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Methodological and typological issues

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1. Introduction

1.1 Contribution of this paper

1 Motion event encoding research has come a long way in the last three decades within cognitive linguistics and spatial semantics.[1] A large range of different languages, different data sources, and different aspects of motion have been studied from several theoretical viewpoints, using different sets of measures. This body of studies has triggered considerable debates within the linguistic community with respect to the proper methodology for studying motion events and their linguistic encoding across languages and cultures.

2 Cross-linguistic differences in motion event encoding are typically explained by differences in the encoding strategies offered by languages and the constrained possibilities to organize semantic components of motion (i.e. Manner and Path) in discourse. Encoding differences are traditionally captured within the 'lexicalization patterns' framework proposed by Talmy (1985, 2000), according to which the languages of the world differ in the way semantic components are organized and distributed over syntactic constituents. For example, Germanic languages (such as English) are usually characterized by structural restrictions in the way verbs select their spatial complements, realizing this in compact constructions encoding Manner information in the main verb together with peripheral (mostly Path) devices; Romance languages (such as French) show structural restrictions or omissions at the level of complements, mostly lexicalizing Path information in the main verb; whereas other systems allow a freer combination of elements (such as Greek or Slavic). This last category as well as within-system variation is the central focus of this paper. Peripheral patterns and alternative combinations, as well

as the best way to deal with these from a methodological perspective, is of special interest to our investigation.

3 This type of traditional classification is usually based on the lexical meaning of constituents, and typically ignores more general typological parameters such as morphosyntactic complexity, lexeme preferences, utterance structure constraints and relational information as controlled by verbal predicates (i.e. number of arguments, type of spatial complements, etc.). Recent work on encoding patterns underlines the fact that spatial encoding involves a lot more than only lexical meaning (cf. Skopeteas 2008; Beavers et al. 2010). The theoretical aim of this paper is to expand the dominant lexical-based assumption in showing the important role not only of semantics but also that of morphological and syntactic properties within the clause that encodes a motion event, and thus contribute to a unified analysis of motion encoding that incorporates morphosyntactic (i.e. case marking, prefixation) and pragmatic features. In addition, we show that a synthesis of different data sources and measures is helpful to gain a more comprehensive understanding of motion event encoding, especially for languages that present ambiguous typological status, such as Greek.

4 In the following sections, we will first give an extensive but not exhaustive overview of these different approaches in order to: (i) present the current state of the art in motion event encoding research; (ii) identify the 'core' spatial components and measures used in the literature; and (iii) propose a multidimensional perspective for coding data when investigating spatial language encoding. Our second aim is to use the multidimensional analysis proposed in the first section to investigate two different data corpora, identify the parameters that allow for a clearer typological classification of Greek, as compared to English and French, and draw some methodological and theoretical conclusions that are seen to be important in the domain of spatial semantics and the cognitive investigation of spatial language.

1.2 Motion event encoding: data, theory, and classifications

5 Several different data sources have been used to investigate motion event encoding, and the different types of data have impacted the theoretical viewpoints of the researchers involved. Three main types of data have been employed: introspective, experimental and corpus data.

1.2.1 Introspective classifications

6 Traditionally, spatial language analysis has been above all based solely on the intuitions of researchers. Jackendoff's (1983), Lakoff's (1987) as well as Talmy's (1983, 1985, 1991, 2000) influential classifications all relied on theoretical concepts and introspective descriptions of semantic properties, mainly those of verbs, and the ways verbs together with other devices (lexical or functional) are combined in discourse 'encoding patterns' to form spatial expressions.

7 From a semantic point of view, most researchers make a main distinction between verbs that express a displacement or Path (i.e. *arrive*, *enter*, *exit*, *leave*, *go*) and those that express Manner of motion (i.e. *climb*, *walk*, *run*, *jump*) (cf. Jackendoff 1990; Levin, 1993; Levin & Rappaport Hovav 1992, 1995). In order to characterize this distinction, they typically use three types of criteria based on: (a) the spatial features of the verbs, such as the 'change

of location' (Talmy 2000; Randall 2010), the 'inherently directed motion' features (Levin 1993) or properties linked to a 'change of the basic locative relation' (Boons 1987); (b) the aspectual properties of the verbs linked to telicity (Smith 1991; Vendler 1957; Vetters 1996); or (c) their spatio-temporal properties (cf. Dini & Di Tomaso 1999; Aurnague 2012).

8 Talmy, for example, proposes his influential typology of event conflation based on one of those criteria (the 'displacement or change of location' criterion),[2] on his knowledge of the most 'characteristic' (colloquial, frequent and pervasive) motion expressions in various languages and the most central and universal notion related to motion, that of Path (Talmy 1985: 62). Talmy defines a Motion event as "a situation containing motion and the continuation of a stationary location" of an entity (Talmy 2000: 25), thus referring to a translatory situation – an event in which a Figure moves along a Path involving a change in the position of the figure with reference to time. In that sense, the notion of Path, which is central to Talmy's typology, in its narrowest interpretation, refers to a particular type of Ground – covering a Source, a Goal and an intermediate region – along which a Figure travels.[3]

9 With respect to complex motion events, such as in (1), Talmy argues that the *framing motion event* (*"moving into the cave")* which expresses the core relationship (Path) between the moving Figure and the Ground, and the co-event (*"floating")* which expresses the Manner of Motion, are organized differently across languages. Thus, some components that are internal to the translatory structure or external to it may merge by an operation of conflation, defined as "any syntactic process – whether a long derivation involving many deletions and insertions, or just a single lexical insertion – whereby a more complex construction turns into a simpler one" (Talmy 1972: 257).

(1)	The bottle floated into the cave English (Talmy 2000: 117)

10 As seen before, and according to this framing event schema and the variation he observes in the encoding patterns, Talmy focuses on one particular spatial semantic category, Path, in order to investigate what morphosyntactic categories are responsible for its realization. He takes a *function-to-form* approach and demonstrates that languages characteristically realize Path either in the verb root or in a preposition (which Talmy generalizes to any adnominal category) or with a Satellite (a grammatical category of any constituent other than a noun-phrase or prepositional phrase that is in a sister relation to the verb root). Thus, he recognizes two major types of languages: (a) those who lexicalize the framing Path event in the main verb (*Verb-framed languages*); and (b) those who express it in the periphery of the main verb, in Satellites (*Satellite-framed languages*).[4]

11 From a syntactic point of view, motion verbs are recognized as special, leading to spatial expressions that do not resemble other types of predicates (Boons 1987; Boons, Guillet & Leclère 1976). With this in mind, Matsumoto (2003), who focuses on the distribution of the spatial elements without excluding their semantic characterization, proposes a slightly different terminology. He replaces the terms *Verb-* and *Satellite-framed languages* by *Head-* and *NonHead-framed languages*. His distinction extents Talmy's typology and specifies further the notion of 'satellite'. He underlines, for instance, the fact that all satellites are nonheads, but argues that not all nonheads are satellites. Satellites, as defined above, do not include prepositions or case markers on nominals, since they are not in a sister

relation to the verb. Therefore, sentences like (1) and (2) technically are not *Satellite-framed*, but under his terms, they are clearly NonHead-framed.

(2)	Elina	käveli	koti-in.	Finnish (Nikanne 1990: 77)
	Elina	walk.IPFV.3SG	home-ILL	
	'Elina walked home-into' (illative locative case marking on nominal in Finnish)			

12 These complements have also preoccupied other researchers, who use a slightly different terminology to describe 'satellite' or 'non-head' elements in discourse. For some researchers, languages that do not lexicalize the spatial information (i.e. motion) exclusively through the verb, usually use the combination verb + 'relational element' (cf. Lehmann 1992: 632–634). Such relational elements – termed 'spatial relators' by others (Skopeteas 2008) – are dependent on the verb valency and the specific type of subcategorization restrictions in a given language, as they are part of the verb's sister node containing the reference object (including prepositions, cases, and several classes of affixes).

13 Matsumoto (2003), Skopeteas (2008) and Beavers et al. (2010) – among others cited by Beavers et al. (2010: 369) – may represent the most recent stage in introspective classifications. They argue that attested motion event encoding patterns, including the variability found in languages across the globe, can be attributed to motion-independent morphological, lexical, and syntactic resources as well as preferences situated outside of grammar, including cultural practice. Skopeteas (2008), for example, describes diachronic change in motion event encoding in terms of changes to the restrictions imposed by the verbs on their spatial complements. According to him, the number of arguments controlled by the verbal predicate makes "a crucial contribution to the semantic decomposition of the clause in determining the set of possible permutations of semantic components in a given language" (2008: 54), and thus should be taken into account for the characterization and classification of a system. This line of research goes beyond the traditional distinctions based on lexicalization patterns, and rather tries to explain diversity and change in motion event encoding in a much wider linguistic context. These investigations have immense explanatory power, as they can shed light on determinants of motion event encoding patterns as well as provide reasons why we find correlations between features such as encoding patterns and the lexicon.

14 We note however, that the introspective classifications presented above attempt to classifiy whole languages on the basis of the most pervasive patterns that they are known to display, rather than substantiate these claims by looking at experimental or corpus-based language data. They focus on theoretical and sometimes domain specific aspects of motion event encoding and have therefore been instrumental for providing typology research with the relevant conceptualizations. Concepts such as Figure, Ground, Path and co-event are vital for the analysis of motion events. However, whereas these concepts are grounded in theoretical deliberations in introspective classifications, they become more concrete when they are used to measure language behavior. This is the topic of the next section – the various ways in which these introspective concepts were shaped into explicit measures in order to describe variation encountered in narratives (story-tellings) and controlled production tasks (experiments) aimed at eliciting motion discourse.

1.2.2 Controlled story-telling and experiment-based classifications

15 Slobin and his collaborators (Berman & Slobin 1994; Slobin 1996, 2003, 2004; Slobin & Hoiting 1994; Özçalışkan & Slobin 2000) revolutionized the application of the Talmian typology by investigating its validity in several controlled story-telling tasks. They examined in a systematic way the expression of motion events in controlled narrative productions – Frog Story-tellings[5] – elicited in 21 languages, and observed that speakers of Verb-framed languages (such as French) indeed tend to express Path in verbs and provide less details about Manner, while speakers of Satellite-framed languages (such as English) use a large variety of Manner verbs frequently combined with one or more satellites expressing Path information, thus validating the distinction between Verb- and Satellite-patterns. Examples in (3), from Slobin (2004: 6), illustrate Verb- and Satellite-framed descriptions respectively as elicited with a picture showing an owl emerging out of a tree.

(3)	a.	D'un		trou	de	l'arbre	sort	un	hibou
		from.INDF.ART		hole	of	DEF.ART.tree	exits	INDF.ART	owl
		Path		Ground			Path	Figure	
		'From a hole in the tree exists an owl' (French V-framed pattern)							
	b.	An	owl	popped	out				
		Figure		Manner	Path		(English S-framed pattern)		

16 Berman & Slobin (1994: 118) underline the fact that "[...] categorical characterizations often reflect tendencies rather than absolute differences between languages". That is, there is no absolute ban for any of the two kinds of languages to use the lexicalization pattern unlike the one that it is typically associated with. As one can certainly find instances of Satellite-framing in Verb-framed systems (Aske 1989), so it is also possible to find instances of Verb-framing in Satellite-framing systems (see further discussion in section 1.4 below).

17 One aspect of variation that Slobin and colleagues have described deals with the type of constructions lexical elements can enter in. Most languages have at least some equivalents of Manner verbs (e.g., French: *rouler* 'to roll', *ramper* 'to crawl' etc.) and Path verbs (e.g., English: *ascend* or *enter*). However, depending on the typological characteristics of the language, their frequency of use as well as their diversity seem to be extremely variable. For instance, the French sentence *Le bébé rampe dans la chambre* cannot be used when the event involves a boundary crossing as compared to its English equivalent 'The baby crawls into the room' (cf. Hickmann 2002: 72). Additionally, the French verb *grimper* ('to climb up') not only conflates Manner and Path information but cannot be used for downward motion, whereas in English the verb *climb*, while upward motion is the default, can be used with particles indicating both upward and downward motion (e.g., 'to climb up', 'to climb down') (cf. Soroli 2011b: 175). Evidence from Verb-framed languages (Hebrew and Turkish) shows that speakers of these languages

undeniably use few Manner verbs, while speakers of Germanic languages, as well as Thai and Russian, use them at significantly higher rates (Strömqvist & Verhoeven 2004; Slobin 2004).

18 Slobin (1996) goes beyond typology and further probes into the cognitive implications of such differences and puts forth his *thinking for speaking hypothesis* according to which speakers of different languages attend to different components of motion events (Path, Manner, Figure, Ground) because their language does not make these components equally salient. More precisely, speakers seem to attend differentially to two types of components: those that can be perceived and are objectively always present in the event (i.e. Path), which have consequences for dealing with the external world, and those that are linguistically subjective and relevant to the event but cannot be read off as easily from the perceived event (e.g., distinctions pertaining to Manner, Aspect, Definiteness, Voice). He further extends his investigations to other languages (Slobin 2003, 2004, 2006) and proposes a revision of the Talmian typology by introducing a third class of languages, which he calls Equipollently-framed, including languages with serial verb constructions (e.g., Thai, Mandarin Chinese) in which a Manner verb is often used together with a Path verb, languages with bipartite verb constructions (e.g., Algonquian and Hokan), and languages with Manner preverb + Path preverb + verb root (e.g., Jaminjungan). And since Manner of motion is typically missing from motion descriptions in Verb-framed languages, but is typically co-expressed in Satellite-framed languages, Slobin (2004: 7) additionally proposes that languages be put on a cline of Manner salience ranging from languages with low to high Manner salience. In high Manner salient languages a slot is always available to encode Manner, such as the main verb in S-languages, the first element of a serial verb construction in languages such as Chinese, or Manner morphemes such as verbs, coverbs or ideophones in bipartite languages.

19 In line with such alternative cline classifications, Ibarretxe-Antuñano (2009) instead proposes a continuum of Path-salience, parallel to that for Manner-salience put forth by Slobin (2004). This continuum is thought to range from high-Path-salient languages to low-Path-salient languages: "the former offers rich and frequent descriptions of path, while the latter provides poor elaboration of this component" (Ibarretxe-Antuñano 2009: 410). From this point of view there is a relation between Path-salience and linguistic, cultural and discursive characteristics. The position of languages on this Path-scale depends on how accessible, frequent, and easy Path devices are during processing and production.

20 Although more and more researchers (Ibarretxe-Antuñano 2009; Slobin 2004; Matsumoto 2003) express the conviction that languages should be classified along a continuum (the above clines of Manner and Path salience) rather than be forced either into the S- or V-types of languages, a fundamental divide between these two types still holds on empirical grounds. Several experimental studies investigate binary distinctions and confirm the differences in the encoding patterns for Manner and Path components across languages (Choi & Bowerman 1991; Slobin 1991; Hickmann et al. 2009), suggesting that these differences are already in place in the early stages of acquisition (i.e. Berman & Slobin 1994; Naigles et al. 1998; Bowerman & Choi 2003; Allen et al. 2007; Papafragou et al. 2002; Papafragou & Selimis 2010). Only some of these studies go beyond plain lexical encoding analysis and consider clines of salience from a cross-linguistic perspective insisting on the fact that the encoding options available in a given language seem to depend on a multitude of factors, such as the optionality of a component, the complexity of a given

structure, or even the discourse purposes of the utterance (cf. Slobin 1996, 2004, 2006; Hickmann et al. in press).

21 From an experimental point of view, researchers have tried to measure the relative impact of these factors and explain how variability manifests itself within and across languages. Preferences for some encoding patterns in a given system may first arise due to the shape and size of its verb lexicon, since this lexical category is fundamental for classification. Although languages may have both Path and Manner verbs, they differ significantly with respect to how many verbs of each type they contain. Most languages have basic motion verbs, such as *go* in English, but there is more variability as to whether they have available Path verbs that encode direction, deixis, orientation, boundary crossing etc. (such as *approach* 'go towards' or *enter* 'go in') or specific Manners of motion (such as *amble* 'walk in a leisurely manner', *waltz* 'dance to a three-beat rhythm' etc.). Language systems present strong crosslinguistic differences in verb inventories and it seems plausible that the encoding options that are preferred in a given language would be those that exploit its lexicon to the fullest. Verkerk (2013, 2014a) shows that Satellite-framed languages have a larger Manner verb lexicon, while Verb-framed languages have a more sizable Path verb lexicon.

22 Extensive experimental psycholinguistic research has examined the salience of different types of Manners. For example, research on Manner of motion verbs has shown convincingly that S-languages (mostly Germanic) such as English or German "tend toward greater specification of Manner, probably because the lexicon provides a large collection of verbs that conflate Manner with change of location (crawl, swoop, tumble, etc.), often conflating cause as well (dump, hurl, shove, etc.)" while V-languages (mostly Romance) such as French and Spanish "are less elaborate in this regard, but are often more elaborate in descriptions of location of protagonists and objects and of end states of motion" (Berman & Slobin 1994: 118; and for similar results see Soroli 2011b; Slobin et al. 2014; Hickmann et al. in press).

23 With respect to complexity, the less complex a structure is, the easier it is to process, and thus the more likely it is to be preferred to more complex ones (Hawkins 2004). As a consequence, a language might appear to have a more limited set of encoding options available than it actually does. Similarly, the putative S-framed tendencies noted for example in English by Soroli (2011b) in a controlled elicitation task may arise because the canonical S-framed pattern (Manner verb + Path satellite) is presumably the least marked of the available options. The examples in (4) illustrate some grammatical but marked cases found in her previous experimental data for English: in (4a) a light Motion verb combined with a Manner adverb and a Path adposition; in (4b) a Path verb combined with a Manner adverbial.

(4)	a.	She	went	slowly	out	of	the	room	
		Figure	Motion verb	Manner adverb	Path	adposition	Ground		
	b.	She	left	the room		slowly			
		Figure	Path	Ground		Manner adverb			

24 The extent to which speakers specify different aspects of motion may also vary as a function of the pragmatic purpose in a given situation. For example, speakers might be more likely to specify the Manner of motion together with Path components in a context where Manner is particularly relevant, (e.g., for emphasis in a context where one Manner is contrasted with another). The impact of such factors may be most striking in Verb-framed languages, where Manner is typically expressed in the periphery or not expressed at all, as in (5) (from Hickmann 2001: 117).

(5)	Ils	sont	montés	tous	les	deux,	mais	lui
	3PL.MASC	AUX	ascend.PST.3PL	all	DEF.ART	two	but	3SG.MASC
	il		est monté		tranquillement,		alors	qu' elle
	3SG.MASC		AUX ascend.PST.3SG		quietly		while	3SG.FEM
	est montée en				courant	à	toute	vitesse
	AUX ascend.PST.3SG by				run.PTCP	at	all	speed
	'They both went up, but he went up quietly, while she ran up as fast as she could'							

25 The typicality or inferability of the Manner of motion is also a factor that determines how optional Manner description is. This has been addressed in a comparative study by Papafragou and her colleagues (2006) for two languages assumed typologically different: English, classified as typical S-framed, and Greek as typical V-framed.[6] The frequency of lexicalized Manner to describe motion events was tested with static picture material and the findings showed that Manner encoding is not only typologically but also pragmatically constrained, as the encoding of Manner differed as a function of whether this component was inferable or opaque in the scenes presented. According to the a priori binary classification of the two languages claimed by the authors, English speakers tended to use Manner verbs with or without Path satellites, whereas Greek speakers tended to simply use Path verbs, leaving Manner unexpressed to describe canonical ways of motions (e.g., a scene with a man walking up some stairs, where walking represents the canonical Manner and thus easily inferable in this context). However, the frequency of Manner encoding increased significantly in the Greek utterances (use of more Manner verbs or Manner adverbials) when speakers were presented with scenes showing unexpected Manners of motion (e.g. a plane flying upside down). For the authors, such findings suggest that a system like Greek (assumed to be clearly V-framed) marks Manner in subordinate clauses or leaves it unexpressed, with only one exception: when Manner is non-canonical the system encodes this information by lexicalizing it in the verb or by expressing it in the periphery. However, in order to support such an interpretation and to test in detail the optional character of Manner, particularly in languages like Greek which seem to present complex typological properties, it is necessary to examine data based on dynamic stimuli that present several degrees of Manner saliency rather than make binary V- vs. S-framed classifications.[7]

26 Consequently, relative complexity, pragmatic purposes, and the typicality of Motion components may constrain the available options within a given language, favouring some constructions over others, in turn yielding strong tendencies that may seem to be categorical constraints. The issue of complexity arises in another way with respect to the optionality of some components of motion events. Optionality is inherent in Talmy's Verb- vs. Satellite-framing contrast, for whom satellites are generally optional, unlike the main verb and eventually some of its preverbs (see further details on prefixation and the status of satellites in section 1.4). Thus, the question that arises is when and in what contexts peripheral devices (in the verbal network) are optional and when they need to be expressed.

27 Cross-linguistic research on narratives has brought into question not only the classifications and salience factors involved in linguistic typology, but also opened new perspectives on the implications these typological differences have on our spatial cognition and its development (among many others Berman & Slobin 1994; Bowerman & Choi 2001, 2003; Choi & Bowerman 1991; Gennari et al. 2002; Hickmann 2006; Landau & Jackendoff 1993; Papafragou & Selimis 2010; Slobin 1996).

28 Results from controlled story-telling and experimental studies emphasize the relevance of non-dichotomous, clinal characterizations of linguistic systems and suggest the need for detailed multidimensional (multi-level and multi-measure) analysis of the different spatial components without excluding complexity, pragmatics, and salience as well as cross-level effects (i.e. the influence of general morpho-syntactical characteristics). Departing from the theory-based introspective classifications, they have shown that concepts such as Path can be operationalized in different ways (accessibility of Path devices, amount of Path segments allowed in a single clause, attention to salient Path areas, etc.). The variability of behaviour captured by this range of measures illustrates that there are limitations on their interaction, i.e. Verb-framed languages are associated with having larger Path verb lexicons, but this is not always true (Verkerk 2014a). The multi-measure analysis of motion event encoding that has been made possible by both story-telling and experimental studies now focuses on finding more of these interactions and explanations for them in an even wider sample of languages.

1.2.3 Written corpus-based classifications

29 Alongside story retellings and experimental stimulus-based investigations, the need to posit continuous measures of language behavior rather than dichotomous classifications has also become evident from the investigation of written corpus data. Investigations of cross-linguistic differences in motion event encoding involving the major national corpora, such as the British, American, or Russian National Corpora, seem to be curiously lacking. However, parallel corpora and comparable original corpora especially created or annotated for the purpose of investigating spatial language have been a productive source of motion event investigation. There are four main types of studies that employ written corpora to study motion event encodings, which in almost all cases focus on published novels: original corpora, comparable non-parallel corpora, parallel corpora that compare language pairs, and parallel corpora that compare larger language samples. Studies of original corpora focus on a single language, while comparable non-parallel and parallel corpora focus on the study of two or (far) more languages.

30 First, there is a limited amount of study on motion events in what we call here 'original corpora': selections of published texts (mostly novels) that have been constructed and annotated especially for motion research. These studies do not concern themselves with translations but rather collect motion event descriptions from a set of novels originally written in a single language of interest (Chen & Guo 2009, 2010; Lin 2010). They use the set of motion event descriptions as a characterization of the written encoding of motion events.

31 A second type of written corpora, which is rare in typological studies in general and even rarer in motion studies, is the comparable corpus (Slobin 2000; Özçalışkan & Slobin 2003; Sölling 2011). In this type of corpus, motion events are extracted following the same guidelines from comparable texts that have been written in different languages. Slobin (2000), for example, studied extracts from seven novels in English, Russian, Spanish, and Turkish. He shows that the amount of Manner specification, both in terms of verb tokens as well as verb types, is different between Satellite-framed English and Russian and Verb-framed Spanish and Turkish. In addition, the amount of Manner specification in the written novel corpus is comparable with that found in elicited oral narratives. The only larger study using original but comparable texts that we know of is Sölling (2011), who studies motion verbs in forty North American languages. His comparable texts include creation myths, trickster stories, migration myths, descriptions of rituals, and family histories. Unlike Slobin (2000), Sölling (2011) does not extract a random selection of motion event descriptions from a novel, but rather collects all motion event descriptions from a set of texts. The amount of written original texts in small languages such as those native to North America is often very small, but given that the range of topics is similar, the result is a comparable set of motion event descriptions that can be used as a comparative sample.

32 The use of parallel corpora is far more common in the study of Talmian motion event encoding. It started with Slobin (1996), who studied a set of English and Spanish novels and their translations, showing that translations in both languages adapted motion event descriptions to native patterns. Most of these studies focus on pairs of languages (occasionally three languages) and either compare translations of the source language into the target language (Santos & Oksefjell 1999; Edwards 2001; Ibarretxe-Antuñano 2003; Baicchi 2005; Sugiyama 2005; Filipović 2008; Kopecka 2009, 2013; Capelle 2012; Cifuentes Férez 2013; Dot Marcé 2013; Iacobini & Vergaro 2014; Wang 2015), or look at both originals and translations in both source and target directions (Oh 2003). Baicchi (2005), for example, presents a comparative study of translations of Joseph Conrad's *Heart of Darkness* into Italian and Spanish, and interprets the availability of a large range of motion constructions as evidence for a Slobinian Manner cline, with Italian expressing Manner more often than Spanish. She also finds evidence that the boundary-crossing constraint on using the Satellite-framed construction may be lifted in Italian and Spanish if the event is carried out with particular force dynamics, i.e. sudden, with great intensity, and overcoming resistance. Capelle (2012) shows that English texts as translated from French feature fewer Manner of motion verbs than English texts that have been translated from Satellite-framed German, suggesting that users of parallel corpora need to take into account non-native translation effects.

33 Only a limited amount of studies have employed parallel corpora to study language samples of more than a handful of languages (Slobin 2005; Wälchli 2009; Verkerk 2014b). Slobin (2005), for example, compared translations of chapter 6 of *The Hobbit* (J.R.R.

Tolkien) in five Satellite-framed and six Verb-framed languages. He finds that the latter six languages encode Manner less frequently, and break up the Path of motion in different ways from the five Satellite-framed languages. Wälchli (2009), in his large typological study that employs translations of the *Gospel according to Mark*, investigates the use of Path verbs vs. light and Manner verbs in a large set of Path contexts for more than 100 languages. Wälchli (2009: 215) finds that there is little evidence for a dichotomy, i.e. the existence of a language-type that uses Path verbs in all contexts and another language-type that uses Path verbs in none of the contexts. There are many languages that use Path verbs for some contexts, and non-Path verbs for other contexts. In addition, this classification is not stable across language families, suggesting that even closely related languages may pattern differently with regard to encoding Path on verbs or not. Verkerk (2014b) uses translations of two different novels (*Alice's Adventures in Wonderland* by Lewis Carroll, and *O alquimista* by Paulo Coelho) to analyse twenty Indo-European languages. She employs a range of non-dichotomous continuous features, including construction usage and the size of the Manner and Path verb lexicons. The frequency of use of various motion event encoding constructions is shown to be correlated with the lexicon size of both Manner and Path verbs.

34 Written corpus research has limitations, as is true for any approach. Some of the limitations of parallel texts have been described by Wälchli (2007), but the limitations he points out apply to some extent to original and comparable corpora as well:

> Typologists using parallel texts must be aware of a number of biases: (a) written language bias (Linell 1982), (b) bias toward planned (conscious) language use (including purism) (Miller & Weinert 1998), (c) bias toward religious and legalese registers, (d) narrative register bias, (e) bias toward large languages (in spread zones), (f) bias toward standardized (simplified?) language varieties, (g) bias toward non-native use of languages, (h) bias toward translated language (rather than original language use). Wälchli (2007: 132)

35 The bias in parallel texts towards translated language use rather than original language use has been the focus of a handful of studies. As mentioned above, Capelle (2012) shows that English is less rich in Manner of motion verbs when translated from French than when translated from German, suggesting that users of parallel texts should use not one but several original texts, with different types of source languages, to be able to take this effect into account. Wu (2008) studies several different English translations of the same Chinese text and finds differences across translators, with at least one translator seemingly 'exaggerating' Manner information. Honcová (2015) shows that differences between the idolects of the translators as well as their viewpoint on the original scene influence the translation.

36 In this light, varying both source languages as well as using a large range of source texts in order to avoid source and translator effects seems sensible in parallel corpus research. Using comparable texts would avoid this problem all together, but the direct comparability of parallel texts does have a major appeal. And of course, any analyst of written corpus data has to take into account the bias towards written, planned, and narrative-like language use, which will differ from spoken or even controlled narrative language use in many respects. For any typological investigation it is of interest to find out whether language behavior in the spoken and written domains is similar or different. In section 1.4 we consider some of these similarities and differences between spoken and written language use in motion studies for the three languages featured in this paper, English, French, and Greek.

1.3 Components, measures and parameters

37 The different types of data discussed in the previous sections have led researchers to posit different theoretical frameworks and to focus on different structural and discourse-related parameters, summarized in Table 1. Here we present these parameters as an overview of potentially correlated measures of motion event encoding – most of them relate to the semantics of Path encoding, several relate to the semantics of Manner encoding, and only two relate to syntactic architecture.

Table 1. Structural and discourse characteristics of Verb- and Satellite-framed languages (inspired by Zlatev & Yangklang 2004).[8]

Parameter	**Source**	**Verb-framed**	**Satellite-framed**
Type of the core schema (Path)	Talmy 1991	Verb	Satellite
Number of Path segments per clause	Berman & Slobin 1994	Low	High
Path use	Ibarretxe-Antuñano 2009	High	Low
Size of the Path verb lexicon	Verkerk 2014a	Big	Small
Boundary-crossing constraint	Aske 1989	Yes	No
Deixis (deictic Path verb)	Aurnague 2012	High	Low
Goal bias	Aurnague 2015	High	Low
Ground specifications and aspect	Flecken, Stutterheim & Caroll 2014	Low	High
Scene setting	Slobin 1996	Yes	No
Existence of a Co-event (i.e. Manner or Cause)	Talmy 1991	Yes	Yes
Type of the co-event	Talmy 1991	Adverbial	Verbal
Manner verb use	Slobin 1997	Low	High
Size of the Manner verb lexicon	Slobin 2004	Small	Big
Figure specifications	Soroli 2011b	Low	High
Head	Matsumoto 2003	Yes	No
Event granularity across clauses	Hickmann 2009	Low	High

38 As seen above, there are many parameters that can be used to measure motion event encoding across languages. What we observe is that the different parameters differ in terms of granularity and level of characterization mixing; combining for example semantic features with pragmatic information. Their presence or absence in a system is often indicated in relatively moderate terms (i.e. high or low marking) avoiding hard binary yes or no characterizations. However, it is not clear which of these parameters should be considered central and if researchers should relate a specific measure to others to further our understanding of motion encoding and the typological position of a system. Such a decision is especially important because the measures, as listed in Table 1 as well as others (see section 1.4), do not necessarily correlate, even though Table 1 implicitly suggests that they do.

39 Dan Slobin's work has centred around the concept of 'rhetorical style', a set of associated linguistic patterns that are typically used by speakers of the same language to express certain concepts. His work commonly addresses several measures at the same time. Other studies have supported a correlation between Satellite-framed and Verb-framed encoding patterns and the lexicon, most importantly the size of the Manner and Path verb lexicon (Wienold 1995; Verkerk 2013, 2014a). However, whether these correlations hold across other measures and languages remains to be seen. Berthele (2013), for instance, investigated Manner verb usage, Path verb usage, more elaborate Path expressions, and the number of Ground elements in nine language varieties. He shows that there is no correlation between Path and Manner verb usage, and the usage patterns found are better explained using a set of sociolinguistic, rather than motion-specific, variables. Koptjevskaja-Tamm et al. (2010) likewise question the correlation between encoding patterns and the Manner verb lexicon, given differences in Germanic and Slavic elaboration of aquamotion.

40 What is obvious is that the various parameters do not necessarily correlate, indicating the need for careful assessment of motion encoding across studies, across languages and even within systems, especially if different parameters and theoretical frameworks are involved. It is quite difficult to draw holistic conclusions on the basis of only speakers' verbal behaviour with regard to only one of those features. Thus, the now accepted notion that the description and analysis of diversity in motion event encoding necessarily goes beyond the dichotomy proposed by Talmy (1991) can also be thought of as a question regarding different measures and their interaction.

41 It is now clear that depending on the measure a researcher focuses on, the conception and classification of a system may differ. For example, Sampaio et al. (2009) show that Amondawa should be classified as a Verb-framed language if we regard the lexicalization of Path on verbs, but as a Satellite-framed language if we focus on the encoding of Path on postpositions as this is nearly always required in this system. As for French – a system that is systematically classified as Verb-framed – most researchers report that speakers tend to massively encode Path on the main verb. However, Kopecka (2006) goes beyond lexical encoding and shows that, when morphological markers are taken into account, French presents parallel 'mixed patterns' due to prefixal satellites that she describes from a diachronic perspective (see also the next section for further discussion on prefixation).

42 The next section underlines the theoretical impact coding decisions have for typology research, especially in systems that present parallel or equipollent framings.

1.4 English, French, and Greek: some methodological issues

43 The problem of double framing in languages, as sketched above, has preoccupied many researchers (among others Slobin 2004; Croft et al. 2010; Matsumoto 2003; Ji 2009; Soroli 2012). If Path can be expressed both in a verb root and in a satellite, the language qualifies both as V-framed and as S-framed. More specifically, some 'atypical' languages, classified by Talmy as predominantly V-framed, can present features that deviate from the canonical type and vice versa. This includes V-languages that cumulate many Path components in a single clause (e.g., Chantyal, Basque, Tzeltal), languages that frequently co-express Manner, or languages in which the co-expression of Manner is not marked (e.g., Japanese coordinated verbs, ideophones, adverbials, and participles). In addition, some languages can exhibit patterns of the opposite type. This is the case of split systems. Talmy classifies Spanish as V-framed in one place (2000: 49) but notes as well that it presents characteristics of a split-system in another place (2000: 65): "[...] a language can characteristically employ one conflation type for one type of Motion event and characteristically employ a different conflation type for another type of Motion event. This can be called a split or complementary system of conflation" (2000: 64).

44 Aske (1989) and Slobin & Hoiting (1994) also observed that motion events in which the Path component is conceptualized as crossing a boundary (e.g. *into*, *out of*) are the ones that are represented with the Path conflation pattern, whereas motion events with Path conceptualized with no boundary crossing (e.g., *from*, *to*, *towards*) are characteristically represented with a Co-event conflation pattern, as in English. Such cases are illustrated with French and Spanish examples in (6):

(6)	a.	Corrí	de	mi	casa	a	la	escuela	
		run.PST.1SG	from	1SG.POSS	house	to	DEF.ART	school	
		'I ran from my house to the school' (Spanish)							
	b.	Il	a	couru	de	la	maison	jusqu'à	l'école
		3SG.MASC	have.PST	run.PST.3SG	from	DEF.ART	house	until	school
		'He ran from the house to the school' (French)							

45 The regular co-expression, though, of Manner and Path in the verbal network (or even within the same verb) does not seem to fit with the typical V-framed classification; and conversely, the omission of Manner or Path from the verbal network does not fit with the S-framed pattern either.

46 Additional data from Chinese (Ji 2009) brings into question Talmy's classification of this language as clearly S-framed, showing that the structure of Chinese utterances expressing motion events differs from the one typical in English and German in terms of how semantic components are selected, encoded and distributed across an utterance, showing a high level of variability depending on specific types of events. Mandarin Chinese behaves as a Verb-framed language for caused motion events, whereas it

presents more Satellite-framed patterns when voluntary motion descriptions are elicited. [9]

47 These kinds of problems motivated Slobin to introduce a third class mentioned above, the Equipollently-framed languages, that consist in systems with: (a) serial verbs (e.g. Thai, Mandarin Chinese); (b) coordinated verbs (e.g. Japanese); and (c) complex stems (e.g. Kiowa, Klamath). However, this proposition is not appropriate for all non-clear V- or S-framed systems. One complication comes from languages that have both V- and S-framed constructions for expressing the very same motion event and that do not favour one over the other for structural reasons. This is the problem of how we should describe alternate, split or mixed, or parallel framing systems.

48 In his recent writings, Talmy (2000, 2009) notes the possibility of certain forms of mixed conflation. For example, for languages such as Shona or Greek, it is unclear whether S- or V- framed patterns dominate, since the relative ranking of Path and Manner verbs is apparently more variable than in split systems. For this reason Talmy assigned such systems to a specific category, called the *parallel systems of conflation* (Talmy 2000). He illustrates such cases with examples (in 7) from Modern Greek (adapted from Talmy 2000: 66) where both S- and V-framed patterns are equally frequent:

(7)	a.	Έτρεξε	μέσα						
		Etrexe	mesa						
		run.PST.3SG	inside						
		'He ran in' (Greek S-framed pattern)							
	b.	Μπήκε	(τρέχοντας)	στο	σπίτι				
		Bike	(trehontas)	sto	spiti				
		enter.PST.3SG	run.PTCP	to.DEF.ART	house.ACC				
		'He entered the house (running)' (Greek V-framed pattern)							

49 Similar findings have been reported by Selimis & Katis (2010) in an experimental crosslinguistic English-Greek study, in which "Path was found extensively encoded through elements such as satellites and prepositional phrases in both languages" (cf. exemples in 8).

(8)	a.	The	girl	went	in	to	get	some	ice skates
				Motion verb	Path		(English S-framed pattern)		
	b.	Μπήκε		μέσα	στο		σπίτι		
		Bike		mesa	sto		spiti		

		enter.PST.3SG	inside	to.DEF.ART	house.ACC		
		'She entered into the house' (Greek S-framed pattern)					

50 Soroli (2011a) also reports extensive use of the S-framed construction as mentioned above (Manner or Path verb + Path peripheral devices) and further suggests that Greek displays interesting additional S-like variation due to prefixation (see discussion on prefixation below) and due to Manner-first constructions (Soroli 2012). The syntactic flexibility of Greek allows for the placement of Manner participles, Manner adverbials or comitative or instrumental phrases that express Manner of motion in front of the main verb as illustrated in (9).

(9)	a.	Η	κοπέλα	με	το	ποδήλατο	διέσχισε		
		I	kopela	me	to	podilato	dieshise		
		DEF.ART	girl	with	DEF.ART	bicycle	cross.PST.3SG		
		το	δρόμο						
		to	dromo						
		DEF.ART	street.ACC						
		'The girl with the bicycle crossed the street' (Manner comitative phrase + Path verb)							
	b.	Η	κοπέλα	τρέχοντας	διασχίζει	το	δρόμο		
		I	kopela	trehontas	diashizi	to	dromo		
		DEF.ART	girl	run.PTCP	cross.PST.3SG	DEF.ART	street.ACC		
		'The girl running crosses the street' (Manner participle + Path verb)							

51 It should be noted again that Talmy's typology aims to capture 'prototypical' patterns of language use, but doesn't exclude other means of expression within a given system. Thus, although Satellite-framed languages do have Path verbs and Verb-framed languages have Manner verbs, their preferred lexicalization pattern differs in terms of frequency. As a consequence, a language type reflects speakers' privileged or preferred constructions once external factors such as morphosyntactic complexity and biases in lexical inventories are taken into consideration. Other issues, that are rarely taken into account in typology research, especially in the domain of spatial language, include: subcategorization (the number of the arguments depending on the verbal valency), case marking, utterance architecture and flexibility (word order and organization of the semantic components), semantic and morphosyntactic richness of the peripheral devices, as well as the global degrees of Path and Manner elaboration in the utterances. It is thus important to go beyond lexicalization patterns and jointly investigate the morphological

and syntactic options a language offers, how frequent these constructions are and in which contexts they appear, before drawing conclusions about the dominant ones.

52 With respect to Greek, studies from ancient Homeric (Imbert 2008) and diachronic investigations (Skopeteas 2008) report this language initially as an S-framed system. From a synchronic point of view the precise typological status of Modern Greek remains open. As mentioned above, Talmy (2000) first reports parallel V- and S-framed lexicalization patterns in Greek. Papafragou (2006), however, in a comparison with English, considers Greek as a clear V-framed system and reports Path lexicalization as the dominant pattern. Nevertheless, additional experimental work on verbal and non-verbal behavior from a cross-linguistic perspective (Selimis & Katis 2010; Soroli 2012) further supports Talmy's observations of parallel conflation in the Greek system. These findings, that mainly concern lexicalization but also other issues linked to the packaging of spatial information at the lexical and syntactical level, raise new questions for language typology and classification.

53 One such crucial typological issue that further supports the idea of a parallel system of conflation for some languages, but has not been discussed systematically from a typological perspective, is the use of preverbs. The use of preverbs has been investigated by Kopecka (2006) for French. She reports that, historically, French has a number of motion verbs constructed with preverbs: spatial prefixes, which are synchronically still semantically transparent (separable from the verb root such as *s'en-voler* 'to fly away', *ac-courrir* 'to run to' etc.) but with limited productivity; and some cases of prefixed forms that lost their semantic compositionality (e.g., *recevoir, remplir*) (see also Amiot 2002; Apothéloz 2005). These verbs are vestiges of ancient French, when S-framing was still common in this language, but are not enough to support any claim for parallel conflation since in Modern French only two prefixes remain still productive (*re-* and *dé-*).

54 To our knowledge, the issue of prefixation from a typological perspective hasn't been discussed much for Greek. Koletti (2001) first and Soroli (2012) recently have mentioned prefixation as one of the parameters that should be taken into account for the typological classification of Greek. For the purpose of this study, we paid special attention to prefixation, its productivity and decompositionality. Depending on the theory one might consider the prefixed forms as monomorphematic or as bimorphematic. Although Greek, when ignoring prefixation, displays some non-negligible Satellite-framing characteristics (Manner verbs with systematic presence of Path peripheral devices as reported by Talmy (2000) and Selimis & Katis (2010) as well as Manner-first constructions as reported by Soroli (2012) together with extensive Verb-framed constructions as reported in other studies (cf. Papafragou et al. 2006), the coding of prefix units that are still semantically transparent as satellites may play an additional crucial role for the classification of this language as a parallel system of conflation.

55 The majority of Greek preverbs are inherited from ancient Greek[10] and for some researchers, through morphophonetic and semantic changes, they completely fused with the verb root in speakers' judgements (cf. Méndez Dosuna 1997, Efthymiou 2003; Basea-Bezantakou 1992). For others, prefixation in Greek is considered to be a partially productive phenomenon. More specifically, Ralli (2004: 246) maintains that «most Ancient Greek preverbs are still in use, certain preverbs are not productive (e.g., *αμφι amphi*), and some of them have developed new meanings or functions (e.g., *παρα para*)».[11] Research that focuses on the semantics of certain prefixes reports that Greek prefixes generally differ in terms of morphological productivity, as not all prefixes can combine with all

spatial verbs freely (for further discussion on the productivity of Greek prefixes see also Efthymiou 2001, 2002, 2003; Efthymiou et al. 2015a, b; Charitonidis 2013).

56 The issue that is of special interest to us, theoretically and methodologically, is to understand whether (some) very common verbal prefixes, such as *peri* in *περι-φέρω perifero* 'to around-bring'; *eks*[12] in *εξέρχομαι ekserhome* 'to out-come'; *kse* in *ξεγλιστρώ kseglistro* 'to out-slide'; *ana* in *ανεβάζω anevazo* 'to up-put'; *kata* in *κατεβαίνω kateveno* 'to down-walk' etc., function as satellites for motion verb roots in Greek and to what extent their presence in the system has an impact on the typological status of this language.

57 For some researchers, highly frequent complex forms such as the above, that present some amount of morphotactic opacity, are highly likely to have a whole-word representation in the mental lexicon (cf. Plag 2003 on word formation in English) and thus raise some doubts about the analysis of certain verbs as prefixed satellitar forms. For example, in our case, for verbs such as *ανεβάζω anevazo* 'to up-put' and *κατεβαίνω kateveno* 'to down-walk', one might suggest that they should be considered as monomorphematic, because: a) both *ανεβάζω anevazo* 'to up-put' and *κατεβαίνω kateveno* 'to down-walk' are highly frequent complex verbs;[13] and b) these complex forms show low morphotactic transparency: « a » (the last vowel of ana- and kata-) is often deleted and replaced by the augment « e », which is traditionally considered to be the mark of past (see Triandafyllidis (1941): MGr. *ανεβάζω anevazo* < Hellenistic Gr *ἀναβάζω anevazo* < AGr *ἀναβιβάζω anavivazo*, MGr *κατεβαίνω kateveno* < AGr *καταβαίνω kataveno*). However, recent experimental priming effect studies show that neither frequency nor orthographic transparency are good predictors for morphological processing and decomposition.

58 Speakers of typologically different languages have been tested and found capable of recognising morphologically complex words and performing morphemic segmentation systematically, and this phenomenon occurs very early in the time course of word recognition and is independent of orthographic alternations (McCormick et al. 2008) or frequency ratio variations (Giraudo & Voga 2013). For example, research conducted by McCormick, Rastle & Davies (2008) shows that priming effects were of the same magnitude when participants had to recognize words that could and could not be parsed easily into their morphemic constituents (for instance when comparing transparent: darkness-DARK to less transparent pairs: adorable-ADORE where an orthographic alternation, such as a missing « e », was present). This suggests that morpho-orthographic decomposition is a general process that applies to any stimulus that has a morphological structure (see also Rastle & Davies 2008 for a discussion). Giraudo & Voga (2013) go a step further suggesting that decomposition is not only the recognition of a bipartite morphological structure (segmentation into two distinct morphemes) based on simple orthographic analysis but rather a multilevel process that involves both sublexical (morpho-orthographic) recognition and abstract supralexical lexeme assimilation. This process tolerates form variations induced in the process of derivation (such as allomorphy, suppletion etc.) and deals with the functional part - the internal morphological structure - of word formation.

59 These findings with priming tasks show that the segmentation process is an automatic process that is not influenced by factors such as frequency or orthographic opacity. Analogously, we believe that it is highly likely that the constituents of relevant complex forms of the verbal lexicon (such as *ανεβάζω anevazo* 'to up-put' and *κατεβαίνω kateveno* 'to down-walk) have separate mental representations, at least in Greek where prefixation still maintains some of its productivity. Thus, we hypothesize that Greek speakers should

be capable of recognising complex forms such as *ανεβάζω anevazo* 'to up-put', not only because they sublexically segment the word in prefix and autonomous verb root forms but also because they recognise functionally the role of each form in their language, and this is irrespective of the surface frequency of the verb root (cf. note 12). It is obvious, however, that further experimental research is certainly needed in order to uncover how prefixes are organized, processed and represented within the mental lexicon of the speakers and what are the factors affecting their recognition.

60 Our aim here is to follow a methodologically neutral way to study the encoding patterns of the languages under investigation and with respect to prefixation to see how often these prefixed forms are used (at least in Greek and French), and how their usage affects typological classification. For this reason in the present study we decided to apply a neutral double coding on our data: a) coding that considers the verbs as completely lexicalized monomorphematic forms (M-coding : accounts for monomorphematic forms as if all prefixed verbs had lost their semantic compositionality and had whole-word representations in speakers' minds) ; and b) bimorphematic coding (B-coding) that considers some preverbs as satellites but only in the cases of autonomous verb roots (such as in *κατεβάζω katevazo* 'to up-put', *περπατάω perpatao* 'to around-step' etc.), as if the prefix and the verb root had separate mental representations. Cases of prefixed verbs that have lost their semantic compositionality (as in *κατηφορίζω katiforizo* 'to down-direct oneself', **φορίζω *forizo*) or those prefixed verb roots that are prefix-dependent (as in *διασχίζω diashizo* 'to *trans-cut; to cross') had to be excluded from the B-coding (see also coding method in section 2.5).

61 With respect to French, motion event encoding has been studied extensively and has generally been described as Verb-framed. In a study by Soroli & Hickmann (2010) involving a spoken elicitation task in which participants were asked to describe a set of video clips, the most typical response pattern for French was indeed V-framed: produced utterances involved a Path verb (about 60%) with either nothing in the periphery (about 37%) or other Path devices (33%), as opposed to only 30% of Manner peripheral devices. These numbers are very similar to a written elicitation task conducted by Pourcel (2004). Pourcel discusses the results of a written elicitation task of videos that contrast different Manners and Paths and states that French speakers encode Path in the verb 65% of the time; and Manner only 33% of the time. For English speakers, Manner is encoded in the verb in 85% of the descriptions, and Path in only 15% of the descriptions. In another study, Pourcel (2009) provides an overview of her work on French and English motion event encoding, discussing results from a free prose recall task involving a short movie that generated oral narratives. She assesses the amount of Path and Manner expression in English and French in this task, and finds that Path is encoded equally often, around 50% of the statements in both languages, while only around 35% of the French statements encode Manner, as opposed to over 50% by English speakers. Berthele (2013) also reports about 70% Path verb use (as opposed to 25% Manner verb use) in retellings of the Frog Story by French speakers, confirming again a typical V-framed pattern according to which French has a preference for Path lexicalization in the main verb, tending to leave Manner peripheral or omitted. Kopecka (2006), however, shows that Modern French motion encoding has been shaped by the lexicalization of Path prefixes with verb roots, which has resulted in some highly frequent Path verbs (*arriver*, *descendre*, *entrer*) as well as verbs that incorporate Manner (*accourir*, *dérouler*, *écouler*). Some of these are still semantically transparent, in the sense that the prefix can still be separated from the verb

in a meaningful way. However, the productivity of these prefixes, as measured by the number of new derivations they have been a part of until recently, is negligible. Kopecka (2013) shows the difference between Old French and Modern French motion encoding through Modern French translations of Old French narratives. Modern French uses more Path verbs (58%) and less Path peripheral devices (only 5 types) than Old French. In Modern French, most motion verbs stand alone, as only 25% are combined with a Path satellite. This latter result is supported by Hijazo-Gascón & Ibarretxe-Antuñano (2013: 47), who only find Path information encoded outside of the verb in 44% of the motion descriptions elicited using the Frog Story picture book.

62 Although French displays a consistently Verb-framed character in a wide range of studies, just like Greek in some studies (cf. Papafragou et al. 2006), the coding of prefixes that are still semantically transparent, as we saw, may have an important impact on classification issues. If we code them to be lexicalized with the verb, they will be included in the whole lexeme and thus coded as Path verbs (this is the dominant position in the literature), thus resulting in a Verb-framed classification. If on the other hand prefixes are coded separately as Path satellites, then French will seem to make use of Satellite-framed constructions more often, depending of course on how often verbs with semantically transparent prefixes are used in discourse. How often these prefixed verbs are used, and how their usage affects the classification of French (or Greek), is a question that will be answered below.

63 The differences linked to coding decisions, types of data (written vs. narrative vs. controlled productions) or types of stimuli (voluntary vs. caused; dynamic vs. still, cartoons vs. videos) seem all to have an important role on the characterization of the languages. Various spoken tasks, for instance, suggest that the characterization of French as Verb-framed is dependent on the study and the possibilities speakers have in each experimental set-up to elaborate on Path (see for example Ji 2009; Hickmann et al. in press).

64 The English motion event encoding system is well described as Satellite-framed and has served as a benchmark for comparative research, especially as a language to contrast with Verb-framed systems. Slobin (1996) describes English as a Satellite-framed language, with a high diversity of motion verb + satellite combinations and a lot of attention to dynamic details of motion rather than to static scene-setting as is common in Verb-framed languages. This characterization holds across other studies, although there is quite a bit of variance both in measures and results. English has been characterized as a highly Manner-rich language. Slobin (2005) looks at translations of Tolkien's *The Hobbit* and finds that English uses a high number of manner verbs types as well as a high total number of Manner expressions. The abundance of Manner verbs that English has available is demonstrated also in Cifuentes Férez (2010) and Fanego (2012). Naigles et al. (1998) report on a verbal elicitation task, and show that English speakers use Manner verbs in 90% of the contexts in which only one verb was present in the response. Soroli & Hickmann's (2010) results for English are very similar, with the most typical pattern of a verbal response to video clip being a Manner verb (about 83%) together with a Path satellite (about 80%) in one compact structure. Oh (2009) finds in a set of original texts that almost all motion descriptions of novel characters include at least one Manner verb, suggesting that Manner verbs are especially common in written English language.

65 Nevertheless, some studies find some variation, even in English, reporting less pronounced preference for Manner verbs. Feiz (2011), for instance, elicited oral

narratives or retellings of two short films (*The Banjo Frog* and Chafe's *Pear Film*) and found that 58% of the motion verb types employed by English speakers in their retellings encode Manner, and 60% of the motion verbs were accompanied by Path satellites. Özçalışkan & Slobin (2003) provide a direct comparison between a study of written narratives taken from novels and oral retellings of the Frog Story. The motion verb usage is quite similar, with motion verbs classified as 51%-54% Manner verbs; 27%-30% Path verbs, and 20%-15% neutral verbs. In their study of oral descriptions of three-panel motion scenes, Papafragou et al. (2006) found that English adults used Manner verbs 69% and Path verbs 26% of the time. Outside the main verb, English speakers encoded both Path and Manner information in 68% of their descriptions. These findings seem to illustrate differences between the elicitation materials and methods as well as potential individual variation: depending on the richness of both Path and Manner information in the materials, speakers will provide different emphasis on each component. The striking difference in motion verb usage in written narratives between Oh (2009) and Özçalışkan & Slobin (2003) is likely to be due to their method of collection of the various descriptions, different definitions of what constitutes Manner and Path verbs, as well as different ways of counting Motion verbs (per phrase or per complete description of movement from a point A to a point B).

66 We observe a growing interest across the board in atypical patterns and attempt to fully understand non-prototypical verbal strategies across languages without excluding within-system variation in languages that until now were considered to be prototypical of their class (for instance English of the S-type and French of the V-type). We also observe the desire of researchers to further investigate systems that seem to be more problematic or at least less prototypical (such as Greek) and identify the properties of systems that present double or parallel conflation patterns. All in all there is a growing need to acquire several types of language data (oral and written) elicited in different situations (controlled and natural) as well as to define in a systematic way the parameters and measures that allow us to capture variation and assess in an optimal way the typological status of a given language.

2. Method

2.1 Aims of the study

67 The purpose of this paper is to propose a multi-data and multi-level methodological approach for assessing variation across and within systems with a special focus on Greek. We propose to investigate the expression of motion events in different types of data (a parallel corpus and an orally elicited controlled production task) in three typologically different languages (English, French and Greek) focusing not only on the typical encoding strategies of those systems but also on their potential for parallel encoding strategies. More specifically, we are interested in reanalyzing encoding patterns in a broad way and propose a deep investigation that goes beyond exclusively lexical characterizations. We investigate the following characteristics: the expression of Manner and Path components, as well as their quantitative elaboration in terms of semantic density and focus in the utterance; the distribution of the Path component in different loci (verb roots vs. other devices such as prefixes, particles, participles, gerunds and adverbials); and multiplicity in the organization of lexical and functional categories (i.e. their variable distribution in

the sentence and the flexibility of linguistic elements such as *Manner-first* patterns, case marking, etc.).

2.2 Rationale: specific hypotheses and predictions

68 We expected variation to emerge in both across- and within-system measures, either in the specific semantic realizations of the main spatial components or in combination with other more general non-spatial features of the systems. More specifically, all three languages English, French, and Greek were expected to encode Path information, although we predicted possible variation in the frequency, the degree of elaboration, and the means by which Path is encoded. Following the *Manner-salience hypothesis*, cross-linguistic differences were expected with respect to the encoding of Manner information. English, being an S-type language, should encode more Manner information as opposed to V-type languages French and (to some degree) Greek, which should express Manner to a lesser degree and by limited peripheral means. English descriptions should contain Manner verbs combined systematically with other devices marking Path (such as Path particles). According to the *Path-salience hypothesis,* French and (to some degree) Greek should display the opposite profile: greater and multiple Path elaboration not only inside the verb but also in multiple other devices within the verbal network.

69 The above predictions may be problematic, as mentioned in previous sections, as they insist on clear-cut distinctions. French for instance may be considered as typically V-framed expressing Path information only in monomorphematic verb lexemes, but then we would ignore the satellites (i.e. prefixes) that are contained in some Path verbs, as discussed in section 1.4. The existence of a still productive system of prefixes in Greek leads to additional predictions: that some differences between French and Greek should nonetheless be found – even if those two systems are considered to belong to the same V-framed class. In particular, Greek should show a pattern that is intermediate between English and French as it can combine one Manner or Manner+Path verb with multiple markings of Path, so that Path elements, including Path verbs, should occur more frequently than in English but would be organized differently than French. The *parallel conflation hypothesis* suggests that variation should be not only the result of specific degrees of semantic salience but also the result of more general (non-spatial) linguistic properties: argument structure, case marking and variable architectural morphosyntactic distributions which determine the structural flexibility of the system.

2.3 The experimental study

70 The study included a total of 60 native speakers of each of the languages examined (20 for French, 20 for English, 20 for Greek). All participants were above 18 years of age and had no reported acquired or developmental disorder of any kind. They were asked to fill out a sociolinguistic questionnaire (Soroli 2011b) the aim of which was to ensure that they could be considered as 'monolinguals' according to several criteria (for example, no substantial knowledge of another language and no stay in another country for longer than six months). They were all tested in their native language and country: United Kingdom (in Cambridge), France (in Paris) and Greece (in Athens) respectively.

71 The materials in all language groups comprised a set of 10 stimuli that showed voluntary motion events. These stimuli consisted of animated videos showing characters (humans

in diverse settings) performing displacements in different Manners (e.g., walking, running, jumping, roller skating, riding a scooter, riding a bike) along six types of Paths (up, down, into, out of, across and along) (cf. Soroli 2011b). Figure 1 illustrates an example of a video clip involving a 'Ride a scooter-Into' event, in which a woman rides a scooter through a door into a building.

72 Participants were seen individually in a quiet room. They were shown the stimuli one by one on a screen and asked to tell "what happened" to a naive interlocutor. The task began with a training item that served to familiarize the subjects with the task before the actual testing started. A total of 600 utterances were elicited and coded in the three languages.

Figure 1. Example of a "Ride a scooter-into" event

2.4 The parallel-corpus study

73 The parallel corpus data come from a parallel corpus of texts in 20 Indo-European languages that was specially constructed to study motion event encoding (Verkerk 2014b). It consists of the originals and the translations of *Alice's Adventures in Wonderland*, *Through the Looking-Glass and what Alice found there* (both by Lewis Carroll) and *O alquimista* (by Paulo Coelho). The first two Alice novels were originally published in English, whereas *O alquimista* was written in Portuguese. The original parallel corpus contained data on 20 Indo-European languages, but here we are only considering the data on English, French, and Greek. The Alice novels are from the mid nineteen-century (1865, 1871), while their translations into French and Greek, and all three translations of *O alquimista*, are more recent (1979-2009, see references). Despite this difference in age, the language use of the Alice novels is distinctly modern (except for an occasional choice of words, such as the

use of 'grand' as a measure adjective which is now out-dated), and has not impacted the analysis of the inquiry into motion events to our knowledge.

74 The parallel corpus was constructed as follows. The first step was the collection of all descriptions of motion events from the three novels. Motion events were considered to be 'situations in which an animate being moves from one place to another' (Özçalışkan & Slobin 2003: 259). Each of these extracts was a single sentence in which a single event was described (Berman & Slobin 1994: 657). The total number of original extracts retrieved was 1270. The next step was to select a smaller set of extracts to analyse further. Only extracts encoding voluntary (non-causative) motion were included. The selection was done taking into account the type of motion event encoding construction and the main motion verb. As a result, the selection featured a large range of different constructions in the originals, and at least one instance of each attested motion verb. The set of selected motion event extracts constitutes 221 sentences from the three novels, which give a total of 663 utterances extracted and coded in the three target languages.[14]

75 For the purpose of this paper, the English, French, and Greek data were re-coded in such a way as to be able to directly compare the behaviour of these three languages in the experimental study with that in the parallel corpus. The coding is explained in section 2.5.

2.5 Coding and analysis

76 Our general prediction was that both speakers and translators should produce semantic and syntactic structures that are in line with what we know about motion event encoding in English, French, and Greek, and therefore they should focus to different extents on Manner and Path information as well as organize them differently. More specifically, the first level of analyses examined three aspects: the types of spatial information in the utterances (hereafter *focus*), the morphosyntactic means whereby this information was expressed (hereafter *locus*), as well as the semantic *density* of the utterances (in terms of number of components encoded).[15] These measures relate to several parameters listed in Table 1: type of core schema; number of Path segments; Path use, existence of a Co-event; type of co-event, and Manner verb use. However, our measures are closer to the data as they do not collapse several measures into complex parameters such as 'Satellite-framed' and 'Verb-framed'.

77 All data were coded with respect to any element that provided Manner and Path information, specifically main verb roots and any other device outside of the verb, such as verbal prefixes, particles, prepositions, and adverbials. Utterances in all languages were thereby grouped into different types depending on their *focus*, i.e. depending on whether they expressed: only Manner (M); only Path (P); both types of information separately (MP) or fused Path-Manner (F); whether they encoded semantically light or neutral motion (Z);[16] or some other information semantically irrelevant to motion or no information at all (0).[17] The following examples (10-15) illustrate each of these cases.

(10)	A man is riding a bike	(M)
(11)	A man is crossing the street	(P)

(12)	A man is walking up the hill	(MP)
(13)	Il a grimpé 'He climbed.up'	(F)
(14)	The man goes to the house	(Z)
(15)	There is a man	(0)

78 In each case the utterances were also analyzed as to the *locus* of the information encoded, i.e. whether the components above were expressed in verb roots vs. in other devices, and as to the *semantic density* (SD) of the sentences overall, i.e. the number of semantic components encoded. The semantic density of the utterances could range from zero to two: when only *Motion* information or no specific semantic component was expressed then sematic density was noted as zero (SD0); when only one component was expressed (either Manner-only or Path-only) then density was noted as 1 (SD1) and when two components (either Manner and Path separately or Manner and Path fused) were encoded then density was indicated as 2 (SD2), as illustrated in the examples (16) to (19) below:

(16)	He gets to the street	(Motion)	(SD0)
(17)	He is walking	(Manner-only)	(SD1)
(18)	She left	(Path-only)	(SD1)
(19)	The woman walked across the street	(Manner and Path)	(SD2)

79 For French and Greek particular attention was placed on prefixes that could be defined as productive in relation to autonomous verb stems (see also the discussion above in section 1.4). Given the properties of these languages and the questions addressed about Greek's typological status previously, a double coding was applied – one which considers prefixed verbs as monomorphemic (M-coding) and one which considers the prefix-verb combination as bimorphemic (B-coding). This provides us with the most "neutral" analyses of the oral and written corpora: the M-coding did not differentiate prefixed and plain verb forms, while the B-coding decomposed prefixed verb forms into a verbal root and a satellite-like verbal prefix.[18] As a result, verbal prefixes were treated once as part of the verb in the M-coding (20a), and once as part of the periphery in the B-coding (20b) as illustrated for Greek below with the verb *ανεβαίνω aneveno* ('to ascend').

(20)		Ανεβαίνει	τρέχοντας	
		Aneveni	trehontas	
		ascend.PRS.3SG	run.PTCP	
	a.	ascend [Path verb]	run [Manner participle]	(M-coding)

	b.	up-walk [Path prefix]-[Manner verb]	run [Manner participle]	(B-coding)
		'He is ascending by running'		

80 The syntactic analysis focused on the *architecture* of the sentences and how spatial components were organized in them (similar to the last parameter listed in Table 1, "event granularity across clauses"). It distinguished four construction types, classifying the number of the clauses and their relation: Tight-simple constructions (TS), where all semantic information was expressed in one simple clause with no subordination (example 21); Tight-complex constructions (TC), where semantic information was expressed in an utterance containing one or more subordinate elements, such as a relative clause or a gerund (example 22); Loose-simple constructions (LS), where semantic information was spread over several clauses which were either juxtaposed or coordinated (example 23); and Loose-complex constructions (LC) where semantic information in the utterances was contained in one or more main clauses with at least one subordinate element (example 24).

(21)	A man is cycling up to the hill	(TS)

(22)	La	fille	traverse	la	rue	en	courant	(TC)
	DEF.ART	girl	cross.PRS.3SG	DEF.ART	street	by	run.PTCP	
	'The girl crosses the street by running'							

(23)	Un	homme	monte	et	court	vite		(LS)
	INDF.ART	man	ascend.PRS.3SG	and	run.PRS.3SG	quickly		
	jusqu'en	haut	de	la		colline		
	until	top	of	DEF.ART		hill		
	'A man is ascending and is running quickly to the top of the hill'							

(24)	La	fille	court	jusqu'à	l'autre	côté,	traverse	(LC)
	DEF.ART	girl	run.PRS.3SG	until	other	side	cross.PRS.3SG	
	la	rue		en	faisant	du	rollers	
	DEF.ART	street		by	do.PTCP	of	roller.skate.PL	
	'The girl is running to the other side, is crossing the street by skating'							

3. Results

3.1 Architecture analysis: the organization of spatial components

81 With respect to the general syntactic organization of the utterances, the results (presented in Tables 2a-b) show that, depending on the language, users are constrained to express spatial information through specific architectures that allow them to communicate the most salient components in the most economical and informative way.

Table 2a: Syntactic architecture in the experimental study.[19]

Language	TS	TC	LS	LC	0
English	169 (94%)	3 (2%)	6 (3%)	2 (1%)	0 (0%)
Greek	76 (42%)	73 (41%)	29 (16%)	2 (1%)	0 (0%)
French	71 (39%)	89 (50%)	16 (9%)	2 (1%)	2 (1%)

Table 2b: Syntactic architecture in the parallel corpus study.

Language	TS	TC	LS	LC	0
English	194 (88%)	20 (9%)	5 (2%)	1 (.5%)	1 (.5%)
Greek	180 (81%)	30 (13.5%)	8 (4%)	1 (.5%)	2 (1%)
French	191 (86%)	19 (9%)	4 (2%)	0	7 (3%)

TS: TIGHT-SIMPLE CONSTRUCTIONS, TC: TIGHT-COMPLEX CONSTRUCTIONS, LS: LOOSE-SIMPLE CONSTRUCTIONS, LC: LOOSE-COMPLEX CONSTRUCTIONS, 0: MISSING.

82 Overall, tight-simple (TS) constructions were the most frequent constructions, especially within the parallel corpus data set, and this was true irrespective of language, as opposed to the experimental data set that solicited more striking language-specific patterns. Namely, in the experimental data set, English speakers were found to produce more TS responses (94%) than French (39%) or Greek (42%), who also produced many complex constructions in the data (50% and 41% respectively). We note also that Greek has a third pattern, choosing to express spatial information also in LS constructions (see example 27) with coordinate utterances (16%). It is worthwhile to note that among LS and TC strategies, more than 50% of these constructions are Manner-first constructions, as illustrated in examples in 27 and 28.[20] Examples in 25-28 illustrate the main patterns in all three languages.

(25)	a.	TS	She jumped down the hill	(experimental data set)

	b.	TS	Alice ran to the side of the ditch to look for him.	(paralel corpus data set)

(26)	a.	TC	Elle	descend	la	coline	en	sautant	
			3SG.FEM	descend.PRS.3SG	DEF.ART	hill	by	jump.PTCP	
			‘She descends the hill by jumping’				(experimental data set)		
	b.	TC	quand	tout à coup	un	valet	en	livrée	
			when	all of a sudden	INDF.ART	footman	by	livery	
			sortit	du	bois	en	courant		
			leave.PST.3SG	out.of	forest	by	run.PTCP		
			‘When suddenly a footman in livery exited the woods running’						
			(parallel corpus data set)						

(27)	LS	Μία	κοπέλα	χοροπηδάει	και	κατεβαίνει	το	λόφο
		Mia	kopela	horopidai	ke	kateveni	to	lofo
		A	girl	jump.PRS.3SG	and	descend.PRS.3SG	DEF.ART	hill.ACC
		‘A young woman jumps and descends the hill’				(experimental data set)		

(28)	a.	TC	το	φοβισμένο	Ποντίκι	πλατσούρισε	δια		
			to	fovismeno	Pontiki	platsourise	dia		
			DEF.ART	frightened	Mouse	splash.PST	cro		
			γειτονική		λίμνη	(Manner verb + Path particle)			
			gitoniki		limni				
			neighbouring.ACC		lake.ACC				
			‘The frightened Mouse splashed crossing the neighbouring lake’						
				(parallel corpus data set)					
	b.	TC	Μία	κοπέλα	χοροπηδώντας	κατέβηκε	το		
			Mia	kopela	horopodontas	katevike	to		
			A	girl	jump.PTCP	descend.PST.3SG	DE		

			‘A young woman jumping descends a hill’				(experimental data set)
							(Manner participle + Path ver
	c.	TC	Μία	κοπέλα	χοροπηδάει	κατεβαίνοντας	ένα
			Mia	kopela	horopidai	katevenontas	ena
			A	girl	jump.PRS.3SG	descend.PTCP	INDF.ART
			‘A young woman jumps descending a hill’				(experimental data set)
							(Manner verb + Path particip
	d.	TC	Η	κοπέλα	κάνοντας	πατίνι	μπήκε
			I	kopela	kanontas	patini	bike
			DEF.ART	girl	do.PTCP	scooter	enter.PST.3SG
			στο	κτίριο			(Manner participle + Path ver
			sto	ktirio			
			to.DEF.ART	building.ACC			
			‘The young woman doing scooter entered inside to the building’ (experimental data set)				

83 These results indicate that even if TS constructions seem to be preferred overall as speakers need to express a maximum of spatial information using simple constructions with a minimal processing cost. There are also additional language-specific preferences and great within-system variation as to the organization of the clauses in spatial discourse. In English, both Path and Manner can be expressed in compact simple clauses in a systematic way, while French and Greek seem to require more complex constructions (mostly TC and LS) to describe the same events.

3.2 The semantic density analysis: number of spatial components encoded

84 In line with the previous results on utterance architecture, the *density* measure captures the number of spatial components encoded in the sentences. The results are presented in Tables 3a-b.

Table 3a. Semantic density in the experimental study.[21]

Language	**0**	**1**	**2**
English	0 (0%)	13 (7%)	167 (93%)

Greek B-coding	0 (0%)	10 (6%)	170 (94%)
Greek M-coding	0 (0%)	20 (11%)	160 (89%)
French	3 (2%)	41 (23%)	136 (75%)

Table 3b. Semantic density in the parallel corpus study.

Language	**0**	**1**	**2**
English	12 (5%)	83 (38%)	126 (57%)
Greek B-coding	10 (5%)	95 (43%)	116 (52%)
Greek M-coding	10 (5%)	108 (49%)	103 (46%)
French	11 (5%)	129 (58%)	81 (37%)

0: 0 SPATIAL COMPONENTS, 1: 1 SPATIAL COMPONENT, 2: SPATIAL COMPONENTS

85 English and Greek B-coded utterances were the most dense across data sets, systematically focusing on both Path and Manner components (PM-conflation: 93% and 94% in the experimental data; 57% and 52% in the parallel corpus data respectively). In contrast, French utterances focused mostly on one component (Path) but this result was more obvious in the parallel-corpus data set (58%), probably because in the experimental data we find many compact Path+Manner (fused) conflations with upward motion items, given the existence of a common verb in French that lexicalizes both components for such events (the verb *grimper* 'to climb up'). When Greek verbal prefixes are coded as path satellites, Greek is similar to English with more density 2 scores across data sets, whereas when verbs are coded as monomorphemic, it is more similar to Verb-framed French in having more density 1 scores.

3.3 Focus analysis: the type of information expressed

86 The *focus* measure allows us to capture the types of the specific spatial information encoded in the sentences across languages. The results are presented in Tables 4a-b.

Table 4a: Focus in the experimental study.

Language	**P**	**M**	**F**	**M & P**	**Z**	**0**
English	13 (7%)	0 (0%)	0 (0%)	167 (93%)	0 (0%)	0 (0%)
Greek B-coding	7 (4%)	4 (2%)	1 (.5%)	168 (93.5%)	0 (0%)	0 (0%)
Greek M-coding	14 (8%)	3 (1.5%)	1 (.5%)	162 (90%)	0 (0%)	0 (0%)
FrenchB-coding	40 (22%)	1 (.5%)	28 (16%)	108 (60%)	1 (.5%)	2 (1%)

French M-coding	40 (22%)	1 (.5%)	32 (18%)	104 (58%)	1 (.5%)	2 (1%)

Table 4b. Focus in the parallel corpus study.

Language	P	M	F	M & P	Z	0
English	69 (31%)	14 (6.5%)	0 (0%)	126 (57%)	11 (5%)	1 (.5%)
Greek B-coding	72 (33%)	23 (10%)	15 (7%)	101 (45.5%)	9 (4%)	1 (.5%)
Greek M-coding	82 (37%)	26 (12%)	23 (10.5%)	80 (36%)	9 (4%)	1(.5%)
French B-coding	87 (39.5%)	42 (19%)	14 (6.5%)	67 (30%)	9 (4%)	2 (1%)
French M-coding	87 (39%)	42 (19%)	19 (9%)	62 (28%)	9 (4%)	2 (1%)

P: PATH ONLY, M: MANNER ONLY, M AND P: BOTH MANNER AND PATH EXPRESSED SEPARATELY, F: FUSED MANNER AND PATH IN MONOMORPHEMATIC ELEMENTS, Z: SEMANTICALLY LIGHT UTTERANCES, 0: NON-MOTION OR MISSING UTTERANCES.

87 There are differences between both languages and data sets, especially with regard to the number of sentences that encode both Manner and Path. For the experimental study, all three languages are most likely to encode both Manner and Path information (93% in English and Greek B-coded; 90% in Greek M-coded; 60% in French B-coded and 58% in French M-coded), with the exception of French that presents fused verbs and Path-only patterns more often than the other systems (18%). For the parallel corpus study, the differences across languages are less distinct. English is more likely to encode both Manner and Path in separate linguistic elements (57%) than either French or Greek M-coded (36% and 28% respectively), whereas French is most likely to encode only Path (39%) or only Manner (19%). It does not make much difference whether French is coded with B-coding or with M-coding, as there are only a few contexts in which this difference applies. However, B-coding and M-coding make a big difference for Greek: M-coded Greek is similar to French, whereas B-coded Greek is similar to English across data sets.

3.4 Locus: the means through which information is expressed

88 The *locus* measure captures what specific spatial components are encoded and where they are expressed in the sentence: in the verb root vs. in the periphery. We first consider the components expressed in the verb, as presented in Tables 5a-b.

Table 5a. Semantic components in the verbs of the experimental study.

Language	P	M	F	M & P	P & F	Z	0
English	1 (.5%)	170 (94.5%)	0 (0%)	1 (.5%)	0 (0%)	8 (4.5%)	0 (0%)
Greek B-coding	12 (7%)	133 (74%)	1 (.5%)	34 (18.5%)	0 (0%)	0 (0%)	0 (0%)

Greek M-coding	66 (36.5%)	14 (8%)	1 (.5%)	99 (55%)	0 (0%)	0 (0%)	0 (0%)
French B-coding	144 (80%)	8 (4.5%)	24 (13.5%)	2 (1%)	0 (0%)	2 (1%)	0 (0%)
French M-coding	144 (80%)	6 (3%)	28 (16%)	0 (0%)	0 (0%)	2 (1%)	0 (0%)

Table 5b. Semantic components in the verbs of the parallel corpus study.

Language	**P**	**M**	**F**	**M & P**	**P & F**	**Z**	**0**
English	74 (33.5%)	106 (48%)	0 (0%)	2 (1%)	0 (0%)	38 (17%)	1 (.5%)
Greek B-coding	93 (42%)	97 (44%)	12 (5.5%)	3 (1%)	1 (.5%)	13 (6%)	2 (1%)
Greek M-coding	105 (47.5%)	78 (35%)	19 (9%)	3 (1%)	1 (.5%)	13 (6%)	2 (1%)
French B-coding	117 (53%)	69 (31%)	12 (5.5%)	1 (.5%)	0 (0%)	15 (7%)	7 (3%)
French M-coding	117 (53%)	65 (29.5%)	16 (7%)	0 (0%)	1 (.5%)	15 (7%)	7 (3%)

P: PATH ONLY, M: MANNER ONLY, M AND P: COORDINATE MANNER AND PATH VERB, P AND F: COORDINATE PATH AND FUSED MANNER AND PATH VERBS, F: FUSED MANNER AND PATH, Z: SEMANTICALLY EMPTY VERBS, 0: NO VERB

89 The information encoded systematically in the verbs of the S-framed systems (English and Greek B-coded) was Manner as opposed to the systematic lexicalization of Path in the V-framed systems (French and Greek M-coded). The typological difference is more obvious in the experimental data set as opposed to the parallel corpus data where we observe more gradual differences. For example, in the experimental data as well as in the parallel corpus study, English speakers prefer massively (94.5% and 48%) to express Manner in the main verb (29), even though in the corpus study, in some cases the translators lexicalize Path (33.5%), example 30) or use light verbs (17%, example 31).

(29)	He ran into the house	(experimental data set)

(30)	The next day, the boy returned to the well, hoping to see the girl	(parallel corpus data set)

(31)	Fatima went back to her tent	(parallel corpus data set)

90 In French on the contrary, we have a clear preference for the lexicalization of Path (80% and 53%) across data sets (32a), while Manner-only is rarely used (3% in the experimental data, example 32b), and mostly left peripheral (as we will see below) or unexpressed (32c), and this difference between Path and Manner lexicalization is most striking for the experimental data.[22]

(32)	a.	Un	homme	sort	d'une	porte	en	courant	
		INDF.ART	man	exit.PRS.3SG	from.INDF.ART	door	by	run.PTCP	
				Path	Path (source)		Manner		
		'A man exits from a door running'			(experimental data set)				
	b.	Un	homme	marche	dans	la	maison		
		INDF.ART	man	walk.PRS.3SG	inside	DEF.ART	house		
				Manner	Location				
		'A man walks inside the house'			(experimental data set)				
	c.	Un	homme	entre	dans	la	maison		
		INDF.ART	man	enter.PRS.3SG	inside	DEF.ART	house		
				Path	Path (goal)				
		'A man enters into the house'			(experimental data set)				

91 We note however that French and Greek have some interesting fused verbs that encode Manner and Path together in one lexicalized form (*grimper* and *σκαρφαλώνω skarfalono* 'to climb up' for upward motion, French uses fused verbs 16% of the time in the experimental set, and 7% in the parallel corpus, Greek has 9% fused verbs in the parallel corpus, see also examples in 33).

(33)	a.	Ένας	κύριος	σκαρφαλώνει	με	το	ποδήλατο	στο	λόφ
		Enas	kyrios	skarfaloni	me	to	podilato	sto	lofo
		INDF.ART	man	climb.up.PRS.3SG	with	DEF.ART	bike	to.DEF.ART	hill
		'A man climbs up with the bike onto the hill'				(experimental data set)			
	b.	Un	homme	grimpe	une	collline	à	vélo	
		INDF.ART	man	climb.up.PRS.3SG	INDF.ART	hill	on	bike	
		'A man climbs up a hill on a bike'				(experimental data set)			

92 The Greek data present rather big variation in the encoding patterns. Greek behaves as an S-framed system in the experimental data when we look at the specific components expressed in the verb, where it encodes mostly (74%) Manner (34) or Manner together with Path (18.5%) in coordinated verbs (35), but at the same time it shows a preference for path (42%) in the parallel corpus data set (36).

(34)	Πηδάει	προς	την	πόρτα	(Manner verb)			
	Pidai	pros	tin	porta				
	jump.PRS.3SG	towards	DEF.ART	door.ACC				
	'He jumps towards the door'			(experimental data set)				

(35)	Ένας	τύπος	χοροπηδάει	και	μπαίνει	σε	ανοιχτή	πόρτα
	Enas	typos	horopidai	ke	beni	se	anoihti	porta
	INDF.ART	guy	jump.PRS.3SG	and	enter.PRS.3SG	in	open	door.ACC
						(Manner verb + Path verb)		
	'A guy jumps and enters to an open door'				(experimental data set)			

(36)	Με	διάφορες	προφάσεις	όλοι	έφευγαν	(Path verb)
	Me	diafores	profasis	oli	efevgan	
	with	various	pretext.PL	all	leave.PST.3PL	
	'Under various pretexts they were all leaving			(parallel corpus data set)		

93 The results on the spatial components included in the periphery complement what we have just reported on regarding verbs (see Tables 6a-b), but also offer the opportunity to go beyond a simple analysis of the lexical meaning of the involved spatial constituents. The relational information, as given by the peripheral devices of the verbal network, provides information about selectional restrictions motion verbs display. For instance, motion verbs occur often with dynamic relators (i.e. particles such as *into*, *out*, *across*) but not exclusively. Some dynamic motion verbs occur with non-dynamic relators, such *in* in English or *dans* in French, depending on verb valency and pragmatic features of the event (see also Skopeteas, 2008). English, as we saw previously in both data sets, is most likely to express Manner in verbs, but complements this behaviour by systematically encoding Path in particles (86% in the experimental data, see example 29 above for a construction with a dynamic relator). French either expresses Manner and Path in the periphery (61% in the experimental data) or gives no specific spatial information but rather simple general localizations (32.5% in the parallel corpus, see 32b-c above). In Greek, verbs display some selectional restrictions, such as a preference to use motion verbs with dynamic relators that either express Path (53% in the experimental data set and 31% in the parallel corpus data) or only general localization (30% in the parallel corpus). Examples in 37a-b illustrate this dominant pattern with accusative case marking (locative preposition + accusative marked noun phrase). We note, however, that Greek also retains some idiomatic "preposition-case" constructions despite grammaticalization changes

that tend to over-generalize the accusative use. These changes include the desemanticization of cases (and parallel generalization of the accusative for allative events as seen in 37a-b) and idiomaticization of preposition-case constructions such as the marginal *epi*+genitive, found in the data and illustrated in 37c (see also Luraghi, 2003: 308 on the loss of older meanings of cases).

(37)	a.	Ένας	κύριος	τρέχει	στο	δρόμο			
		Enas	kyrios	trehi	sto	dromo			
		INDF.ART	man	run.PRS.3SG	on.DEF.ART	street.ACC			
		'A man runs on the street'				(experimental data set)			
	b.	Η	Φάτιμα	μπήκε	στη	σκηνή			
		I	Fatima	bike	sti	skini			
		DEF.ART	Fatima	enter.PST.3SG	in.DEF.ART	tent.ACC			
		'Fatima entered into the tent'				(parallel corpus data set)			
	c.	Ένας	κύριος	τρέχει	επί	του	δρόμου		
		Enas	kyrios	trehi	epi	tou	dromou		
		INDF.ART	man	run.PRS.3SG	on	DEF.ART	road.GEN		
		'A man runs on the road'				(experimental data set)			

94 Greek encodes motion using verbs without a prefix (διασχίζω *diashizo* 'to cross'; *περνάω pernao* 'to pass'; *τρέχω treho* 'to run') and with prefixed verbs (*ανεβαίνω aneveno* 'to up.step', *κατεβαίνω kateveno* 'to down.step'; *περπατάω perpatao* 'to around.walk', etc.). The preverbal forms can function as Path satellites, thus in the B-coding they were taken into consideration together with other devices such as adverbs or participles (53% in the experimental and 31% in the parallel corpus study). In the M-coding they were once analysed as if they were part of the verb root (as monomorphematic). See examples 38a-b.

(38)	a.	Μία	κοπέλα	κατεβαίνει	χοροπηδηχτά	ένα	λόφο
		Mia	kopela	kateveni	horopidihta	ena	lofo
		INDF.ART	girl	descend.PRS.3SG	jumping.happily	INDF.ART	hill.ACC
				Path verb	Manner adverb	(M-coding)	
		'A young woman descends jumping happily a hill'				(experimental data set)	

	b.	Μία	κοπέλα	κατε-βαίνει	χοροπηδηχτά	ένα	λόφο
		Mia	kopela	kate-veni	horopidihta	ena	lofo
		INDF.ART	girl	down-walk.PRS.3SG	jumping.happily	INDF.ART	hill.ACC
				Path prefix-Manner verb	Manner adverb	(B-coding)	
		'A young woman walks down a hill jumping happily' (experimental data set)					

Table 6a. Semantic components expressed in the periphery (experimental study).

Language	P	M	F	M & P	Z	0
English	155 (86%)	0 (0%)	0 (0%)	25 (14%)	0 (0%)	0 (0%)
Greek B-coding	96 (53%)	5 (3%)	0 (0%)	59 (33%)	2 (1%)	18 (10%)
Greek M-coding	64 (36%)	26 (14%)	0 (0%)	36 (20%)	11 (6%)	43 (24%)
French B-coding	15 (8%)	51 (28%)	0 (0%)	109 (61%)	5 (3%)	0 (0%)
French M-coding	11 (6%)	51 (28%)	0 (0%)	109 (61%)	9 (5%)	0 (0%)

Table 6b. Semantic components expressed in the periphery (parallel corpus study).

Language	P	M	F	M & P	Z	0
English	108 (45.5%)	3 (1%)	0 (0%)	58 (24%)	37 (16%)	32 (13.5%)
Greek B-coding	83 (31%)	23 (8.5%)	4 (1.5%)	31 (12%)	79 (30%)	45 (17%)
Greek M-coding	71 (27%)	26 (10%)	5 (2%)	27 (10.5%)	79 (30%)	53 (20.5%)
French B-coding	50 (20%)	39 (16%)	2 (1%)	16 (6.5%)	80 (32.5%)	58 (24%)
French M-coding	46 (19%)	41 (17%)	2 (1%)	14 (5.5%)	80 (32.5%)	61 (25%)

P: PATH, M: MANNER, F: FUSED MANNER AND PATH ELEMENT, Z: SEMANTICALLY EMPTY ELEMENT, 0: NO PERIPHERY. THE COUNTS FOR TABLE 6B DO NOT ADD UP TO 221 AS THE PERIPHERY MOST COMMONLY CONTAINS MORE THAN ONE TYPE OF SPATIAL COMPONENT.

95 In both data sets, Manner is expressed in the periphery more often in Greek and French (14% and 28% respectively in the experimental data; 10% and 17% in the parallel corpus data) than in English, while fused (M+P) elements rarely feature in the periphery. Semantically empty elements and non-dynamic elements are also more frequent in Greek (30%) and French (32.5%) in both codings. This is due to the larger number of locative prepositional phrases in Greek and French, such as *se*+NP or *à*+NP. The periphery can also

be empty, and this happens most often in French in the parallel corpus data set (25%). Comparing the three languages, Greek patterns similar to French regarding its use of encoding Manner and Path in the periphery in the experimental study, but is in between English and French regarding its encoding of Path in the periphery of the parallel corpus study.

4. General Discussion

96 The multi-methodological approach proposed here aimed to use different types of data sets and widen the scope of the involved levels of analysis theoretically and methodologically in order to better capture within- and across-system variation by comparing Greek motion encoding to more typical *Satellite-* (i.e. English) and *Verb-framed* (i.e. French) patterns. From a theoretical point of view, such a perspective underlines the implications coding decisions have on capturing morphological, semantic and syntactic variation and thus sheds light on the typological change that may occur when parallel extra-categorical patterns are used within a given system. In our earlier work (Soroli 2011a, 2012; Verkerk 2014b) multiple encoding strategies emerged across languages in both oral and written corpora respectively. More specifically, with respect to Greek, coding motion events seems to be a challenge since depending on the data type, the coding decisions, and the discourse aims, several patterns co-exist – leaving questions about the typological status of this system.

97 The questions we addressed included the following: To what extent do English, French and Greek belong to typologically different groups? What are the dominant patterns, and is there any within-system variation? Does variation have an impact on the typological status of a system? What are the different types of variation we can observe (semantic, morphological, syntactic)? Is semantic characterization, in terms of selection, conflation, distribution and organization of the conceptual components (Manner and Path) sufficient for typological classifications? Can other non-spatial properties of the languages contribute to such characterizations? How do morphosyntax and semantics contribute to motion event typology research? Is Greek a hybrid system? How can we analyse verbs with preverbs? Is prefixation still productive? Do selectional restrictions of motion verbs restrict the types of spatial complements they take? What is the role of case marking? What is the role of syntactic flexibility regarding word order? In order to respond to these questions and examine several proposals concerning the status of Greek (as a clear *V-framed* system with monomorphematic verbs; as a parallel V- and S-framed system; or as a language that comprises an *S-framed prefixed* sub-system of bimorphematic motion verbs in addition to V- and basic S-framed properties) we used detailed multi-level (semantic and morpho-syntactic) analyses and double coding.

98 The results showed some general tendencies that confirm partially typical crosslinguistic differences but also capture variation across and within systems on several levels. With respect to the syntactic organization of the utterances, we report a general preference for tight-simple constructions. Some variation was found in French and Greek, in that both languages encoded spatial information in TS but also in TC-constructions (especially in the experimental data). Greek also presented some coordinate clauses (LS) and more importantly many Manner-first constructions. With respect to the selection, density and distribution of the semantic components, we noted important variation across languages: strong PM conflation in English, less in French and Greek, some intermediate patterns

depending on the coding decisions for Greek, as well as important variation across data sets. More specifically, the experimental study elicited more information on both Manner and Path, whereas the number of contexts in which both Manner and Path were relevant was limited in the parallel corpus (there are some extracts where the original texts only include Path).

99 The results on the *locus* measure again present some differences across data sets. The experimental study indicates a radical opposition between English and French - English is most likely to express Manner in verbs, while French is least likely to do so. Greek is somewhere in between these two, and much depends on the coding: using B-coding, Greek resembles English, whereas when M-coding is used, Greek is most likely to encode either Manner and Path together in the verb or just Path. In addition, Greek verb valency displays selectional morphosyntactic restrictions for spatial peripheral complements, probably due to the progressive loss of the semantic transparency of cases (i.e. massive use of the accusative case and limited use of the Genitive case) showing that the system evolves towards a grammaticalization of the peripheral devices that mostly specify Path (i.e. direction, source, goal) or Ground. Overall, Greek displays differential behaviour: B-coded Greek behaves similarly to English with regard to Manner coding, whereas M-coded Greek behaves more similarly to French in both its amount of Path verbs and Manner verbs and its morphosyntactic distribution of the spatial components.

100 The variation found in English, French, and Greek motion event encoding systems, as well as between the M-coding and B-coding for Greek and French, allows us to reach some conclusions about coding, measures, and general methodology. As is clear from the results, it made a big difference whether preverbs are coded as monomorphematic with the verb root (M-coding) or as Path satellites (B-coding) for Greek, whereas the difference for French is minimal. There are many more motion verbs for which coding preverbs as part of the verb root or as satellites is relevant for Greek as there are for French. This of course has a diachronic explanation: French preverbs have hardly formed any new derivations since the 15th century (Kopecka 2006), whereas many Greek preverbs are still productive today (Ralli 2004). The consequence for motion event encoding researchers is that we need to take into account morphological characteristics of the languages we study, and investigate further the productivity of preverbs and similar devices, as the classification of these elements will make a big impact on how we view these systems typologically – in the current case, whether Greek is more similar to S-framed English or to V-framed French. The consequences of dealing with morphological elements such as preverbs show that the study of semantics, of where specific motion components (Path and Manner) are expressed in the clause, is not enough for a holistic view on motion event encoding. We need information on morphosyntax and syntactic architecture as well. Although we have not conducted a full quantitative analysis, we have noted selectional restrictions on the case marking of Grounds in Greek that are imposed by motion verbs.

101 Likewise, the analysis of syntactic architecture is relevant for the investigation of patterns of information structure, whether languages prefer tight-complex constructions or whether they also allow using more complex, marked constructions in which spatial information is distributed over several utterances or clauses. We found Greek to be of great interest in this respect, as it permits Manner-first constructions in which Manner is encoded in the first position of an utterance (with one or several clauses), a pattern not found in S-framed English or in V-framed French.

102 The measures we have used are more elemental than the traditional construction types used in most other studies, most famously 'Satellite-framed' vs. 'Verb-framed'. Of course, there are also many studies that report on the type of spatial components encoded on the verb and outside the verb, but very few combine analysis at the level of semantic, syntactic and morphological distribution at the same time. We believe that the present analysis stays closer to the data and captures variation in motion event encoding better. We also believe that these components – semantics, morphosyntax, and syntactic architecture – should be described not with respect to motion event encoding only, but in the light of general semantic, morphological, and syntactic patterns in the languages, in line with Beavers et al. (2010) and Skopeteas (2008). We need to broaden our perspective not only to include a more extensive range of measures but also to find explanations for motion event encoding patterns in terms of general linguistic characteristics. The large English Manner verb lexicon, for example, can be linked to other semantic domains for which English has large sets of descriptive verbs, including perception, communication, and ingestion (Snell-Hornby 1983). As another example, the Satellite-framed nature of the Balto-Slavic languages can be attributed to their productive system of spatial prefixes, and their investigation necessarily entails questions regarding productivity and monomorphemic status as well (Verkerk, 2014b). Apart from looking at the interaction between existing motion measures (Berthele, 2013), we also need to look outside the motion domain, where we will find that motion patterns can be explained by far more general features.

103 The differences across data sets that we have reported are not unexpected, but they have not been given proper attention in the literature. English, the best-researched language in the world, is reported to use Manner verbs in motion descriptions ranging from 51% (Özçalışkan & Slobin 2003) to in 'almost all' descriptions (Oh 2009), (see also section 1.4). Clearly, this amount of variation is influenced by both the type of task as well as the amount of Manner elaboration allowed by the task. For our two data types, it is relevant to address this issue in some detail.

104 From one perspective, translators of written texts have a lot of (lexical) freedom, as they can decide on one appropriate translation out of many; whereas participants in experiments are restricted in their vocabulary choices by the stimuli at hand as well as the need to formulate a response in a short time frame. If a video or elicitation material depicts a man moving in a very salient manner, for instance with an instrument (i.e. a bicycle) the motion event description is likely to involve the equivalent of the verb 'cycle'. A translator seems to have at least a little freedom (at least at the lexical level) in that they may choose a less colloquial verb, or a more lengthy adverbial description encoding the cumbersome movement. To study lexical semantics, therefore, written corpora are probably a better choice over experimental studies, as they will give a more diverse picture of the lexical material that is available in a language. But on the other hand, the big difference in across-language variation between the experimental study and the parallel corpus suggests that the translators are restricted by the original, while participants in an experiment can more freely opt for any linguistic pattern (at least from a constructional point of view) they feel fits best.

105 The content of an experimental task, as well as the constructions selected in a written corpus, impacts the characterization as well. The Frog Story, for instance, doesn't feature any vehicles, as opposed to other stimuli (i.e.. the Pear Story) – thus creating different possibilities for Manner elaboration. These differences between different types of studies

(spoken elicitations, experimental tasks, written corpora) and between the content of studies (video materials, pictures, corpus selection) impact the characterization of motion event encoding that researchers draw up.

106 In the experimental study, the majority of sentences in all three languages included both Manner and Path (cf. focus analysis). This number was more varied as well as much smaller in the parallel corpus study. Both Manner and Path are highly salient in the video materials, triggering the participants to encode both by the most colloquial means available to them. In addition, the Manner of motion can be considered to be non-typical for several videos (i.e. roller skating, riding a scooter), triggering explicit encoding of Manner as also found by Papafragou et al. (2006). In the parallel corpus, there is less of an impetus to encode two spatial components, as the source material doesn't always include two spatial components (a sizable subset of the source material only encodes Path, not Manner). This is reflected in the focus results and in the density results: most sentences included two spatial components in the experimental study, while this varied between about 40-60% in the parallel corpus. The syntactic architecture results point in the same direction: Greek and French in the experimental study use far more TC constructions, suggesting a need to encode both Manner and Path, even if this results in more elaborate constructions.

107 The locus results, that dealt with the type of spatial components expressed in the verb and the periphery, display clear typological differences between English, French, and Greek. The experimental study and the parallel corpus study point in the same direction, but the differences between languages are far greater in the experimental than in the parallel corpus data. One might expect that variation across data sets may be related to the fact that written language is lexically richer than spoken language (Cunningham & Stanovich 1998) and thus across- and within-language variations should emerge more strikingly in the richer (the parallel corpus) data set. However, variability emerges more clearly with the spoken (experimental) data than with the written one. Apparently, the experimental study allows participants to use the most frequent and colloquial pattern to encode motion in their language, and thus allowing us to capture crosslinguistic variability. The written parallel corpus shows the same cline as for spoken experimental data, but the differences between languages are far smaller for this data set. This must be attributable to faithfulness to the original: the translator may leave out Path segments, or replace a Manner verb with a Path verb, but given that more or less the same meaning must be conveyed, they cannot go too far in altering the source meaning (see again the bias toward translated language as identified by Wälchli 2007). The results of the parallel corpus are therefore interesting for comparing the languages that are included in the corpus, but do not necessarily give a complete picture for any individual system.

108 The controlled oral and parallel written corpora we compared are not the only language sources to capture variation. The present paper suggests that different types of data contribute differently in the characterization of the systems. It is clear that large-scale investigations, comparisons between translation, experimental, free-narrative and free-discourse data, as well as deep multi-level analysis, are needed in order to find correlations between measures, capture variation, and eventually complete the description of motion event encoding strategies.

5. Concluding Remarks

109 The data from the three languages presented in this paper, English, French, and Greek, attest to great variation. Such crosslinguistic variability is problematic for two-way or even three-way typologies. Variability depends not only on general encoding constraints – for example on how semantic components such as Manner and Path are lexicalized or grammaticalized in a language – but also on specific properties linked to the lexical inventories and the morphosyntactic resources of the system. This suggests the need for a more unified account of variability and, from a methodological point of view, multi-level analysis of the data.

110 As we saw, very few researchers have tried to provide a unified analysis of motion event encoding, and those who tried an alternative account (among others Skopeteas (2008) on verbal valency from a diachronic point of view, Beavers et al. (2010) on non-motion typological constraints, etc.) did so without explicitly proposing a systematic way of coding intending to capture variation from a multi-level perspective. As we demonstrated, Greek is of special interest for such kind of investigations because it provides several types of strategies on all levels (semantically rich utterances, variation in syntactic organization, multiple morphological markings), possibly due to its history (Luraghi 2003; Skopeteas 2008; Imbert 2008).

111 To conclude, this research offers a novel methodological framework and provides new insights into the problem of linguistic variation. We investigated different types of data sets, explored several methodological issues and potential parameters for analysis, choosing to code the data in a theory-neutral way. This allowed us to capture great across and within-language variability and opened new perspectives for further description of the available coding schemes in the domain of motion events.

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ANNEXES

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NOTES

1. This work was partly supported by the ANR & DFG project « Langacross2-Utterance structure in context » (reference number : ANR-10-FRAL-0008) (E.S.) and by the Max-Planck-Gesellschaft zur Förderung der Wissenschaften through funding the Max Planck Research Group

"Evolutionary Processes in Language and Culture" as well as the ERC grant « The evolution of human languages » (reference number 268744) (A.V.).

2. Talmy characterizes Motion as "the presence per se of motion or the locatedness in the event". Motion is thus either translational involving translocation, or self-contained concerning only location, with the presence of displacement as the determining feature.

3. In his recent writings Talmy uses the terms Path and Manner of motion which partially correspond to Tesnière's (1959) *Déplacement* ('displacement') and *Mouvement* ('movement'), Vinay & Darbelnet's (1958) *Result* and *Mean*, and Malblanc's (1944) *Sens de mouvement* ('direction of motion') and *Sens de l'action* ('direction of action'). Note that some studies prefer to use terms such as *Route* or *Direction* (cf. Wälchli 2001) to refer to the *Path* component. In this work we prefer to use Talmy's terminology for Path. By doing so the term becomes relevant for both the description of Path of Motion and Path verbs, as coded in this paper.

4. In this view, verb particles in English, affixes in Atsugewi, preverbs in Russian and German, verb complements in Chinese and incorporated nouns in Caddo, are some examples of what Talmy calls satellites. However, for some researchers (cf. Matsumoto 2003: 408; Filipovic 2007: 33; Beavers 2010: 338 among others) the Satellite notion fails to identify a natural class of elements that is purely in a sister relation to the verb root. In this paper we employ the terms 'other devices' and 'satellites' in a broader sense considering any constituent that is in the verbal network (including other verbs, preverbs, participles) that are in a sister relation to or adjoined to the main verb root. However, for coding reasons, some narrower distinctions are needed, thus we indicate those overtly when necessary.

5. The Frog story is a wordless picture book (original title *Frog, where are you?* by Mayer 1969) which has been used as elicitation material in numerous narrative studies in different languages. It is a 24-picture booklet about the story of a boy and his dog who go out in search of their pet frog, which has escaped from its jar.

6. Note that the precise typological status of Greek remains open (see also Selimis 2007: 45; Soroli 2011a, 2012), as we will see below.

7. Similar observations concerning the optionality of Manner were also made by Slobin (1996), who notes the considerable loss of Manner component in English-to-Spanish translations of novels (see also the next section for a further discussion of parallel corpora). It appears that speakers avoid satellites when possible, although usage of these devices depends on how necessary the meaning components are to the event description, as well as how inferable they are from context. Avoidance of satellites may in turn move certain languages towards more predominant V-encoding options, and vice versa, even if other options are available.

8. Apart from the differences between Verb-framed and Satellite-framed languages, it is important to mention the 'Equipollently-framed' construction type proposed by Slobin & Hoiting (1994: 492), Slobin (2004), and Zlatev & Yangklang (2004), as well as the additional constructions distinguished by Croft et al. (2010).

9. Ji (2009) is also the first, to our knowledge, who opts for a double coding of her data in order to question the typological status of this system in a more neutral way.

10. Not all preverbs are inherited from ancient Greek. For example, kse- was not present in Ancient Greek (see Ralli 2004; Méndez Dosuna 1997).

11. Lieber & Baayen (1994) suggest a connection between the semantics of polysemous preverbs and their productivity. For instance, a not very productive element may gather strength in some well-defined subset of its formations and thus re-emerge as highly productive (1994: 70). For instance, *para-* 'proximity or alongside', becomes extremely productive with the recent new meaning of excessive realization (i.e. meaning 'abnormal size or measure'). Moreover, when the semantic representation of a prefix is determined, then the item can be independent, stored separately from the verb roots it typically combines with (see also Voga et al. 2013 for a psycholinguistic approach on this issue) and thus be more productive.

12. *eks-* is an allomorphic form (allomorph) of *ek-*.

13. Both *ανεβάζω anevazo* 'to up-put' and *κατεβαίνω kateveno* 'to down-walk' have high surface frequency. However, the frequency ratio between root and prefixed derivation is lower for the latter since the verb root of *κατεβαίνω kateveno* is the verb *βαίνω veno* ('to walk'), which is a defective verb that is only used in Modern Greek in a few fixed phrases.

14. After the set of motion event descriptions was selected, the original and translated sentences were analysed further with the help of native speakers and language specialists. The original coding of motion event components and constructions is discussed in Verkerk (2014b).

15. Similar coding definitions are discussed in Hickmann et al. (2009) and Soroli (2011b).

16. 'Z' included neutral uses such as the English verbs *go* and *get,* the French *aller,* and the Greek *πάω pao* alone or only with general location as well as light verbs such as *do, faire* and *κάνω kano.*

17. '0' included static or causal utterances, omitted information in the experimental data or missing translations in the parallel corpus data.

18. With respect to the B-coding, prefixed verbs that have lost their semantic compositionality as *κατηφορίζω katiforizo* ('to down-direct oneself', **φορίζω *forizo*) or prefixed verb roots that are prefix-dependent as in *διασχίζω diashizo* ('to *trans-cut; to cross') were not considered as bimorphematic and thus their prefix was not counted as satellite.

19. In tables 2a and 2b, we do not distinguish between M-coding and B-coding for Greek and French, as it is not relevant for syntactic architecture.

20. When Manner was very salient in the experimental stimuli (ie. use of an intrument such as a bicycle, roller blades, etc.) speakers were found to prefer this Manner-first position of the participle, which is possible because of the free word order in Greek.

21. In tables 3a and 3b, we do not distinguish between M-coding and B-coding for French, as the analysis of semantic density is not affected by the two levels of coding.

22. We come back to the peripheral devices below and discuss the presence of locatives and dynamic relators in these utterances.

RÉSUMÉS

Depuis ces dernières années, une attention considérable est accordée aux langues qui ne peuvent être caractérisées de manière complète dans le cadre d'analyse traditionnel de Leonard Talmy et ne correspondent ni au type de langue à cadrage verbal ni à celui à cadrage satellitaire. Afin de capter cette diversité, les chercheurs ont été amenés à proposer des typologies basées sur une analyse en constructions ou à proposer des classifications en continua. La présente étude se focalise sur le grec, une langue considérée comme présentant des structures parallèles, comparée à une langue à cadrage satellitaire, l'anglais, et une langue à cadrage verbal, le français. Nous comparons deux ensembles de données, une série expérimentale et une analyse de corpus parallèle, afin d'étudier l'impact du type de données et des décisions de codage sur la classification typologique du grec. Nous situons les résultats de ces deux ensembles de données dans une analyse plus large de la théorie du mouvement et montrons qu'une analyse multidimensionnelle des aspects sémantiques, syntaxiques et morphologiques capte mieux la diversité typologique des langues qui présentent des structures mixtes ou parallèles que ne le font les modèles de lexicalisation traditionnels.

In recent years, considerable attention has been paid to languages that cannot be adequately described in Leonard Talmy's traditional framework of Satellite-framed and Verb-framed languages, resulting in cline-based and construction-based typologies. In the current paper, we focus on Greek, which has been said to have both Satellite-framed and Verb-framed characteristics. We compare two datasets, one experimental and one corpus-based, to uncover the impact of coding decisions and the implications for the classification of Greek as compared to Satellite-framed English and Verb-framed French. We situate the results from these two datasets in a wider analysis of motion theory, and show that taking into account semantic, syntactic and morphological aspects fares better than the exclusive focus on lexicalization patterns which was common in earlier work. We demonstrate the impact of the method of data type and the coding schemes on the characterization of linguistic patterns.

INDEX

Keywords : motion events, linguistic variation, English, French, Greek
Mots-clés : langage spatial, verbes de mouvement, variation interlangue, anglais, français, grec

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