COGNITIVE STUDIES | ÉTUDES COGNITIVES, 18
Warsaw 2018

Article No.: 1601
DOI: 10.11649/cs.1601

Citation: Łozińska, J., & Pietrewicz, B. (2018). Lexicalisation of vertical motion. A study of three satellite-framed languages. *Cognitive Studies | Études cognitives*, *2018*(18). https://doi.org/10.11649/cs.1601

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LEXICALISATION OF VERTICAL MOTION. A STUDY OF THREE SATELLITE-FRAMED LANGUAGES

Abstract

This article presents a comparison of the description of motion in three satellite-framed languages, namely in Polish, Russian and English. More specifically, the lexicalisation patterns of horizontal and vertical motion are compared on the basis of elicitation data. The study highlights the divergent patterns of the lexicalisation of motion along these two planes in the three languages. Besides a description of the motion verbs coding these relations, the linguistic and non-linguistic factors influencing the lexicalisation patterns of motion are discussed.
Keywords: vertical motion; motion event; satellite-framed languages; lexicalisation patterns; Polish; Russian; English

1 Introduction

Talmy's (2000) division of languages into satellite- and verb-framed languages has triggered a large amount of cross-linguistic research into the lexicalisation of motion events. Most of these studies have two common characteristics. First of all, they tend to concentrate on contrasting satellite- and verb-framed languages since the differences here are expected to be the most significant (e.g., Cardini, 2008; Fargard, Zlatev, Kopecka, Cerruti, & Blomberg, 2013; Kopecka, 2004; Özçalışkan & Slobin, 2003; Slobin, 1996, 2004). Far fewer studies concern intra-typological analyses of the lexicalisation of motion (e.g., Filipović, 2007; Hasko, 2010). Secondly, most of the research done so far has almost exclusively focused on instances of the lexicalisation of horizontal motion, as this is the canonical plane of the movement of animate entities, and consequently horizontal motion is more frequently coded than vertical motion. To illustrate, in literary texts of crime fiction in Polish the instances of coding vertical motion were found to constitute only 6% of all instances of the descriptions of motion events (Łozińska, 2018).

The present study differs from the aforementioned research in two respects. First of all, the three languages under analysis, namely Polish, Russian and English are satellite-framed. The assumption is that the intra-typological differences between languages within the same typological

category may reveal lexicalisation subtleties which would have remained undetected if the comparison were to be carried out between more distinct patterns. Secondly, vertical spatial relations, most commonly neglected in the research conducted so far, are the main focus of this study.

According to one of the major tenets of Cognitive Linguistics, human physical, cognitive, and social embodiment constitutes the basis for our conceptual and linguistic systems (Rohrer, 2007, p. 27). More specifically, human interaction with the world shapes and constrains meaningful expression. Let us stress here that the notion of embodiment encompasses bodily experience as well as culture and, which is of special importance in the present study, the specificity of a given language. Thus these are the linguistic and non-linguistic factors closely tied to the human physical, cultural and linguistic interaction with the world that, we believe, to a large extent shape the lexicalization patterns of motion events.

The previous body of research into the lexicalization of vertical motion (e.g., Naigles, Eisenberg, Kako, Highter, & McGraw, 1998) has indicated a varying pattern of the lexicalization of vertical motion when compared with the horizontal in the domain of verb-framed languages. To illustrate, in Naigles et al.'s (1998) study, 100% of the Spanish prepositions *a*, *de* and *para* describing boundary-crossing horizontal events were accompanied by path verbs (which is predictable for verb-framed languages), while for the vertical boundary events, 97% of responses with these prepositions occurred with manner verbs. Thus, the lexicalization patterns of vertical motions would appear to be anomalous and on this basis we advance our first hypothesis (H1) that there is a significant difference between the coding of vertical and horizontal relations in satellite-framed languages.

Secondly, since the lexicalisation of spatial relations is motivated by human bodily interaction with the surrounding world, some important language tendencies should be universal and language independent (H2). Nevertheless, the languages under study vary morphologically. What is of particular importance here is that in the English language there are no verbal prefixes, which in Polish and Russian are typically used for the description of spatial relations. Thus, we advance Hypothesis 3 (H3) that the observed differences in the lexicalization patterns will be between the studied Slavic languages and English.

2 Talmy's typology of languages

Talmy (1985, 2000) divides languages into two typological categories: satellite- and verb-framed. These two groups differ in the lexicalisation patterns of motion events. In brief, besides the fact of Motion, a motion event consists of the Figure, the Ground and the Path. Before discussing a motion event itself, it would be appropriate to define these components. The Figure is "a moving or conceptually movable object whose path or site is at issue", while the Ground is defined as "a reference frame, or a reference object stationary within the reference frame, with respect to which the figure's path or site are characterised" (Talmy, 2000, p. 26). The Figure, which is the focus of attention, is perceived as a prominent coherent element, distinguished from the rest of what is in the field of vision, namely the Ground. Finally, the Path is defined as the path followed or the site occupied by the Figure with respect to the Ground (Talmy, 2000, p. 25). In verb-framed and in satellite-framed languages these four components are mapped differently onto the syntactic structure of a given language. Verb-framed languages characteristically map the Path onto the main verb while satellite-framed ones map it in the satellite. Sentence (1) illustrates the way in which motion into a container is rendered in a verb-framed language, such as Spanish. The verb expresses the path of motion while the manner components are expressed peripherally in a gerund. The example comes from Talmy (2000, p. 49).

(1) *La botella entró a la cueva* (*flotando*).
The bottle MOVED-in to the cave (floating).
'The bottle floated into the cave'

In turn, Sentence (2) illustrates how motion is rendered in satellite-framed languages. The Russian verb *bežat'* 'to run', besides the fact of Motion, involves the semantic component of manner, while the verbal prefix *v-*, in combination with the preposition, codes the Path into a container.

(2) *Ja vbežal* (*v dom*).
'I ran in (-to the house).'

In Talmy's typology the notion of the satellite is essential yet troublesome. It is understood as "the grammatical category of any constituent other than a noun-phrase complement that is in a sister relation to the verb root" (Talmy, 2000, p. 102). In Polish and Russian satellites, which are typically verbal prefixes, are easily distinguishable. For instance, in the Russian sentence in (2), the prefix *v-* is inseparably connected with the verb while the preposition *v* is in construction with the following Ground nominal.

In English, conversely, the class of satellites frequently coincides with prepositions. A common feature of English satellites is that they are in construction with the verb, in contrast to prepositions, which are omitted when the Ground nominal is omitted. Rendering complex paths by means of a string of satellites is exemplified by Talmy's famous example in (3).

(3) *Come right back down out from up in there!* (Talmy, 1985, p. 102)

Nevertheless, distinguishing between satellites and prepositions in English is more troublesome than in Slavic languages (for a detailed method of distinguishing prepositions from satellites see Talmy, 2000, pp. 106–107).

The next difference between the lexicalization patterns of motion between English and the studied Slavic languages emerging from the morphological properties of these languages is that in the English language it is possible to associate a vast number of grounds and paths with only one motion verb, as in (3). In Polish and Russian, only one verbal prefix usually accompanies a motion verb, which is why complex paths need to be expressed by a string of prefixed verbs.

3 Method

The elicitation method was chosen for the purposes of analysis, as it has many benefits. First of all, it has been shown that output referring to time and space different from the actual time and space of the speaker elicited by, for example, videos is more complex than spontaneous speech. Next, it has been proved that the data obtained from a respondent watching videos is richer in detail than spontaneous speech (Doughty & Long, 2000). This allows a large amount of data to be collected in a short period of time.

Nevertheless, our assumption is that the data obtained by means of an elicitation task is still close to everyday, colloquial speech and is characteristic with regards to the patterns of the lexicalisation of motion. According to Talmy (1985, p. 62), 'characteristic' means that: "(i.) It is colloquial in style, rather than literary, stilted, etc. (ii.) It is frequent in occurrence in speech, rather than only occasional. (iii.) It is pervasive, rather than limited, that is, a wide range of semantic notions are expressed in this type". Hence, findings derived from elicited data should be considered as more accurate than linguistic data selected from, for example, novels or translated texts.

Participants

A survey was conducted on three groups of native speakers: Polish, English and Russian. In each group there were 20 respondents. They were of various ages, but the predominant age group was 25–40. The level of education also varied in every group and there was no predominant one.

Procedure

The experiment was conducted via internet. Every participant was interviewed individually in their native language. All participants were asked to watch a compilation of cartoons, designed for this study and uploaded on YouTube (`https://www.youtube.com/watch?v=YzTOOy5TQNI`). The compilation consisted of twelve short fragments of cartoons and after every fragment the participants were given a 20 second break. During this break they were asked to write an answer to the question: 'Please describe what is happening'. The question was asked in their native language. Having written the answers, the respondents were asked to provide personal information about their nationality, age, sex and level of education.

Coding criteria

In order to undertake a reliable comparison between the studied languages, the semantic features which classify a given verb into the category of motion verbs need to be specified. Firstly, the verbs taken into consideration in the present research denote translational motion, defined as the one "in which the location of the figure changes in the time period under consideration" (Talmy, 2000, p. 25). Thus, both the description of spontaneous motion performed by animate and inanimate entities were taken into consideration. Consequently, self-contained motion, like rotation, oscillation, or dilation, as well as motion brought about by external agents, fell beyond the scope of the analysis.

The features of the selected verbs are mainly semantic and the only syntactic feature refers to the intransitivity of the verb. The criterion of intransitivity has already been used in the previous studies of verbs of motion in other languages (e.g., Cardini, 2008; Slobin, 2005). The intransitivity condition excludes the uses of verbs which denote caused motion. Thus one instance of a verb in its intransitive use may have been included in the list of motion verbs (e.g., *Gnał przez miasto z dużą predkością.* 'He rushed through the city at great speed') while its transitive use has been excluded from the list of motion verbs (e.g., *Gnał stado przez łąkę.* 'He raced a herd across the meadow').

Moreover, reflexive forms of verbs, which are made up of motion verbs and reflexive pronouns (*się* [Pol], *sebja* [Rus]) generally code translational motion along a path. These motion verbs accompanied by the reflexive pronouns are widely used in Polish and Russian. (e.g., Polish verbs *udać się* 'to start moving' or *włóczyć się* 'to gallivant', and in Russian *mčat'sja* 'to speed' or *karabkat'sja* 'to climb', 'to clamber') and were analysed.

It should be underlined here that verbs encoding the beginning or end of motion, such as Polish *wyruszyć* 'to set off' or *dotrzeć* 'to arrive' or Russian *brosit'sja* 'to dash' or *udrat'* 'to start moving fast' were not excluded from the analysis. This is due to the fact that the analysed data will also include the uses of prefixed motion verbs, which, when prefixed, profile either the beginning or end of movement (e.g. Polish *przyjść* 'to come' or *dojść* 'to arrive'), and this does not exclude them from the analysis.

Apart from the intransitivity requirement, the selected verbs included in the list of motion verbs had to meet one semantic condition. It is necessary that the roots of the selected verbs express a change of location. A root of a verb is understood here as the dictionary form devoid of prefixes and suffixes. Thus, verbs denoting the termination of movement as a result of various types of collision e.g. *zderzyć się* 'to crash' were not taken into consideration. To summarise, the verbs selected for the analysis meet one syntactic requirement, that of intransitivity, and one semantic requirement, that the root include a change-of-location component.

Stimuli

Table 1 presents the types of figures and the manners of vertical and horizontal motion in which the figures moved presented in the stimuli. The types of figures, kinds of the manner of motion,

Table 1: Types of figures and manners of motion presented in stimuli.

Figures	Wile E. Coyote, Bugs Bunny, mice, Tom, Jerry, The Road Runner, Chipmunk
Manners	jumping, running, slipping, flying, sleepwalking, slithering, walking, rushing, flipping, racing, stepping, slithering, sneaking, crawling, travelling, groping, storming, thrusting, zooming, stampeding
Paths	towards / away from the speaker, up, down, into and out of a container

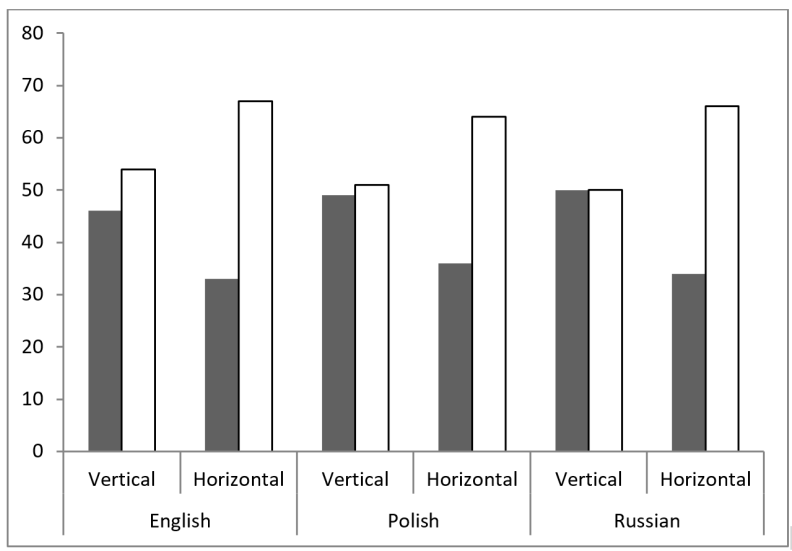

Figure 1: Path verbs (black bars) and manner verbs (white bars) – type analysis

as well as the direction of motion, were chosen to represent a variety of manners and paths of motion.

4 Results

Figures 1 and 2 below present the comparison of the use of the path verbs (black bars) and manner verbs (white bars) in the descriptions of vertical and horizontal motion obtained in the course of type and token analysis respectively. It should be noted that the type of a verb in the present analysis refers to its minimal semantic function, while tokens of a verb are all instances of types in specific contexts.

In the case of all three languages under study both the type and token comparison of motion verbs shows that the path verbs used for the description of vertical relations significantly outnumber the path verbs that are used for coding horizontal motion. The differences between the use of path and manner verbs are statistically significant for all three languages (Polish: $ch^2 = 19,76p < 0,001$; Russian: $ch^2 = 17,71p < 0,001$; English: $ch^2 = 19,07, p < 0,001$). Thus, the results support the first hypothesis that in the three languages the lexicalisation of vertical motion will differ from the horizontal.

The second hypothesis is also supported. As expected, in all three languages there are more manner verbs noted in both the type and token analysis. This prediction is based on the fact that Polish, Russian and English are satellite-framed languages. Nevertheless, both the type and token analyses have revealed that in the three languages vertical motion is significantly more frequently

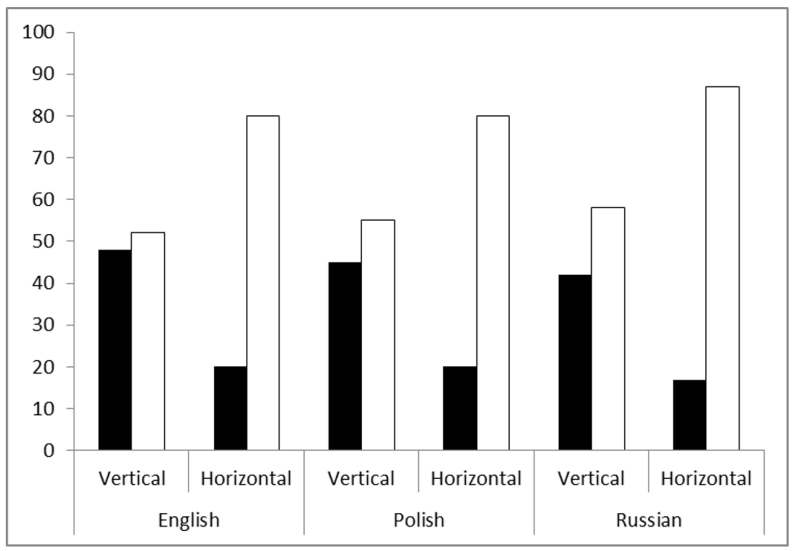

Figure 2: Path verbs (black bars) and manner verbs (white bars) – token analysis

coded by path verbs when compared with horizontal motion. This, therefore, would appear to be a ubiquitous tendency in the studied languages, which points to bodily interaction with the world being universal to all human beings.

Finally, the third hypothesis is refuted, since neither the token nor the type verb analyses have revealed a significantly different use of English path or manner verbs for coding either the horizontal or vertical scale of motion when compared with the Slavic data. Furthermore, contrary to expectations, the type analysis of the English verbs revealed a much larger number of manner verbs than in the Polish and Russian data. This finding was not anticipated, since in the Slavic languages the description of complex paths requires the use of a number of prefixed verbs, which is not the case in English.

5 Discussion

In the three languages under study, all of which are satellite-framed, motion is assumed to be typically encoded by means of manner verbs. In the course of the present study, however, in all of them a different lexicalization pattern was noted for vertical and horizontal spatial relations. Generally speaking, more verbs with the semantic component of path are used for coding motion along the vertical plane. The question that arises concerns the factors, both linguistic and non-linguistic, that prompt the speakers of the three studied languages to use path verbs to describe vertical motion rather than manner verbs. Let us first concentrate on the linguistic factors.

Firstly, when talking about vertical motion, there are obviously only two directions: namely UP and DOWN. This simple observation leads to the realisation of an important linguistic tendency present in Polish and, to a lesser extent, in Russian. It can be observed that among the path verbs used for the description of vertical motion there are a large number of verbs that have emerged via the process of prefix-verb fossilisation. These verbs in Polish include *wdrapać się* (5), *unosić się* 'to rise' (3), *wpinać się* (3), *wybić się* (1), and in Russian *spustit'sja* (3) or *vzbirat'sja* (3). All of these verbs are typically used for coding vertical motion. It can be assumed that the frequent use of specific prefix-verb combinations, due to the fact that there are only two possible directions of motion, leads to their entrenchment and hastens the process of fossilisation.

In general, the lexicalisation of the prefix-verb combination is an important source of path verbs

in all Balto-Slavic languages (Verkerk, 2014, 2015). For example, among Polish verbs the following have emerged as a result of a prefix-verb combination: *dostać* 'to get', *dotrzeć* 'to get', *oddalić* 'to go away', *porzucić* 'to abandon', *przybyć* 'to arrive', *wybrać się* 'to set out', and in Russian *peresekat'* 'to cross', *podnimat'sja* 'to go up', *vozvrašat'sja* 'to return', *blizit'sja* 'to approach', *ogibat'* 'go round', *spustit'sja* 'to go down' (Verkerk, 2014, pp. 270–271).

While prefix-verb fossilisation is a rich source of path verbs in Polish and Russian, in English the motion verb lexicon increases at a great pace. The influx of manner verbs was particularly evident in the nineteenth century, when the following intransitive verbs of goal-directed human motion were added to the English lexicon: *barge*, *career*, *clomp*, *cruise*, *dawdle*, *dodder*, *drag oneself*, *drift*, *flop*, *gambol*, *goose-step*, *hike*, *hustle*, *leapfrog*, *lunge*, *lurch*, *meander*, *mosey*, *pounce*, *promenade*, *race*, *sashay*, *scurry*, *skedaddle*, *skitter*, *slither*, *slog*, *slosh*, *smash*, *sprint*, *stampede*, *tromp*, *twist*, *waltz*, *wiggle*, *worm*, *zip* (Slobin, 2004, p. 235). To illustrate the richness of motion verb lexicon in English, one can examine the sentences in (4), all of which describe the same motion situation by various respondents.

(4) a. *The character is running forwards, his legs are going in a circular movement for him to run.*
b. *The character is travelling at high speed along a desert road.*
c. *The character is speeding along a road*
d. *zooming along*

The variety of motion verbs of manner in English is reflected in the high number of types of manner verbs displayed in Figure 1. Nevertheless, the variety of the types of verbs does not correspond with the frequency of their use, which is revealed in Figure 2. It should be stressed that on the basis of the usage-based approach to language, it is the frequency of use that most accurately describes the lexicalisation patterns existing in a given language.

Before the specific ways of rendering horizontal and vertical relations are analysed and compared in an attempt to reveal the cognitive, non-linguistic factors of language users, let us answer the question of how the horizontal motion differs from the vertical from the perceptual perspective of a human being. One of the major assumptions of cognitive linguistics is that our conceptual system emerges from our bodily experience, including our perception (Lakoff, 1987, p. xiv). Thus, if horizontal motion differs perceptually from vertical motion, it is reasonable to assume that the linguistic structures describing such relations will reflect these perceptual differences.

In general, the most significant difference between horizontal and vertical motion is that animate entities, whose motion receives most attention, tend to move horizontally. In other words, when the animate type of motion is concerned, the horizontal path is typically assumed. Vertical motion, in contrast, is non-canonical and consequently more salient, which is why one may expect the pattern of lexicalising vertical motion to diverge from that which would be expected on the basis of the typology of a given language. The salience of the vertical plane of motion has been supported by psychological experiments, which show that attention to vertical relations is easily activated by such linguistic items as the sun or grass (Dudschig, Souman, Lachmair, Vega, & Kaup, 2013) and that German respondents tend to make hand movements when expressing upward or downward motion (Dudschig, Lachmair, Vega, De Filippis, & Kaup, 2012). The increase in gestures when talking about vertical relations suggests the salience of this particular scale of motion.

As revealed in Figures 1 and 2, in the case of vertical motion, the non-canonical path is frequently coded not atypically of satellite-framed languages, namely in the verb. Let us recall that Naigles et al. (1998) also note atypical coding of vertical relations in the Spanish language, although here the pattern is reversed in comparison with our study. Let us examine how vertical motion perceptually differs from horizontal motion.

First of all, upward motion and downward motion differ considerably due to a completely dissimilar experience of the moving figure with the force of gravity. Motion UP requires extra

energy and is usually slow and strenuous, whereas motion DOWN is usually effortless, fast and, significantly, may be uncontrolled. Let us first analyse the lexicalization patterns of downward motion. As far as verbs coding downward motion are concerned, a clear tendency can be observed in all three languages. Let us first compare the sentences in (5) and (6).

(5) a. *Character falls as the branch breaks.* [Eng]
b. *Postać spada ze złamanej gałęzi.* [Pl]
'A figure falls from a broken branch.'
c. *Volk upal s dereva, potomu čto slomalas' vetka.* [Ru]
'A wolf fell from a tree, because a branch had broken down.'

(6) a. *Lots of characters running down a zigzag staircase.* [Eng]
b. *Duża grupa postaci zbiega po schodach ewakuacyjnych.* [Pl]
'A large number of characters are running down fire escape stairs.'
c. *Bystro sbežali po lestnice.* [Ru]
'They quickly ran down the stairs.'

In all of the sentences in (5) path verbs are used, while all of the sentences in (6) exclusively use manner verbs. Although the sentences in both (5) and (6) describe relations of moving down, the motion in (5) is involuntary and uncontrolled as opposed to (6). The speakers of all three languages used exclusively path verbs for coding involuntary downward motion. As far as voluntary motion is concerned, Polish and English speakers exclusively used manner verbs, while the Russian respondents occasionally used such path verbs as *(s)puskat'sja* / *(s)pustit'sja* 'to move down' or *nosit'sja* 'to scamper about', which is illustrated in (7).

(7) a. *Tolpa v tempe spuskaetsja po požarnoj lestnice vniz.* [Ru]
'A crowd quickly goes down fire escape stairs.'
b. *V speške nesutsja vniz.* [Ru]
'(They) hurriedly go down.'

As regards to the lexicalisation of upward motion, the verbs usually used for this purpose include the semantic component of the path for yet one more reason. Let us examine the sentences in (8).

(8) a. *The character carefully climbs a tree.* [Eng]
b. *Kojot wspina się na drzewo.* [Pol]
'A coyote climbs a tree'
c. *Karabkaetsja na derevo* (...) [Ru]
'(He) climbs a tree'

All three verbs in (8), namely *to climb*, *wspinać się* 'to climb' and *karabkat'sja* 'to climb' include both the semantic components of upward path and manner. The manner in this case is a specific motor movement of body parts, as well as the effort expended to overcome gravity. The semantic component of this particular kind of physical effort, or specific movement of body parts applied to overcome gravity, simultaneously introduces information about the direction of the figure's movement. As noted by Johnson (2007, p. 22) "[d]ifferent movements thus demand different degrees of exertion and energy. We learn to anticipate, usually unconsciously, the amount of tension required to perform various activities". Thus, the results show that the extra amount of energy or a specific movement of body parts that the upward motion requires is frequently coded in motion verbs.

In conclusion, each of the factors influencing the lexicalisation patterns of motion events (whether linguistic or non-linguistic) discussed above relates either to a certain aspect of human biological properties (e.g., being subject to gravity or making a great deal of effort when overcoming it) or to the intricacies of a given language (e.g., its morphology or diachronic development i.e., prefix-verb fossilisation in the Slavic languages). Since meaning is embodied, embodiment, to a large degree, shapes the lexicalisation patterns, which seems to be particularly evident in the case of vertical motion encoded in satellite-framed languages. It should be stressed that embodiment here is understood not only as the human bodily experience, but also as the influence of culture or the spoken language on meaningful expression. It is not surprising, therefore, that the domain of motion allows the embodiment motivation of the ways in which motion is expressed to be accurately identified, since as Johnson (2007, p. 20) notes "[m]ovement occurs within an environment and necessarily involves ongoing, intimate connection and interaction with aspects of some particular environment".

6 Conclusion

To summarise, Polish, Russian and English respondents tend to use more path verbs when talking about vertical movement. Since this is not a canonical way of moving for animate entities, a different pattern of lexicalisation is used by the respondents. It would appear that the direction of motion, since non-canonical, cannot be easily assumed by the hearer and must be stated explicitly. The specific non-linguistic factors influencing the lexicalisation patterns which have been analysed in the paper are: the control exerted by the moving figure over its downward motion and the extra effort required to overcome gravity while moving up. In the case of Polish and Russian, the linguistic factor at work is the fossilisation of prefix-verb combinations expressing up and down motion. As stated in the paper, the process of fossilisation is accelerated by the entrenchment of these combinations due to the fact that there are only two possible directions of vertical motion. Finally, it should be stressed that the rich lexicon of manner verbs in English, noted by Levin (1993) and reflected in Figure 1, does not correspond with the frequency of their use, which is shown in Figure 2. To our knowledge these findings are the first to show that the lexicalization patterns of vertical motion differ from those of horizontal motion in satellite-framed languages and that specific linguistic and non-linguistic factors are responsible for these differences.

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Appendix

Table 1: Motion verbs used for the description of vertical motion – Polish data.

Type of verb	Number of tokens	Semantic component
skakać / *skoczyć* 'to jump'	40	Manner
padać / *paść* 'to fall'	37	Path
biegać / *biec* 'to run'	18	Manner
wspinać się / *wspiąć się* 'to climb'	13	Path+Manner
nurkować 'to dive'	9	Path+Manner
wdrapać się 'to climb'	5	Path+Manner
wwiercać się / *wwiercić się* 'to grind yourself'	5	Path+Manner
łazić / *leźć* 'to trail'	4	Manner
pędzić 'to speed'	3	Manner
uciekać 'to escape'	3	Path
unosić się / *unieść się* 'to rise'	3	Path
wbijać się / *wbić się* 'to enter forcefully'	3	Path+Manner
chodzić / *iść* 'to walk'	2	Manner
wirować 'to spin'	2	Path
nurzać się 'to submerge'	2	Path+Manner
lądować 'to land'	2	Path+Manner
latać / *lecieć* 'to fly'	1	Manner
sunąć 'to glide'	1	Manner
zapierdalać vulg. 'to rush'	1	Manner
obracać się / *obrócić się* 'to turn'	1	Path
rzucać / *rzucić się* 'to dash'	1	Path+Manner
wydobywać się / *wydobyć się* 'to plume'	1	Path+Manner
wkręcać się 'to grind yourself in'	1	Path+Manner
wybijać / *wybić się* 'to tap yourself out'	1	Path+Manner

Table 2: Motion verbs used for the description of vertical motion – Russian data.

Type of verb	Number of tokens	Semantic component
Total	124	
prygat' / *prygnut'* 'to jump'	30	Manner
padat' / (*u*) *past'* 'to fall'	14	Path
begat' / *bežat'* 'to run'	10	Manner
lazit' / *lezt'* 'to climb'	10	Path+Manner
karabkat'sja 'to climb with difficulty using limbs'	9	Path+Manner
nyrjat' / *nyrnut'* 'to dive'	6	Path+Manner
valit'sja 'to fall down forcefully'	6	Path+Manner
vvinčivat'sja / *vvintit'sja* 'to screw in'	5	Path
nosit'sja 'to scamper about'	4	Manner
ruhnut' 'to tumble down, collapse'	4	Path+Manner
letat' / *letet'* 'fly'	3	Manner
mciat'sja 'to speed'	3	Manner
(*s*)*puskat'sja* / (*s*)*pustit'sja* 'to move down'	3	Path
vzbirat'sja / *vzobrat'sja* 'to move up'	3	Path
rvat'sja / *rvanut'sja* 'to direct oneself forcefully'	3	Manner
grohat'sja / *grohnut'sja* to fall down with a crash, crash down	2	Path+Manner
siganut' / *sigat'* to jump, leap'	2	Manner
vzmyt', *vzmyvat'* to rocket, soar up upwards	2	Path+Manner
brosat'sja / *brosit'sja* 'to dash'	1	Path+Manner
vkrutit'sja / *vkručivat'sja* 'to circle'	1	Path
oprokinut'sja / *oprokidyvat'sja* 'to overturn'; 'tip over'	1	Path+Manner
pljuhnut'sja / *pljuhat'sja* 'flop down', 'flop into', 'plump into', 'plop into', 'drop into'	1	Path+Manner

Table 3: Motion verbs used for the description of vertical motion – English data.

Type of verb	Number of tokens	Semantic component
to fall	33	Path
to jump	27	Manner
to climb	19	Path+Manner
to dive	15	Path+Manner
to run	12	Manner
to spin	5	Path
to walk	4	Manner
to rush	3	Manner
to stampede	2	Manner
to go	2	Path
to drop	2	Path+Manner
to step	1	Manner
to race	1	Manner
to flip	1	Manner
to fly	1	Manner
to come	1	Path
to approach	1	Path
to turn	1	Path
to escape	1	Path
to corkscrew	1	Path+Manner
to bounce	1	Path+Manner
to hop	1	Path+Manner
to sink	1	Path+Manner

This work was financed by the Polish Ministry of Science and Higher Education.

The authors declare that they have no competing interests.

The authors' contribution was as follows: concept of the study: Joanna Łozińska; data analyses: Joanna Łozińska; stimuli design and the collection of the Polish and English data: Barbara Pietrewicz; the writing: Joanna Łozińska.

Publisher: Institute of Slavic Studies, Polish Academy of Sciences, University of Silesia & The Slavic Foundation