifiers. In general, there is a tendency for semantic congruence

between the verbs and modifiers in which fast motion verbs combine with fast motion modifiers (e.g., *kihutas ruttu* ‘(s)he raced quickly’) and slow motion verbs combine with slow motion modifiers (e.g., *lonkis aeglaselt* ‘(s)he was strolling slowly’). Nevertheless, a substantial number of slow motion verbs combine with fast motion modifiers (e.g., *roomas kiiresti* ‘(s)he was crawling fast’). This suggests that fast motion is more specific and salient than slow motion. Based on these results showing that fast motion is more frequent, diverse, and salient than slow motion, we suggest the **fast-over-slow** bias. Given that this bias was formulated based on the Estonian data, further research using data from other languages is required to investigate it in a cross-linguistic perspective.

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Abbreviations

1, 2, 3	person	INE	inessive
ADE	adessive	INF	infinitive
ADP	adposition	NOM	nominative
ADPP	adpositional phrase	NP	noun phrase
ADV	adverb	PART	partitive
ADV P	adverb phrase	PL	plural
ALL	allative	PPP	passive past participle
APP	active past participle	PRS	present
COM	comitative	PTCL	verbal particle
ELA	elative	PST	past
GEN	genitive	PTCP	present participle
GER	gerund	SG	singular
ILL	illative		

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Appendix A. Possible dimensions of manner and its major categorisations

Manner features	Ikegami 1969, English motion verbs	Snell-Hornby 1983, English and German verbs**	Narasimhan 2003, Hindi and English motion verbs	Cardini 2008, Italian and English motion verbs	Kopecka 2010, Polish motion and modifiers	Slobin et al.	Taremaa 2017, Estonian motion verbs and modifiers	Stosic 2019, French motion verbs
						2014, English, Polish, French, Spanish, and Basque motion verbs and modifiers of human gait		
Body-movements (also with respect to a surface) / motor pattern / mode	(✓)*	✓	✓	✓	✓	✓	✓	✓
Posture of the mover		✓			✓	✓	✓	
Configuration or physical condition of the mover		✓			✓		✓	✓
Appearance of the mover		✓					✓	

Manner features	Ikegami 1969, English motion verbs	Snell- Hornby 1983, English and German verbs**	Narasimhan 2003, Hindi and English motion verbs	Cardini 2008, Italian and English motion verbs	Kopeccka 2010, Polish motion verbs and modifiers	Slobin et al. 2014, English, Polish, French, Spanish, and Basque motion verbs and modifiers of human gait	Taremaa 2017, Estonian motion verbs and modifiers	Stosic 2019, French motion verbs
Emotional state (includes relaxedness and hurrying) or attitude of the mover		✓	✓	✓	✓	✓	✓	
Purpose(less)ness / aim(less)ness of the mover		✓			✓			✓
Instrument / vehicle / means	(✓)*	✓	✓	✓	✓	✓	✓	✓
Trajectory (the shape of it) / course	(✓)*	✓	✓	✓	✓		✓	✓
Medium / environment / space	(✓)*	✓	✓		✓		✓	✓
Sound		✓		✓	✓		✓	
Speed / velocity / rate / pace	✓	✓	✓	✓	✓	✓	✓	✓
Effort (easy, effortless vs. difficult, laborious)		✓		✓	✓	✓	✓	✓
Energy, force, impetus (forceful, violent vs. weak, feeble)	✓	✓		✓			✓	✓
Weight (heavy vs. light) / softness		✓		✓	✓			
Continuity (continuous, steady vs. abrupt, jerky) / rapidity / smoothness		✓		✓		✓	✓	
Harmony (elegant, co- ordinated vs. clumsy, awkward)		✓		✓			✓	
Steadiness (controlled, steady vs.		✓		✓	✓		✓	

	Ikegami 1969, English motion verbs	Snell- Hornby 1983, English and German verbs**	Narasimhan 2003, Hindi and English motion verbs	Cardini 2008, Italian and English motion verbs	Kopecka 2010, Polish motion and modifiers	Slobin et al. 2014, English, Polish, French, Spanish, and Basque motion verbs and modifiers of human gait	Taremaa 2017, Estonian motion verbs and modifiers	Stosic 2019, French motion verbs
Manner features								
uncontrolled, unsteady)								
Suddenness		✓			✓			
Impaired motion		✓			✓	✓		
Rhythm		✓			✓		✓	

* Motion verbs with these semantic features are discussed by Ikegami (1969), but he does not consider them as manner features. In addition, Ikegami does not classify manner verbs into smaller categories, nor does he discuss them in much detail.

** Snell-Hornby (1983) does not classify manner as such, but manner features listed here are mentioned in her descriptions of the semantics of motion verbs in English and German.

Appendix B. Speed modifiers of slow, variable, and fast motion

No	Unique items of slow motion modifiers	Form	Translation	N of occurrences
1	<i>aeglaselt</i>	AdvP (single adverb)	'slowly'	22
2	<i>rahulikult</i>	AdvP (single adverb)	'peacefully'	17
3	<i>aeglasel sammul</i>	NP _{ADE}	'in slow steps'	4
4	<i>rahulikus tempos</i>	NP _{INE}	'at a calm pace'	4
5	<i>aegamisi</i>	AdvP (single adverb)	'slowly'	2
6	<i>aeg-luubis</i>	AdvP (single adverb)	'in slow motion'	1
7	<i>aegamööda</i>	AdvP (single adverb)	'slowly'	1
8	<i>aeglase rahuga</i>	NP _{COM}	'with slow peace'	1
9	<i>aeglasel galopil</i>	NP _{ADE}	'on a slow gallop'	1
10	<i>aeglaselt-aeglaselt</i>	AdvP	'slowly-slowly'	1
11	<i>aeglaselt liueldes</i>	Gerund	'gliding slowly'	1
12	<i>ebaloomulikult aeglase kõnnakuga</i>	NP _{COM}	'unnaturally slow gait'	1
13	<i>hästi aeglast jooksu</i>	NP _{PART}	'very slow running'	1
14	<i>ikka veel aeglaselt</i>	AdvP	'still slowly'	1
15	<i>jube aeglaselt</i>	AdvP	'horribly slowly'	1
16	<i>tasapisi</i>	AdvP (single adverb)	'slowly, gradually'	1
17	<i>oma aeglasel sammul</i>	NP _{ADE}	'at one's slow pace'	1
18	<i>piisavalt aeglaselt</i>	AdvP	'slowly enough'	1
19	<i>pikkamisi</i>	AdvP (single adverb)	'slowly'	1
20	<i>pisitasa</i>	AdvP (single adverb)	'slowly'	1
21	<i>rahuliku tempoga</i>	NP _{COM}	'at a calm pace'	1
22	<i>rivaalidest tunduvalt aeglasemalt</i>	AdvP	'much slower than rivals'	1

No	Unique items of slow motion modifiers	Form	Translation	N of occurrences
23	<i>rõhutult aeglaselt</i>	AdvP	'emphatically slowly'	1
24	<i>vaikses tempos</i>	NP _{INE}	'at a quiet pace'	1
25	<i>väga aeglaselt</i>	AdvP	'very slowly'	1
26	<i>väga aeglaste sammudega</i>	NP _{COM}	'with very slow steps'	1
27	49 (= 49ga)	NP _{COM}	'with 49 [kilometres per hour]'	1

No	Unique items of variable speed modifiers	Form	Translation	N of occurrences
1	<i>erineval kiirusel</i>	NP _{ADE}	'at different speeds'	1
2	<i>heas, hiljem juba rahulikus rütmis</i>	NP _{INE}	'in a good, later already calm rhythm'	1
3	<i>kohaliku piirkiirusega</i>	NP _{COM}	'at the local speed limit'	1
4	<i>omas tempos</i>	NP _{INE}	'at one's own pace'	1
5	<i>täpselt sellises tempos</i>	NP _{INE}	'at exactly this pace'	1
6	<i>varieerides tempot järgmiselt: ...</i>	Gerund	'by varying the pace as follows: ...'	1
7	<i>võrdelise kiirusega</i>	NP _{COM}	'at a relative speed'	1

No	Unique items of fast motion modifiers	Form	Translation	N of occurrences
1	<i>kiiresti</i>	AdvP (single adverb)	'fast, quickly'	45
2	<i>kiirelt</i>	AdvP (single adverb)	'fast, quickly'	25
3	<i>ruttu</i>	AdvP (single adverb)	'fast, quickly'	17
4	<i>ummisjalu</i>	AdvP (single adverb)	'fast, quickly'	11
5	<i>kähku</i>	AdvP (single adverb)	'fast, quickly'	10
6	<i>kiirel sammul</i>	NP _{ADE}	'with fast steps'	7
7	<i>väga kiiresti</i>	AdvP	'very fast'	7
8	<i>kiiruga</i>	NP _{COM}	'in a hurry'	6
9	<i>hoogsalt</i>	AdvP (single adverb)	'fast, vigorously'	6
10	<i>suure kiirusega</i>	NP _{COM}	'with high speed'	5
11	<i>hooga</i>	NP _{COM}	'fast, vigorously'	4
12	<i>kiiremini</i>	AdvP (single adverb)	'faster'	5
13	<i>kiirustades</i>	Gerund	'hurrying'	4
14	<i>nii kiiresti</i>	AdvP	'so fast'	4
15	<i>suure hooga</i>	NP _{COM}	'very fast, vigorously'	4
16	<i>tuhatnelja</i>	AdvP (single adverb)	'tantivy, very fast'	4
17	<i>kiiremas korras</i>	NP _{INE}	'as fast as possible'	3
18	<i>kui kiiresti</i>	AdvP	'how fast'	3
19	<i>täiega</i>	AdvP (single adverb)	'very fast, intensively'	3
20	<i>kibekiiresti</i>	AdvP (single adverb)	'fast'	2
21	<i>kiire sammuga</i>	NP _{COM}	'with fast steps'	2
	<i>kiirete sammudega</i>	NP _{COM}	'in quick steps'	2
22	<i>kärmelt</i>	AdvP (single adverb)	'fast, quickly'	2
23	<i>nii kiiresti kui sain</i>	AdvP (+ separate clause)	'as fast as I could'	3

No	Unique items of fast motion modifiers	Form	Translation	N of occurrences
24	<i>nobedalt</i>	AdvP (single adverb)	'fast, quickly'	2
25	<i>rutakalt</i>	AdvP (single adverb)	'hastily'	2
26	<i>seda kiiremini</i>	AdvP	'the faster'	2
27	<i>sellise kiirusega</i>	NP _{COM}	'at such a speed'	2
28	<i>sprinti</i>	NP _{PART}	'sprint'	2
29	<i>tulistjalu</i>	AdvP (single adverb)	'with very fast steps'	2
30	<i>täiskiirusel</i>	NP _{ADE}	'at full speed'	2
31	<i>väledalt</i>	AdvP (single adverb)	'fast, quickly'	2
32	<i>aina hoogu juurde</i>	Combination (Adv + NP _{PART} + PRCL)	'faster and faster'	1
33	<i>aina kiiremini</i>	AdvP	'faster and faster'	1
34	<i>arutult</i>	AdvP (single adverb)	'unreasonably fast'	1
35	<i>autodega võrdselt</i>	AdvP	'equally with cars'	1
36	<i>ca 3000 km/h või veelgi kiiremini</i>	Combination (QuantP + AdvP)	'ca. 3000 km/h or even faster'	1
37	<i>ühtlases kiires tempos</i>	NP _{INE}	'at a steady pace'	1
38	<i>ilmselt täiega</i>	AdvP	'probably very fast, intensively'	1
39	<i>imekiiresti</i>	AdvP (single adverb)	'miraculously fast'	1
40	<i>järjest kiiremini</i>	AdvP	'faster and faster'	1
41	<i>kiba-kiiresti</i>	AdvP (single adverb)	'very fast'	1
42	<i>kiireid lõike</i>	NP _{PART}	'fast cuts'	1
43	<i>kiireima hooga mis mul siiani on olnud</i>	NP _{COM} (+ separate clause)	'with the fastest momentum I have ever had'	1
44	<i>kiirel kõnnakul</i>	NP _{ADE}	'on a brisk walk'	1
45	<i>kiirelt, kahe minutiga</i>	AdvP + NP _{COM}	'quickly, in two minutes'	1
46	<i>kiiremini kui kunagi varem</i>	AdvP	'faster than ever before'	1
47	<i>kiirendatul sammul</i>	NP _{ADE}	'with accelerated steps'	1
48	<i>kiirenevalt</i>	AdvP (single adverb)	'accelerating'	1
49	<i>kiiretel liigutustel</i>	NP _{ADE}	'with rapid movements'	1
50	<i>kiiretel sammudel</i>	NP _{ADE}	'in quick steps'	1
51	<i>kiirpaadiga</i>	NP _{COM}	'by speedboat'	1
52	<i>kiirsammul</i>	NP _{ADE}	'with fast steps'	1
53	<i>kiirusega 40,782</i>	NP _{COM}	'at a speed of 40,782'	1
54	<i>kiirusega 900 kilomeetrit tunnis</i>	NP _{COM}	'at a speed of 900 kilometers per hour'	1
55	<i>kiirust aeglustamata</i>	Gerund	'without slowing down'	1
56	<i>kiirust juurde</i>	Combination (NP _{PART} + PRCL)	'faster and faster'	1
57	<i>kippelt</i>	AdvP (single adverb)	'fast, quickly'	1


No	Unique items of fast motion modifiers	Form	Translation	N of occurrences
58	<i>küni 200-kilomeetrise tunnikiirusega</i>	NP _{COM}	'at speeds of up to 200 kilometers per hour'	1
59	<i>kuuendal käigul</i>	NP _{ADE}	'in the sixth gear'	1
60	<i>kõige kiirema jooksuga</i>	NP _{COM}	'with the fastest run'	1
61	<i>kõva hooga</i>	NP _{COM}	'with a strong momentum'	1
62	<i>kärme põrgatusega</i>	NP _{COM}	'with a quick bounce'	1
63	<i>kärmel sammul</i>	NP _{ADE}	'with fast steps'	1
64	<i>lausa 70 km/h</i>	QuantP	'as much as 70 km/h'	1
65	<i>liiga hoogsalt</i>	AdvP	'too vigorously'	1
66	<i>liiga kiirelt</i>	AdvP	'too fast'	1
67	<i>liiga kiiresti</i>	AdvP	'too fast'	1
68	<i>lubamatu kiirusega</i>	NP _{COM}	'at an unacceptable speed'	1
69	<i>meeletu kiirusega</i>	NP _{COM}	'at an insane speed'	1
70	<i>millise kiiruga</i>	NP _{COM}	'at what speed'	1
71	<i>mingi kiirusega</i>	NP _{COM}	'at some speed'	1
72	<i>minust kiiremini</i>	AdvP	'faster than me'	1
73	<i>minust oluliselt kiiremini</i>	AdvP	'much faster than me'	1
74	<i>mitu korda kiiremini</i>	AdvP	'several times faster'	1
75	<i>nagu väle jänes</i>	Comparison	'like an agile rabbit'	1
76	<i>nagu välk</i>	Comparison	'like lightning'	1
77	<i>neli sekundit kiiremini</i>	AdvP	'four seconds even faster'	1
78	<i>nii kiirelt kui sai</i>	AdvP (+ separate clause)	'as fast as (s)he could'	1
79	<i>nii kiiresti kui keha lubas</i>	AdvP (+ separate clause)	'as quickly as the body allowed'	1
80	<i>nii kiiresti kui suutsime</i>	AdvP (+ separate clause)	'as fast as we could'	1
81	<i>nii kuis tuul</i>	AdvP (+ comparison)	'as the wind'	1
82	<i>niisuguse kiirusega nagu polekski ta olnud vana auväärt tiiger, vaid vallatu tiigripoeg</i>	NP _{COM} (+ separate clause)	'at such a speed as if he had not been an old venerable tiger, but a mischievous tiger cub'	1
83	<i>nobeda tempoga</i>	NP _{COM}	'at a brisk pace'	1
84	<i>oma hirvesammudega</i>	NP _{COM}	'with their deer footsteps'	1
85	<i>oma väledatel jalgadel</i>	NP _{ADE}	'on his agile legs'	1
86	<i>padavai</i>	AdvP (single adverb)	'fast, quickly'	1
87	<i>palavikulise kiiruga</i>	NP _{COM}	'with a feverish rate'	1
88	<i>palju kiiremini kui mina</i>	AdvP (+ comparison)	'much faster than me'	1
89	<i>parajalt rutakalt</i>	AdvP	'quite hastily'	1
90	<i>parimal juhul 228 km/h</i>	QuantP	'at best 228 km / h'	1
91	<i>peaaegu minu tempos</i>	NP _{INE}	'almost at my own pace'	1

No	Unique items of fast motion modifiers	Form	Translation	N of occurrences
92	<i>peaegu valguse kiirusega</i>	NP _{COM}	'almost at the speed of light'	1
93	<i>peadpööritava kiirusega</i>	NP _{COM}	'at breakneck speed'	1
94	<i>välkkiirelt</i>	AdvP (single adverb)	'lightning fast'	1
95	<i>pidurdamata hooga</i>	NP _{COM}	'with unstoppable momentum'	1
96	<i>piisavalt kiiresti</i>	AdvP	'fast enough'	1
97	<i>pikal sammul</i>	NP _{ADE}	'with long steps'	1
98	<i>kiiremini kui keskmine harrastaja</i>	AdvP (+ comparison)	'faster than the average enthusiast'	1
99	<i>päris jõudsalt</i>	AdvP	'pretty strong, fast'	1
100	<i>päris kiire hooga</i>	NP _{COM}	'pretty fast pace'	1
101	<i>püsivas tempos</i>	NP _{INE}	'at a steady pace'	1
102	<i>rootslasest kiiremini</i>	AdvP	'faster than the Swedish'	1
103	<i>rutem</i>	AdvP (single adverb)	'faster'	1
104	<i>ruttamata</i>	Gerund	'without haste'	1
105	<i>rutusti</i>	AdvP (single adverb)	'fast, quickly'	1
106	<i>sada viiskümmend kilomeetrit sekundis</i>	QuantP	'one hundred and fifty kilometers per second'	1
107	<i>sellest 35 sajandikku kiiremini</i>	AdvP	'35 hundredth faster than this'	1
108	<i>sellest poole sekundi jagu kiiremini</i>	AdvP	'half a second faster'	1
109	<i>sellise hooga</i>	NP _{COM}	'with such momentum'	1
110	<i>sellise kolinaga</i>	NP _{COM}	'fast and with such noise'	1
111	<i>sellise rutuga</i>	NP _{COM}	'with such haste'	1
112	<i>siuh</i>	AdvP (single adverb, onomatopoeic)	'fast, whizzing'	1
113	<i>siuhti</i>	AdvP (single adverb, onomatopoeic)	'fast, whizzing'	1
114	<i>suht kiiresti</i>	AdvP	'relatively quickly'	1
115	<i>suhtelise kiirusega 10 m/s</i>	NP _{COM}	'at a relative speed of 10 m / s'	1
116	<i>suhteliselt kiirelt</i>	AdvP	'relatively quickly'	1
117	<i>suurel kiirusel</i>	NP _{ADE}	'at high speed'	1
118	<i>hästi kiiresti</i>	AdvP	'very fast'	1
119	<i>taldade välkudes</i>	Gerund	'so fast that one could only see the mover's foot soles'	1
120	<i>teistest sajandiksekundi võrra kiiremini</i>	AdvP	'a hundredth of a second faster than others'	1
121	<i>teistest viis korda kiiremini</i>	AdvP	'five times faster than the others'	1
122	<i>tempokalt</i>	AdvP (single adverb)	'fast, at a good pace'	1

No	Unique items of fast motion modifiers	Form	Translation	N of occurrences
123	<i>tugevas tempos</i>	NP _{INE}	'at a strong pace'	1
124	<i>tunduvalt kiiremini</i>	AdvP	'much faster'	1
125	<i>turboga</i>	NP _{COM}	'with a turbo'	1
126	<i>tõtakalt</i>	AdvP (single adverb)	'fast, quickly'	1
127	<i>tõtlikult</i>	AdvP (single adverb)	'fast, quickly'	1
128	<i>täie kiirusega</i>	NP _{COM}	'at full speed'	1
129	<i>täie tempoga</i>	NP _{COM}	'at full pace'	1
130	<i>täie vaardiga</i>	NP _{COM}	'at full pace'	1
131	<i>täiel hool</i>	NP _{ADE}	'at full pace'	1
132	<i>töövõtjale omase väledusega</i>	NP _{COM}	'with the agility of the contractor'	1
133	<i>umbes viiekümnese tunnikiirusega</i>	NP _{COM}	'at a rate of about fifty hours'	1
134	<i>valguse kiirusel</i>	NP _{ADE}	'at the speed of light'	1
135	<i>veel kiiremini</i>	AdvP	'even faster'	1
136	<i>võimalikult kiiresti</i>	AdvP	'as fast as possible'	1
137	<i>võimalikult kiiresti</i>	AdvP	'as fast as possible'	1
138	<i>väga kiirelt</i>	AdvP	'very fast'	1
139	<i>üle 400 km/h</i>	QuantP	'over 400 km / h'	1
140	<i>üsna hoogsalt</i>	AdvP	'quite fast, vigorously'	1
141	<i>üsna kiirelt</i>	AdvP	'quite quickly'	1
142	<i>100–110 vahel</i>	AdpP	'between 100–110 km/h'	1
143	<i>100 km tunnis</i>	QuantP	'100 km per hour'	1
144	<i>101 km/h</i>	QuantP	'101 km/h'	1
145	<i>110-ga</i>	NP _{COM}	'with 110 [kilometres per hour]'	1
146	<i>120-kilomeetrise tunnikiirusega</i>	NP _{COM}	'at a speed of 120 kilometers per hour'	1
147	<i>150-kilomeetrise tunnikiirusega</i>	NP _{COM}	'at a speed of 150 kilometers per hour'	1
148	<i>160 kilomeetrit tunnis</i>	QuantP	'160 kilometers per hour'	1
149	<i>186 km/h</i>	QuantP	'186 km/h'	1
150	<i>250 kilomeetrit tunnis</i>	QuantP	'250 kilometers per hour'	1
151	<i>30-km-se tunnikiirusega</i>	NP _{COM}	'at a speed of 30 km per hour'	1
152	<i>45 kilomeetrit tunnis</i>	QuantP	'45 kilometers per hour'	1
153	<i>50-ga</i>	NP _{COM}	'with 50 [kilometres per hour]'	1
154	<i>70+ km/h</i>	QuantP	'70+ km/h'	1

Address for correspondence


Piia Taremaa
Institute of Estonian and General Linguistics
University of Tartu
Jakobi 2-446
51005 Tartu
Estonia
piia.taremaa@ut.ee

 <https://orcid.org/0000-0003-1535-9449>

Co-author information

Anetta Kopecka
Maison des Sciences de l'Homme
Laboratoire Dynamique du Langage
CNRS & Université Lumière Lyon 2
France

Anetta.Kopecka@univ-lyon2.fr

 <https://orcid.org/0000-0002-1000-3710>

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