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SHORT REPORT

Does the road go up the mountain? Fictive motion between linguistic conventions and cognitive motivations

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Abstract Fictive motion (FM) characterizes the use of dynamic expressions to describe static scenes. This phenomenon is crucial in terms of cognitive motivations for language use; several explanations have been proposed to account for it, among which *mental simulation* (Talmy in Toward a cognitive semantics, vol 1. MIT Press, Cambridge, 2000) and *visual scanning* (Matlock in Studies in linguistic motivation. Mouton de Gruyter, Berlin and New York, pp 221–248, 2004a). The aims of this paper were to test these competing explanations and identify language-specific constraints. To do this, we compared the linguistic strategies for expressing several types of static configurations in four languages, French, Italian, German and Serbian, with an experimental set-up (59 participants). The experiment yielded significant differences for motion-affordance versus no motion-affordance, for all four languages. Significant differences between languages included mean frequency of FM expressions. In order to refine the picture, and more specifically to disentangle the respective roles of language-specific conventions and language-independent (i.e. possibly cognitive) motivations, we completed our study with a corpus approach (besides the four initial languages, we added English and Polish). The corpus study showed low frequency of FM across languages, but a higher frequency and translation ratio for some FM types—among which those best accounted for by enactive perception. The importance of enactive perception could thus explain both the universality of FM and the fact that language-specific conventions appear mainly in very specific contexts—the ones furthest from enaction.

Keywords Language · Space · Fictive motion · Enactive perception · Visual scanning

Introduction

Fictive motion (henceforth FM) characterizes the use of dynamic expressions, i.e. mainly motion verbs, to describe static scenes, as in *The road* goes *up the mountain* (where the road *does not* move, vs. *The man goes up the mountain*, where the man *does* move: the latter is thus "real" or "actual" motion). In many languages of the world, a verb used for describing the motion of an entity (as in *I saw him* go *up the road/stairs/mountain*) can thus be used for indicating what might best be conceived of as the entity supporting this motion (*the road, the stairs, the mountain go up*). The psychological grounds for such constructions include, in a very general perspective, our "cognitive bias towards dynamism" in both language and cognition (Talmy 2000: 171–172), and more specifically "our sensorimotor experience of moving along linear entities" and shifts in attention focus (Langacker 1987), i.e. "the possibility of mentally tracing along a linear entity", owing to the spotlight-like nature of our visual attention (Matsumoto 1996:190). Indeed, as all possible "linguistic universals", this phenomenon is generally seen by cognitive linguists as providing evidence of "fundamental properties of the human mind" (Blomberg and Zlatev 2014, alluding to Lakoff 1987; Langacker 1987; Lakoff and Johnson 1999). Understanding this phenomenon is thus crucial in terms of cognitive motivations for language use.

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Since previous work has emphasized the multifaceted nature of FM (Talmy 2000; Matsumoto 1996; Matlock 2004b; Martínez-Losa 2007; Blomberg and Zlatev 2014), it is to be expected that various types of FM might require different cognitive explanations. Besides the role of mental simulation or enactive perception, some authors invoke that of visual scanning: "the conceptualizer (speaker or listener) takes a perspective in the scene and mentally simulates 'movement' or 'visual scanning' along the figure" (Matlock 2004b:1390). We propose (1) to evaluate their respective explanatory power with experimental data and (2) to measure their importance and validity against other possible explanations (brought to light by other types of FM) with a corpus-based approach. Our aim in this paper is thus to test competing explanations and possibly identify language-specific constraints, as have been reported, for instance, for Japanese versus English (Matsumoto 1996), for Yukatek Maya (Bohnemeyer 2010) and for Serbian versus French (Stosic and Sarda 2009).

Methods

We compared linguistic strategies used for expressing static configurations, in languages which are of varying typological and genetic distance: Romance (French/Italian), Germanic (German/English) and Slavic languages (Serbian/Polish), with two complementary methods.

First, we used an experimental set-up, with an elicitation tool (see Blomberg 2014 for a full description). It consists of a series of pictures, including 2 training pictures, 24 target pictures and 12 distractors. In order to test the validity of the visual scanning and the enactive perception hypotheses, the target pictures follow a two-by-two design: 12 in which the figure affords motion (road, bridge, path), 12 not (fence, pipe, line of chairs); 12 from first person perspective (i.e. *proximal*, e.g. the road seems to lead to or from the viewer), 12 from third person perspective (i.e. *distal*, e.g. the road is seen as distant and perpendicular to the viewer). The experimental design is thus {scanning vs. enactive perception} * {'paths' affording human motion vs. non-affording}. The elicitations took place in universities and were conducted in the target languages, with native speakers of French ($n = 13$), German ($n = 20$), Italian ($n = 20$) and Serbian ($n = 6$), all of them students (aged 20–30). Experimenters were Camille Colin (French, German and Italian) and Snežana Todorović (Serbian). The participants were video-recorded, and their contributions were transcribed; we then checked the transcriptions for uses of motion verbs (see below) in relation to each type of picture. Discounting the training descriptions, we thus obtained a total of 2122 descriptions: 1414 for target pictures and 708 for distractors.

Second, in order to evaluate both similarities and differences between languages, we opted for a (translation) corpus approach (with six languages, adding English and Polish to have within-type contrasts). We mostly used online databases of aligned translations (ParaSol, von Waldenfels and Meyer 2006 and ParCoLab, Stosic 2015), selecting source texts for each of the six languages. In each source text, we extracted all occurrences of specific lemmas and retrieved corresponding sections in translated texts. Among the different types of FM identified in the literature, we looked for those in which the use of a motion verb is most likely, following Matsumoto (1996), and thus excluded e.g. access and orientation paths, focusing rather on co-extension, radiation and emanation paths (Talmy 2000: I, 2). Rather than extracting verb lemmas, we searched for the subjects of these verbs; to select these lemmas, we relied on Aurnague's (2004) typology of entities, selecting spatial entities which are most frequently found in FM expressions (see Capelli 2013: 112sqq, whose results are based on an extensive corpus study). We thus distinguished, on a perceptive and functional basis, the following lemma types:

1. communication paths (road, bridge, stairs);
2. longitudinal objects, both functionally designed for motion (pipe, tube) and not (wire, thread);
3. (immaterial) portions of space, including functional openings (door, window) and holes (hole, crack);
4. series of objects, including mainly linear configurations (series, line);
5. places (field, city, zone, mountain);
6. mixed entities (house, hall);
7. body parts (head, neck) and clothes (robe, veil);
8. other objects (tree, cross, column, table);
9. other perceivable entities (light, sound).

With 40 lemmas per language, we found a total of 1192 occurrences of FM expressions and 443 corresponding descriptions without FM, for a total corpus of 1634 occurrences.

Hypotheses

For the elicitation study, our hypotheses were as follows: (1) that all four types of (target) pictures would be described with FM by some speakers, in all languages; (2) that, depending on the type eliciting most FM descriptions, our results would point to (a) mental simulation, or enaction, as the main motivation of FM (if most FM sentences were found in motion-affording contexts), (b) scanning (if most FM sentences were found in distal contexts) or (c) to the validity of both motivations (if most FM sentences were found in both motion-affording and proximal contexts). For the corpus study, our hypothesis was that

lemmas categorized as Type 1, possibly linked to enaction, would appear more frequently in FM expressions, and with a higher translation ratio in all languages, while all others, for which the enaction scenario seems at least less likely, would both appear less frequently and be more language specific (hence less readily translated).

Results

The elicitation experiment yielded very little significant differences in a first run of the results. In fact, the only significant difference was between target pictures and distractors, with the latter presenting a very low percentage of FM expressions (<2.5 %, with no significant differences between languages). Other than that, there were no clearly significant differences either between languages or between picture types. However, we had noted, while conducting the experiment, that the proximal/distal opposition is actually very ambiguous. We had noted, further, that the original "afford" versus "non-afford" opposition was also counter-intuitive, with some images that seem quite natural while others are not.

We therefore reassessed the experiment design on the sole basis of the pictures themselves and redesigned the experiment on an ontological basis. What we did was to check whether pairs of pictures (proximal vs. distal, afford vs. non-afford) were coherent. We found that there was a clear bias: in all four subtypes, (a) some pictures were more clearly proximal or distal than others and (b) some were more clearly motion-affording than others. This brought about a consequent blurring of the intended distinctions. We subsequently used the typology adopted for our corpus study, distinguishing (1) human motion-affording (Type 1 above); (2) non-human motion-affording (Type 2); (3) non-motion-affording (other types). The proximal/distal opposition between pictures was, in our view, too blurred to keep for testing purposes. With this new coding, significant differences were found for motion-affordance versus no motion-affordance ($\chi^2 = 231$, $p < 0.001$), for all four languages. Significant differences between languages included the mean frequency of FM expressions (from 30 % in Italian to 50 % in German).

The corpus study showed a very low frequency of FM expressions across languages, with an extreme amount of noise [422 occurrences of FM expressions (plus translations) out of an initial corpus of approximately 7000 occurrences (plus translations)]. There were significant differences between languages types (Germanic vs. Romance: $\chi^2 = 7.7$, $p < 0.05$, Romance vs. Slavic: $\chi^2 = 8.5$, $p < 0.05$) and between languages of a same type (German vs. English: $\chi^2 = 9.3$, $p < 0.001$, French vs. Italian: $\chi^2 = 10.1$, $p < 0.001$, Polish vs. Serbian: $\chi^2 = 14.4$, $p < 0.001$) (Fig. 1).

We also found a clear difference between types, some appearing to be much more frequent than others. Our results are similar to those of Capelli (2013), except for Type 9, which we found to be unexpectedly frequent (Fig. 2).

Only three types were found to be quite frequent: Talmy's co-extension paths (our Type 1), followed by radiation paths (our Type 9) and advent paths (our Type 8). Our hypotheses concerning inter-language agreement were partly confirmed by the results, as shown in Table 1: among the types which are frequent enough for statistical purposes [Types 1, 5, 6, 8 and 9, for which we have more than a hundred examples (i.e. more a hundred occurrences, counting the original occurrence and its translations)], Type 1 is one of those with the highest translation ratio, along with Type 9 (84 % of occurrences were translated with FM expressions at least in one other language), while Types 8 and 5 have much lower translation ratios (67 and 73 %, respectively). Note that only some of these distinctions are statistically significant, namely the proportion of agreement in Type 8 vs that in Types 1 ($\chi^2 = 6.32$, $p < 0.05$) and 9 ($\chi^2 = 4.736$, $p < 0.05$). For all other distinctions, further tests are needed.

A qualitative study revealed clear differences in terms of construction types, with some verbs used only in specific contexts: verbs of "caused motion" such as *lead* were found mainly in Type 1 (75 % of all occurrences of these verbs in our corpus, and no more than 11 % in any other type). This difference appeared consistently in all languages. Finally, concerning the possible translations of FM expressions, one major difference appeared *between* languages: unlike types which we understand as indicating enactive perception (namely Type 1), those more indicative of scanning (namely Types 6 and 8) presented interesting variations, with posture verbs in Serbian and English versus FM elsewhere (e.g. for inanimates: *The trunk lay on the ground*, vs. French *Le tronc rampait sur le sol* "the trunk crawled on the ground").

Conclusions

The corpus approach enabled us to revisit the results of our experimental study, (a) confirming the importance of enactive perception as a viable explanation for the existence of FM expressions in different languages and (b) showing that the frequency of FM expressions in corpora is actually quite low. While the (possible) universality of FM expressions could thus be explained by the importance of enactive perception, the fact that there are other motivations might account for the higher variability in some contexts, in which language-specific conventions

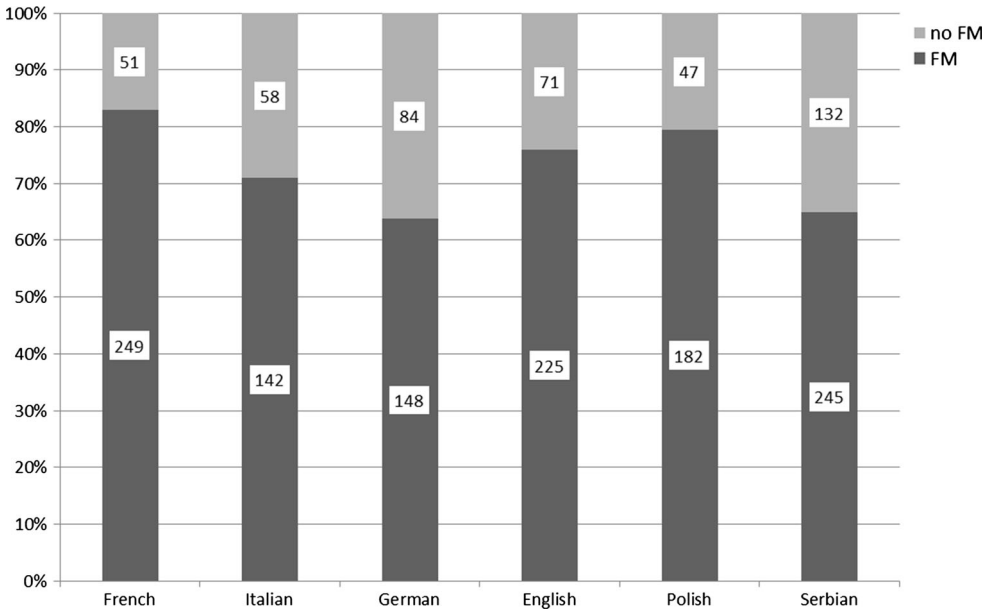

Fig. 1 Frequency of fictive motion expressions per language

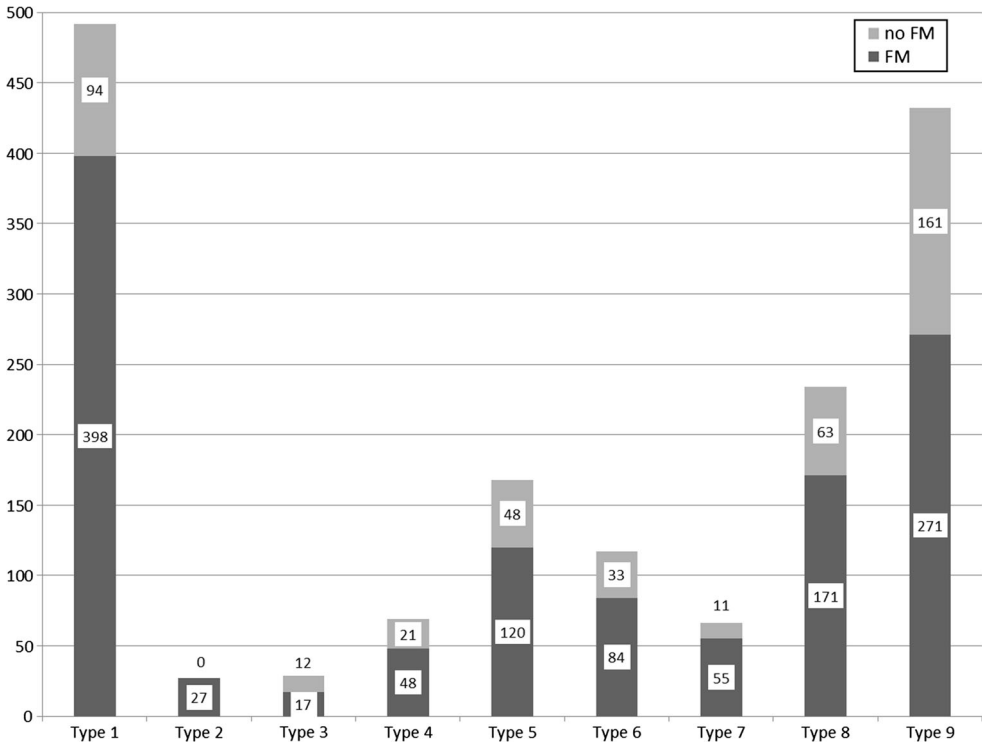

Fig. 2 Fictive motion expressions per type

Table 1 Number of occurrences of FM expressions (*not counting* the translations) with and without corresponding FM expressions in other languages

FM expressions	Type 8	Type 5	Type 6	Type 1	Type 9
No agreement	23	14	5	20	12
Some agreement	47	37	24	104	63
Proportion with some agreement (%)	67	73	83	84	84

seem to play a greater role—precisely the contexts that are furthest from enaction. However, if the frequency of FM expressions we found for Type 9 (Talmy's *radiation paths*) is confirmed, it should probably receive a different explanation. This brings us back to the multifaceted nature of FM expressions. Further research should address these questions, focusing on the question of yet other possible explanations, for instance the importance of metaphorization (see Cacciari et al. 2011).

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