Cross-linguistic Varieties in Coding Multiply-specified Trajectory Motion Events

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1. Introduction

This study examines the descriptions of vertical motion events with multiple elements of a trajectory (i.e., Source, Goal, and Direction) with the manner of jumping. We report experimental results from the NINJAL Project on Motion Event Descriptions across Languages (MEDAL) conducted in five languages (Japanese, Italian, English, Russian, and Hungarian).[1] Our findings show that 1) Source is cross-linguistically less often mentioned in comparison to Goal, in accordance with the finding from horizontal trajectories; 2) there is cross-linguistically an even less focus in explicitly expressing Direction, which can be due to inference based on shared encyclopedic knowledge; 3) five languages differ in the occasions under which Direction is explicitly mentioned, which we argue to be due to language-specific differences in the use of forms representing trajectory elements.

2. Backgrounds

Numerous cognitive studies on motion events have been conducted to explore the coding patterns of motion events in various languages (e.g., Talmy, 1991, Matsumoto, 2017, Slobin, 2004). However, limited attention has been paid to how a complex trajectory involving different elements (e.g., different phases such as Source, Medial, Goal, plus Direction, Distance, etc.) are coded (see Ibarretxe-Antuñano, 2009, Bohnemeyer et al., 2007). The coding patterns of such trajectories are possibly influenced by both language-specific lexicalization and universal constraints (Bohnemeyer et al., 2007).

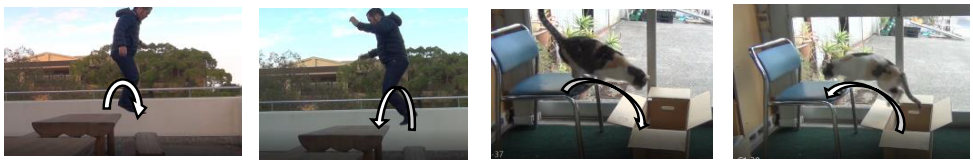
Different phases of a trajectory tend to be expressed to different degrees. It has been argued that an asymmetry exists between Source and Goal (Ikegami, 1987, Lakusta & Landau, 2005, Ishibashi, 2010, Stefanowitsch & Rhode, 2003, Papafragou, 2010). These previous studies point out that there is a greater focus on Goal than Source in languages such as English, Japanese, Greek, etc. We would like to examine if the tendency can be found in the languages discussed in this paper.

A trajectory can also have Direction specified in addition to phases. In an experiment similar to the one reported here, Matsumoto et al. (2013) found that UP & DOWN Directions are mentioned frequently and coded in the head position for walking, running and skipping events in Japanese, Italian, and other languages.

It is important to clarify our approach to the categories used for Path coding positions before we proceed with our analysis. We will divide path coding positions into 1) head and 2) head-external positions, according to Matsumoto (2017). The latter includes Talmy's satellites such as verb prefixes and particles, as well as adpositions and case markers. Among five languages examined in this paper, English, Hungarian and Russian tend to code Path in head-external positions almost exclusively, while Japanese and Italian use the head position more often (Bordilovskaya et al., 2019). The following data can be examined in light of such general tendencies in Path coding.

3. Experiment

15 native speakers of each of the following five languages participated in the experiment: English, Hungarian, Italian, Japanese, and Russian. The participants were asked to watch video clips of various motion events (44 in total) and to verbally describe what they had seen, using the program called Experiment C of NINJAL Project on Motion Event Descriptions across Languages. In this paper, we will discuss the results of only four clips in which a person or a cat jumps up or down (Direction) from one place (Source) to another (Goal) as shown in Figure 1. Thus, all four scenes involve a Source, a vertical Direction, and a Goal.



	clip 1	clip 2	clip 3	clip 4
Figure	man	man	cat	cat
Source	FROM.ON (OFF)	FROM.ON (OFF)	FROM.ON (OFF)	FROM.IN (OUT)
Direction	DOWN	UP	DOWN	UP
Goal	TO.ON (ONTO)	TO.ON (ONTO)	TO.IN (INTO)	TO.ON (ONTO)

Figures 1. Examined video clips

Mano, Yoshinari, and Matsumoto (2018) provide preliminary findings from the English and Japanese data when they discuss L2 English and Japanese data in comparison with L1 data. In this paper, we will provide a full discussion of English and Japanese, plus the three other languages.

4. Results and Discussion

First, we will demonstrate the Path-coding patterns observed in each language. Figure 2 shows the ratios of head coding of Path in five languages.

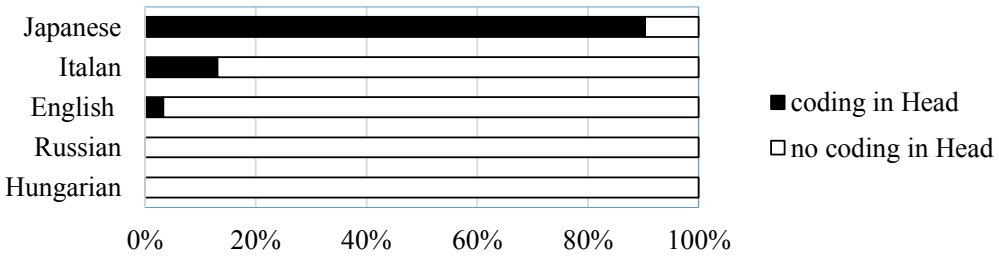


Figure 2. Head-coding of Path

All responses in all languages have Path coding in a head-external element. This means that those responses in which Path is coded in the head also code it in a head-external element as well. Japanese often codes Path both in the main verb (V2 of compound verbs) and postpositions, as in (1). The verbs used are found in (2).

(1) *Dansei-ga* *teeburu-kara* *isu-e* *tobi-ori-ta.* (JPN)[2]
man-NOM table-from chair-to jump-fall-PST
Source Goal Manner-Direction
"A man jumped down from the table to the chair."

(2) *tobi-oriru* 'jump-descend', *tobi-noru* 'jump-move.onto', *tobi-komu* 'jump-enter', *tobi-agaru* 'jump-ascend'

Italian is generally classified as a language coding Path in the head (Yoshinari 2017), but in our results it rarely uses the head position, leaving the task to head-external positions, as in (3).

(3) *Il* *ragazzo* *salta* *dal* *tavolo* *alla* *panchina.* (ITL)
The man jump.PST from.the table to.the chair
"The man jumped form the table to the chair."

In English, Russian, and Hungarian, Path is coded (almost) exclusively outside the main verb root, e.g. verb affixes, adpositions, case markers, etc. English uses prepositions and particles, Russian, verbal prefixes and prepositions, and Hungarian, preverbs and case markers.

(4) *The man* *jumped* *off the table* *onto the bench.* (ENG)
Manner Source Goal

We did not regard verbs of jumping as coding Path, although we will come back to this point later.

Next, we will see whether various semantic components are explicitly mentioned in the responses in each language. The results are given in Figure 3.

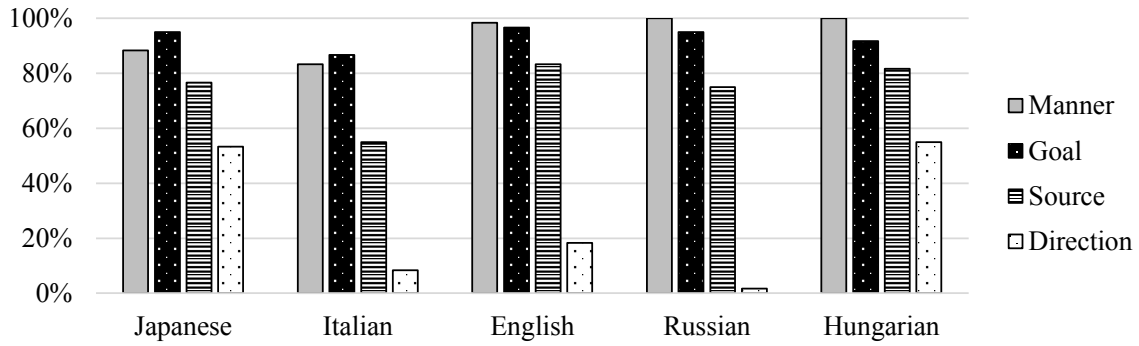


Figure 3. Reference to each semantic component

It is notable that all languages show similar tendencies. Jumping is a salient manner of motion so speakers of all languages tend to mention it. In addition, in all the five languages, Source-Goal asymmetry is confirmed

(Goal: avg. 93.0%, Source: avg. 74.0%). Direction is mentioned far less often than the other three elements (avg. 28.0%). The degrees to which Direction was mentioned differ drastically among the five languages.

Our finding concerning Direction is in sharp contrast to the finding from the running, walking and skipping scenes from a similar experiment reported in Matsumoto et al (2013). Why was Direction not explicitly indicated in the present study? One reason appears to be our encyclopedic knowledge; a jump typically (but not necessarily) involves an initial upward motion followed by a downward motion due to gravity. In addition to it, we also have real-world knowledge about the relative height of a table and a chair (usually a table is higher than a chair), or the common location of boxes for cats (see the video scenes above). Therefore, Direction is inferable, and so many speakers might have thought that the reference to Direction is unnecessary.

There is a clear difference in the frequency of Direction indications among the five languages: more frequent in Japanese and Hungarian than in Italian, English, and Russian. We will show that those languages have different conditions for the indication of Direction.

It is worthwhile to compare Italian and Japanese in this regard. Although Italian often uses the head position to indicate Path, this tendency is known to be less clear, it also tends to indicate Manner in the head more often than other languages known to use the head position, especially when Manner involved is a salient one. This appears to be true of our jumping scenes. If Direction is not expressed in the main verb position, it is optional, leading easily to go unmentioned especially when it is inferable.

Japanese, on the other hand, can use compound verbs to represent both Manner and Path in the verb, keeping Path in the head (V2) position, as in (1). Note that the use of a compound verb means that Manner and Path do not have to compete for the same position in Japanese, unlike in Italian. An additional finding is that most of the cases of directional coding are for the DOWN-path. For the UP-path, the verb chosen is more often *noru* 'move onto', which represents TO.ON, rather than UP, though usually this verb is used for upward motion.

Let us now compare Hungarian, Russian and English, which are similar in that two head-external positions are available for Path coding. In our data, Hungarian, Russian and English all use prepositions or case markers for indicating Source and Goal. They differ in whether to use prefixes or particles and if they do, which Path categories to represent. Almost all of the Hungarian responses contained the use of preverbs (54/60), probably reflecting the fact that Hungarian preverbs are necessary when the scene described is telic. The choice of Path categories encoded in preverbs is markedly different depending on whether the Path indicated involves a boundary crossing. When the trajectory involves a boundary crossing, then a prefix indicating boundary crossing (*ki-* 'out' and *be-* 'into') tends to be used; otherwise, the one representing Direction (*fel-* 'up', *le-* 'down') is given a priority over Goal (*ra-* 'onto').[3]

(5) *A macska be-ugr-ott a szék-ről a doboz-ba.* (HUN)
the cat.NOM into-jump-PST.3SG the chair-DEL the box-ILL
"The cat jumped into the box from the chair."

(6) *A férfi a pad-ról fel-ugr-ott az asztal-ra.* (HUN)
the man.NOM the bench-DEL up-jump-PST.3SG the table-SUB
"The man jumped up onto the table."

This means that when there is a competition between Direction and trajectory phase, then the pattern of choice is: TO.IN, OUT.OF > UP, DOWN > TO.ON, FROM.ON.

Russian is different. Most of the responses in Russian contained the use of verbal prefixes (47/60). No difference is found in the choice of prefixes between boundary crossing versus non-boundary crossing. Instead, the choice depends on the Direction involved.

(7)	*Mužčin-a*	*za-prygnul*	*so*	*skameik-i*	*na*	*stol.*	(RUS)
	man-SG.NOM	PRF-jump.PST	off	bench-SG.GEN	onto	table.SG.ACC	
	"The man jumped off the bench onto the table."						

Most verbal prefixes in Russian are known to be polysemous and multifunctional, and they often indicate somewhat different Paths depending on the verb to which they are prefixed. The verb *prygnu* 'jump' can occur with the following prefixes with the meanings indicated: *za-* 'into, onto', *vs-/vza-* 'up', *v-* 'into', and *vy-* 'out', *s-* 'off, down'. For UP-path, *vy-* 'out' and *za-* 'into/onto' (which represents generic goal-orientedness with respect to *prygnu*) tend to be used (often both in coordinated verbs) rather than *vs-/vza-* 'up', which was used only once. For the DOWN-Path, *s-* 'off, down' and *za-* 'into/onto' are used instead of *v-* 'into'. It appears that the prefix *v-* is only used in describing Goal segment only, and so is not appropriate for the description of a trajectory covering multiple phases as in this experiment. The prefix *za-* can be used with multiple phases. What is clear is that such a choice is a very language-specific issue. (In Figure 3, *s-* 'off, down' is not counted in Direction, since *s-* primarily represents the notion of 'off'.)

In our data, English speakers rarely used particles to indicate Direction, although particles *up* and *down* are available. Interestingly, *up* was used much more often (8 instances) than *down* (3 instances). It is not clear why many English speakers did not use particles to represent Direction. The frequencies of particles in English were low in our data (only 11/60), in contrast to Hungarian in which telicity requires the use of a preverb.

5. Conclusion

The present discussion shows that Source-Goal asymmetry exists in the frequencies of indication in describing the jumping events in Hungarian, Russian, and Italian, in addition to English and Japanese. Direction (UP/DOWN) is not mentioned often in our data, in contrast to the results of other experiments involving other types of the manner of motion. This appears to be due to encyclopedic knowledge as well as certain language-specific circumstances of indicating various aspects of a trajectory.

Notes:

[1] This project is a part of the NINJAL project "Cross-linguistic Studies of Japanese Prosody and Grammar."

[2] Abbreviations used in this paper are as follows:

ACC = accusative; DEL = delative; GEN = genitive; ILL = illative; NOM = nominative; PRF: perfect; PST = past; SG = singular; PV = preverb; SUB = sublative

[3] In Hungarian there is no preverb representing the notion 'off'.

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＜要旨＞

複数経路局面の言語化に関する通言語的比較

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本研究は、方向と複数の経路局面（起点、着点）を含む移動事象場面の描写について、5 つの言語（日本語・イタリア語・英語・ロシア語・ハンガリー語）における言語化傾向を比較し、考察するものである。これまで、移動表現に関しては多くの研究がなされてきたが、複数の経路局面を含む複雑な経路の言語化については、限られた研究しかなされてこなかった。

本研究では、国立国語研究所の共同研究プロジェクトにおいて作成された言語産出実験によって収集したデータの一部を使用する。これは、様々な移動経路や様態を組み合わせた移動事象 44 場面のビデオ映像を用い、口頭で各場面を描写するものである。この実験を、移動表現の類型パターンが異なる 5 言語（日本語・イタリア語、英語・ロシア語・ハンガリー語）の各母語話者 15 名に対して行った。ここではそのうち 4 場面の結果を報告する。その場面は、①人がテーブルからベンチへ跳んで降りる、②人がベンチからテーブルへ跳び乗る、③猫が椅子から下に置いている箱の中に跳んで入る、④猫が椅子より下にある箱の中から椅子の上に跳び乗るものであり、場面ごとに起点（FROM.ON/ FROM.IN）・着点（TO.ON/ TO.IN）・方向（UP/ DOWN）・様態（JUMP）が 1 つずつ含まれている。

得られたデータから、各話者はすべての要素に言及するわけではないことがわかった。そして、分析の結果、以下の 3 点を主張する。1) どの言語においても、先行研究で指摘されている、起点より着点の方をより言及するという「起点-着点の非対称性」が確認され、その存在が支持された。2) どの言語においても上下方向については言及が少なく、これには百科事典的知識（例：テーブルと椅子の高さ）が関わっていると考えられる。しかし、3) 方向に言及することが比較的多い言語（日本語・ハンガリー語）と、そうでない言語（イタリア語・英語・ロシア語）が観察された。これは経路をどの位置で表すのか、そして各経路局面を表す手段とその選択に影響を与える各言語内での要因によるものである。