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The Many Ways to Find the "Right" and the "Left": On dynamic projection models in the encoding of spatial relations

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1 Introduction

Since early work by Talmy (1975, 1985), linguistic representation of space has been at the center of research in lexical typology, cognitive linguistics, and psycholinguistics (see, inter alia, the various approaches represented in Slobin (2000), Levinson (2003), Beavers et al. (2010)). Some of the central aspects of spatial representation, however, have remained largely understudied. Particularly poorly understood is the distinction between dynamic and static spatial expressions and the ways that distinction is drawn by speakers of different languages. On the one hand, speakers often choose not to encode a dynamic relation explicitly, even though they have at their disposal a specialized means for unambiguous encoding of a goal or a source of motion (Nikitina 2008, Tutton 2009 for English). On the other hand, speakers sometimes choose to encode a static relation by means of a specialized dynamic expression, even in the absence of any perceivable motion.

This paper focuses on the latter aspect of the problem: the use of dynamic expressions for the encoding of static locations. Such use is especially common with expressions encoding a spatial relation for which no specialized adposition exists, including expressions for "right" and "left". Examples (1-2) present alternative ways of encoding the same relation with a static or a specialized dynamic (directional) expression in English and German.

(1) a. *On the left of the waterfall*, most of the way up, are wet boggy areas full of bright green sphagnum moss. (BNC)
    b. A big storage chest stood *to the left of the door*. (BNC)
(2) a. Die Grazien *auf der Linken des Apollon von Delos* sind bei Ps.-Plutarch <…> überliefert. (V. Mertens, *Die drei Grazien*…)
    'The Graces on the left of Apollo of Delos are mentioned by Ps.-Plutarch.'

b. *Zu Linken des Mars* befindet sich ein ovaler Schild.
(M. Mattern, *Römische Steindenkmäler*)
'To the right of Mars an oval shield is found.'

The use of directional expressions with a static meaning, as in (1b) and (2b), is described by Talmy in terms of *access paths* – as a "depiction of a stationary object's location in terms of a path that some other entity might follow to the point of encounter with the object" (1996:242; see also Talmy 2000:136-137).

In some other Indo-European languages, and especially in ancient ones, the situation is considerably more complex, and static spatial relations can be described not only by locative and directional expressions, but also with expressions that normally introduce a source of motion. In (3a,b), from Latin and Ancient Greek, localization on the right of the reference object is described by a prepositional phrase with an ablative meaning (the complement of the preposition 'from' is in the ablative case in Latin, and in the genitive case in Ancient Greek).

(3) a. Latin (cf. Sävborg 1941)
tunc *dicet* *rex* *his* *qui* ***a***
then say:FUT.3SG king:NOM them:DAT who:NOM.PL from
dextris ***eius*** *erunt* (Jerome's Vulgate, Matt. 25:34)
right:ABL.PL him:GEN be:FUT.3PL
'Then the king will say to those who are on his right hand…'

b. Ancient Greek
ek ***deksiâs*** ***d'*** ***autôn*** *Leukádioi* *kaì*
from right:GEN PRT they:GEN Leukadians:NOM and
hoi *álloi* *bárbaroi* (Thuc. 2.81.3)
ART.NOM.PL other:NOM barbarians:NOM
'and on their right [were] Leukadians and other barbarians' (literally, "from their right")

This paper discusses the encoding of localization on the "right" and on the "left" of a reference object in Ancient Greek. I discuss, first of all, the competition between two different types of dynamic expression: combinations of preposition and case that are commonly associated with sources of motion (the "ablative" strategy) and combinations that typically describe goals of motion (the "allative" strategy). I argue that the two competing expressions are not distributed randomly, but are used according to a fixed reference frame that can be described in terms of a consistent system of spatial projections. The competition between the two strategies is not attested in English or German, and many other modern Indo-European languages have no equivalent of the sophisticated system of Ancient Greek.

2 The ablative strategy in ancient Indo-European languages

This study focuses on the productive use of dynamic expressions, represented in Ancient Greek by allative and ablative prepositional phrases. Before turning to such constructions, however, it is important to address expressions that cannot be analyzed – at the synchronic level – as instances of the dynamic strategy, but rather attest to a productive use of such a strategy at an earlier time. Especially common are synchronically non-decomposable expressions with an ablative origin. The selection in (4)-(5) illustrates this phenomenon for Latin and French: the static expressions derive from ablative prepositions or forms with ablative suffixes (further examples from a number of Indo-European languages are discussed in MacKenzie 1978).

(4) Latin
   a. adverbs in *-tus*: *intus* 'inside', *subtus* 'below' (cf. *caelitus* 'from heaven')
   b. adverbs in *-ā* (from the ablative adjectives modifying *parte* 'part' or *via* 'way'): *intrā* 'inside' (<**interā parte*), *suprā* 'above' (< **superā parte*)
   c. adverbs in *dē-*: *dēsuper* '(from) above', *dēsub* '(from) below'

(5) French
   a. *dedans* 'inside'< OF *denz* 'inside', *de* + *denz* 'from inside' < Vulg. Latin *de-intus* 'from inside'< *intus* 'inside'
   b. *derrière* 'behind'< VL *de-retro* 'behind'/'backwards'
   c. *devant* 'before' (*de* + *avant*), *dehors* 'outside' (*de* + *hors*), *dessus* 'above' (*de* + *sus*), *dessous* 'underneath' (*de* + *sous*), etc.

A common path of development of such expressions can be described as an ablative-to-locative cycle, illustrated in (6): expressions that originally encoded sources of motion (e.g., *intus* 'from inside' in early Latin) are recruited for the encoding of static relations (Step I), and may even become a synchronically non-analyzable locative expression (cf. *intus* 'inside' in Classical Latin). The new form can then be used as a component of another ablative expression (Vulgar Latin *de intus* 'from inside'), and that expression may subsequently undergo the same type of change and develop into a new locative marker (Steps II, III).

(6) Step I: Early Latin *in-tus* 'from inside' (ablative) > Classical Latin *intus* 'inside' (static)
   Step II: Vulgar Latin *de intus* 'from inside' (ablative) > Old French *denz* 'inside' (static)
   Step III: Old French *de* + *denz* 'from inside' > Modern French *dedans* 'inside' (static)

The ablative-to-locative transfer is characteristic of ancient Indo-European languages, including Ancient Greek (Skopeteas 2002: §7.3). The example in (7) illustrates the static use of an ablative expression for 'behind' – the combination of an ablative preposition with the noun *ópisthen* 'rear', which itself derives from an originally ablative (and later, locative) adverb (Nikitina and Spano forthcoming; Nikitina in prep.).

(7) *apoteikhioûntas* *aû* *ek* *toû* *ópisthen*
raise.wall:PTCP.FUT.ACC.PL PRT from ART:GEN.SG rear
autoùs *hêi* *proelēlúthesan* (Thuc. 7.79.5)
them:ACC where advance:PPRF.3PL
'[Gylippus and the Syracusans sent part of their army] to block them with a wall at their back, where they had advanced'

The very fact that the cycle is so commonly attested suggests that the ablative-to-locative transfer results from systematic use of ablative encoding for static relations, rather than from occasional reinterpretation of individual expressions in specific ambiguous contexts (as suggested in MacKenzie 1978). The data discussed in the following sections substantiates this conclusion, as it shows that multiple types of dynamic expression were used systematically in Ancient Greek to encode spatial relations in unambiguously static contexts, which cannot be interpreted as involving motion. The distribution of such expressions points to an underlying system of fixed projected relations – or *access paths* –that were used to localize objects in space.

3 The projection frame of Ancient Greek

3.1 The distribution of the allative and the ablative strategies

The study is restricted to the encoding of relations of "right" and "left" in two subcorpora of *Thesaurus Linguae Graecae* (http://www.tlg.uci.edu/): Homeric epic (representing archaic poetic usage), and the prose of Herodotus, Thucydides, and Xenophon (representing Classical prose). In the relevant periods, the notions of "right" and "left" were encoded by three major types of lexical item:

- by the adjectives *deksiós* 'right' and *aristerós* 'left', which typically modify body part terms or terms for internal parts of objects ('hand', 'side', etc.);
- by the nouns *deksiá* 'right (hand)' and *aristerá* 'left (hand)', in the singular, which could refer to (i) the right and the left hand, (ii) the right and the left side, (iii) by extension, areas of space adjacent to the right and the left side of a reference object;
- by the nouns *deksiá* 'right (side)' and *aristerá* 'left (side)', in the plural

(neuter gender), referring to (i) the right and the left side of a reference object, and (ii) areas of space adjacent to these sides.

All three types of lexical item appear in static and dynamic prepositional phrases. This study ignores static prepositional phrases and focuses instead on two types of dynamic expression used to describe static location: prepositional phrases normally associated with goals of motion (the allative strategy), and prepositional phrases associated with sources (the ablative strategy). Both are attested with all three types of lexical item. Their distribution, however, is not random but follows the patterns summarized below.

The distribution is related to the distinction between expressions referring to internal parts of a reference object vs. expressions referring to external areas of space. The two meanings are often difficult to distinguish, since in Ancient Greek, nouns referring to the right and the left side can also refer to the adjacent areas. In some contexts, however, the reference is unambiguous. Possessive constructions, for instance, normally refer to internal parts ('x's left [side]'); the same interpretation is associated with expressions consisting of terms for internal parts modified by adjectives (e.g. 'x's left hand'). Such unambiguous contexts restrict the choice of a dynamic expression to just one of the strategies.

First of all, only ablative expressions are attested in descriptions of localization next to an internal part of a reference object, i.e. in an area of space adjacent to a specific part. In (8), localization is defined relative to a body part (left hand), and features an ablative preposition *ek(s)* 'from'. The notion of "left" is encoded by an adjective modifying a body part noun.

(8) *dúnatai* *dè* *toûto* *tò* *épos* *katà*
signify:PRES.3SG PRT this:NOM ART:NOM.SG word:NOM following
tḕn *hellḗnōn* *glôssan* *hoi* *eks*
ART:ACC.SG Greeks:GEN language:ACC ART:NOM.PL from
aristerês *kheiròs* *paristámenoi* *basiléï* (Hdt. 2.30.1)
left:GEN hand:GEN stand.by:PTCP.PRES.NOM.PL king:DAT
'This word means in Greek "those standing on the left hand of the king".'

Example (9) features the same body part noun *kheìr* 'hand', but this time localization is defined relative to an internal part of an inanimate reference object (the army's left side, literally, 'the left hand of the army').

(9) *légetai* *pareónta* *tòn* *Thalên* *en*
say:PRES.PASS.3SG be:PTCP.PRES.ACC ART:ACC.SG Th.:ACC in
tōi *stratopédōi* *poiêsai* *autôi* *tòn*
ART:DAT.SG camp:DAT make:INF.AOR him:DAT ART:ACC.SG
potamòn *eks* *aristerês* *kheiròs* *hréonta*
river:ACC from left:GEN hand:GEN flow:PTCP.PRES.ACC
toû *stratoû* *kaì* *ek* *deksiês* *hrein* (Hdt. 1.75.4-5)
ART:GEN.SG army:GEN and from right:GEN flow:INF.PRES
'It is said that Thales, being in the encampment, made the river, which flowed on the left of the army, also flow on the right.'

In (10), the possessive construction ('the road's left [side]') suggests that localization is defined relative to an internal part of an inanimate reference object (since possessive constructions do not in general refer to external areas of space).

(10) *éstasan* *dè* *Pérsai* *mèn* *ek* *deksiâs,*
stand:AOR.3PL PRT Persians:NOM PRT from right:GEN
hoi *dè* *álloi* *súmmakhoi* *eks* *aristerâs*
ART:NOM.PL PRT other:NOM allies:NOM from left:GEN
tês *hodoû* (Xen. *Cyrop*. 8.3.10)
ART:GEN road:GEN
'The Persians stood on the right side, their allies, on the left side of the road.'

Secondly, localization inside the reference object implies the use of the allative strategy. In (11), the Figure is located within the Ground, in the left part of the battle. The localization is described by a directional prepositional phrase, consisting of the preposition *epì* 'on' and an accusative noun phrase.

(11) *epeí* *hra* *mákhēs* *ep'* *aristerà* *márnato*
since PRT battle:GEN on left:ACC fight:IMPF.3SG
pásēs *ókhthas* *pàr* *potamoîo* *Skamándrou* (Hom. *Il*. 11.498)
all:GEN banks:ACC beside river:GEN S.:GEN
'for he was fighting on the left of the entire battle by the banks of the Scamander river'

Similarly, examples (12)-(13) involve localization in internal parts of the Ground and make use of the same directional prepositional phrase. In (12), the prepositional phrase localizes the Figure in the left part of the space occupied by the ships; in (13), the Figure is located on the right side of the head.

(12) *Héktōr d' ouk epépusto Diï̀ fílos, oudé*
H.:NOM PRT not learn:PPRF.MP.3SG Z.:DAT dear and.not
ti ĕ́dē hóttí hrá hoi nēôn
anything:ACC know:PPRF.3SG that PRT ART:NOM.PL ships:GEN
ep' aristerà dēïóōnto laoì hup' Argeíōn
on left:ACC slay:IMPF.MP.3PL men:NOM by Argives:GEN
(Hom. *Il*. 13.675)
'but Hector, dear to Zeus, had not heard nor knew anything of how on the left of the ships his men were being slain by the Argives'

(13) *hoi tà epì deksià tôn kefaléōn*
they:NOM ART:ACC.PL on right:ACC ART:GEN.PL heads:GEN
komôsi, tà d' ep' aristerà
let.hair.grow:PRES.3PL ART:ACC.PL PRT on left:ACC
keírousi (Hdt. 4.191.1-2)
shave:PRES.3PL
'They let their hair grow long on the right side of their heads and shave the left.'

Example (14) is somewhat special in not localizing the Figure exactly inside an internal part of the Ground. Rather, the Figure is described as a piece of apparel in contact with the Ground's part. The location is encoded by a combination of the preposition *pròs* 'toward' and an accusative noun phrase; that combination instantiates the same allative strategy as in the previous examples.

(14) *Arábioi dè zdeiràs hupezdōménoi*
Arabians:NOM PRT garments:ACC undergird:PTCP.PRF.NOM.PL
êsan, tóksa dè palíntona eîkhon
be:IMPF.3PL bows:ACC PRT bent.backward:ACC hold:IMPF.3PL
pròs deksiá, makrá (Hdt. 7.69.1)
toward right:ACC long:ACC
'The Arabians were undergirded with skirts, and they had at their right side long bows curving backwards.'

In cases of ambiguous reference, on the other hand, both the ablative and the allative strategy are attested. These are the contexts that offer no independent evidence for the interpretation of the terms for "right" and "left" as referring to an internal part of the Ground vs. an external area adjacent to that part: the notion of "left"/"right" is encoded by a noun that is not associated with a genitive possessor. Even in such cases, however, the choice of a strategy does not seem to be random. In particular, the allative strategy tends to be used with distant Grounds and seems to be the only available option in constructions defining a viewpoint.

In (15) and (16), for example, the term for "right" could in principle be interpreted as referring either to an internal part of some reference object ('the right [side of x]') or to an external area extending from that part ('[the area of space projected from] the right [side of x]'). Localization is defined relative to an explicit viewpoint – a hypothetical observer introduced by a participial construction in the dative case: '(on the right) to one sailing into the Euxine' and '(on the right) to one entering the temple'. The construction with an explicit viewpoint requires the use of the allative strategy.

(15) *arksaménē* *dè* *hē* *Thráikē* *haútē*
start:PTCP.AOR.MID.NOM PRT ART:NOM.SG T. this:NOM
estìn *apò* *toû* *stómatos* *toû*
be:PRES.3SG from ART:GEN.SG mouth:GEN ART:GEN.SG
Póntou *mékhri* *Hērakleías* *epì* *deksià* *eis*
Euxine:GEN as.far.as H.:GEN on right:ACC into
tòn *Pónton* *eispléonti* (Xen. *Anab*. 6.4.1-2)
ART:ACC.SG Euxine:ACC sail.in:PTCP.PRES.DAT.SG
'This [portion of] Thrace begins at the mouth of the Euxine [and extends] as far as Heracleia, [being] on the right to one sailing into the Euxine.'

(16) *tôn* *ho* *mèn* *khrúseos* *ékeito*
ART:GEN.PL ART:NOM.SG PRT golden:NOM.SG lie:IMPF.MP.3SG
epì deksià *esiónti* *es* *tón* *nēón,*
on right:ACC enter:PTCP.PRES.DAT.SG into ART:ACC.SG temple:ACC
ho *dè* *argúreos* *ep'* *aristerá* (Hdt. 1.51.1-2)
ART:NOM.SG PRTsilver:NOM.SG on left:ACC
'[Of the craters] the golden one stood on the right to one entering the temple, the silver one, on the left.'

A different tendency is observed in examples with shorter distances to the reference object and in the absence of an explicit viewpoint, as in (17).

(17) *eîkhon* *d'* *hupèr* *deksiôn* *khōríon* *hoîon*
hold:IMPF.3PL PRT above right:GEN.PL place:ACC such:ACC
khalepṓtaton *kaì* *eks* *aristerâs* *állon* *potamón*
most.difficult:ACC and from left:GEN another:ACC river:ACC
(Xen.*Anab*. 4.8.2)
'They had above their right a most difficult bit of ground, and on the left, another river…'

Example (17) describes two different localizations using two different types of expression: one description features a static prepositional phrase ('above their right [side]'), the other, an ablative prepositional phrase ('from the left'). The fact that a

static and a dynamic description are juxtaposed in the same example supports the view that the use of dynamic expressions is indeed a productive strategy for describing static locations, and is by no means restricted to contexts with a static vs. dynamic ambiguity.

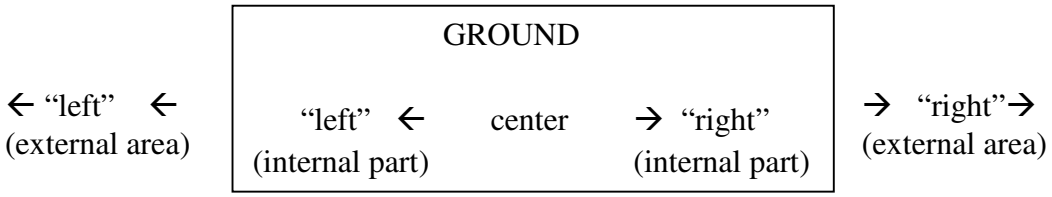
So far the restrictions on the choice of a dynamic strategy (ablative vs. allative) in particular types of context were presented as arbitrary. In the next section, I try to make sense of these patterns and suggest that they are derived from a system of fixed spatial projections – or *access paths* – that are used to define, in a consistent way, the relation between the Figure and the Ground.

3.2 A "centrifugal" model of spatial projections

As described in the previous section, the choice between the allative and the ablative strategy depends on two factors: the localization of the Figure (within vs. outside the Ground), and the nature of the reference point (an internal part of the Ground vs. an external area). With unambiguously Ground-internal reference areas, the ablative strategy is used to describe Figures outside the Ground (8-10), and the allative strategy is reserved for Figures that are contained in the Ground or located in contact with it (11-14). In contexts where the reference area cannot be interpreted unambiguously as referring to an internal part or an external area, both strategies are attested, and other factors – such as the presence or absence of an explicit viewpoint or distance from the Figure to the Ground – may play a role in the choice of a particular expression.

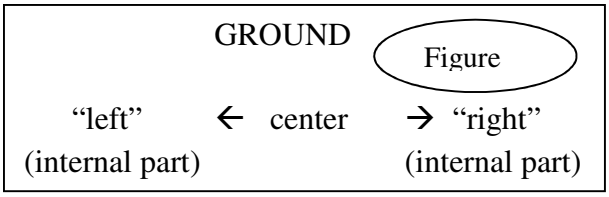
The distribution of the strategies can be accounted for in terms of a model of spatial projections that is represented in (18). In this "centrifugal" model, all spatial relations are directed from the center of the Ground toward external areas.

(18) The "centrifugal" model of spatial projections



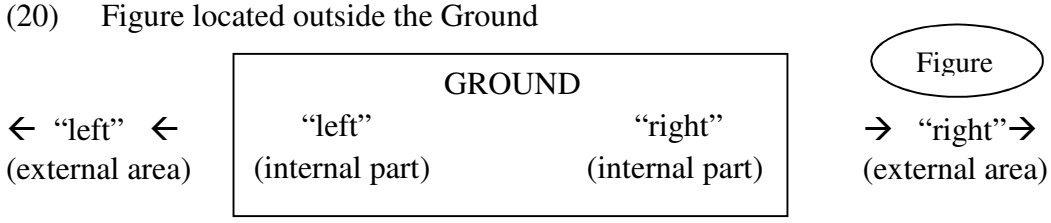
The direction of the projections is predicted by Talmy's concept of *access paths*: the model describes static locations in terms of trajectories that can be used to arrive at a specific localization, starting from the Ground's center. When the Figure is located within the Ground (11-14), the localization is described by the allative strategy, with reference to the Ground's internal parts, as shown in (19).

(19) Figure located within the Ground



When the Figure is located outside the Ground, the relation can be described in one of two ways (cf. the representation in (20)): (i) by the ablative strategy, if reference is made to internal parts of the Ground ('from the internal part'); (ii) by the allative strategy, if reference is made to external areas ('toward the external area'). Option (i) is attested in all cases of unambiguous reference to internal parts (examples 8-10), i.e. with possessive constructions ('the left of x') and with explicit mentions of the part in question ('the left hand of x'). Both options are attested in cases of ambiguous reference, consistent with the model's predictions.

(20) Figure located outside the Ground



The table in (21) summarizes the choice of a strategy according to the two factors.

(21) Choosing between the allative and the ablative strategy

Localization:	Figure inside the Ground	Figure outside the Ground
Relative to internal part	allative	ablative
Relative to external area	not attested	allative or ablative

4 The "centrifugal" model in other languages

The same "centrifugal" model – or vestiges thereof – is attested in some other languages, such as modern Russian (discussed in detail in Nikitina in prep.). Outside of the Slavic branch, however, modern Indo-European languages seem to provide no evidence for a consistent model of spatial projections of the Ancient Greek type. Modern descendants of languages that had been using such models at a previous stage no longer resort to both the allative and the ablative strategies.

Thus, Modern Greek no longer offers a special allative strategy for the encoding of static relations, since it no longer has a distinct allative preposition. It has retained, however, a marginal option of using an ablative construction (Bortone 2010: 345). The example in (22) is the only dynamic option for the encoding of a static spatial relation in Modern Greek. The noun phrase *aristerá apó to aftokínito* 'left of the car' refers to an external area; the model in (23) represents the surviving elements of the Ancient Greek system that make such encoding possible.

(22) *to* *podílato* *ine* *apó* *aristerá* *apó* *to* *aftokínito*
DEF bicycle is from left from DEF car
'The bicycle is to the left of the car.'

(23) Vestiges of a centrifugal model in Modern Greek

The transition from Early to Modern Standard Italian illustrates the loss of the dynamic strategies in Romance languages. In early Italian, ablative expressions are widely attested in descriptions of static relations with terms for internal parts (Poppe 1963), as in example (24) from Dante (Purg. iii, 88-90):

(24) *Come* *color* *dinanzi* *vider* *rotta*
as.soon.as those before saw broken
la luce *in terra* *dal* *mio* *destro canto*
the light at ground from.the my right side
'As soon as those in front saw broken
The light upon the ground at my right side…'

In modern Italian, the ablative strategy has become obsolete (see, inter alia, De Felice (1954) on the history of *da*), and the same relation must be encoded with a general-purpose locative/allative preposition (cf. *alla mia destra* 'on my right'). Due to the loss of specialized allative prepositional phrases, modern Romance languages no longer show evidence for the use of the allative strategy.

English and German display a different combination of dynamic options for the encoding of static relations: while the allative strategy is attested in examples such as (1b) and (2b), no ablative strategy seems to survive.

The systems of these languages are impoverished compared to the systems of Ancient Greek or Latin (the latter is not discussed here, but appears to show similar properties). The gradual simplification of the original models is not restricted to the loss of the allative strategy, which is in turn related to the loss of specialized allative markers (as in Romance or Greek). The Italian example suggests that the ablative strategy may go out of use independently of any other change in the system of spatial encoding (since no specific cause is discernible behind the change).

It appears that the gradual decline of the dynamic model of spatial projections affects independently various Indo-European languages. It is possible that the decline is related to the diminishing role of directional adverbs in the encoding of spatial relations. Directional adverbs were a common source of spatial prepositions in ancient Indo-European languages, but no longer play such a prominent role in their modern descendants. In particular, adverbs with allative and ablative semantics are believed to be at the origin of many basic spatial prepositions of Ancient Greek and Latin (cf., e.g., Lejeune (1939) for Ancient Greek ablative adverbs in *-then*). The development of markers for static relations from allative and ablative adverbs is related to the use of dynamic models of spatial projections, where static relations are specified in terms of an *access path* – a path of hypothetical motion.

As the languages gradually developed rich systems of spatial prepositions, directional adverbs were losing their prominence as a means of encoding static relations. In many modern Indo-European languages, new spatial relators tend to develop from combinations of a basic preposition and a noun referring to an internal part of a reference object (cf., for example, Aurnague (1996) for French). The reorganization of the system of spatial reference – and in particular, the development of rich inventories of spatial prepositions – may have led, in some of the languages, to a gradual decline in the use of dynamic projection models.

This hypothesis finds indirect support in the fact that across languages dynamic strategies are most commonly used for the encoding of relations for which no basic adposition exists. While allative and ablative strategies are commonly attested with complex relations, such as with ‘on the right/left’, they are rarely employed for basic relations such as ‘in’ or ‘on’. This tendency suggests that the presence of a basic preposition specialized for the encoding of a particular relation excludes the use of a dynamic strategy.

5 Conclusion

The use of dynamic projection models is a poorly understood aspect of linguistic representation of space. This study is but a first step toward a systematic investigation of this phenomenon, which aims at exploring the ways systems of spatial encoding develop over time. Its most important implications can be summarized as follows.

First of all, the wide and consistent use of the allative and the ablative strategies for the encoding of static relations suggests, pace MacKenzie (1978), that such use cannot be explained merely in terms of case syncretism or reanalysis of individual expressions in ambiguous contexts. On the contrary, allative and ablative expressions are a major means of encoding relations for which no basic preposition exists.

Secondly, the distribution of the allative and the ablative strategies is not random and points to a special system of spatial projections, which I described in terms of a "centrifugal" model. In this type of model, dynamic projections point away from the Ground's center to its sides and further toward external areas. The model provides an account of certain restrictions that otherwise remain unexplained; in particular, it predicts which relations restrict the choice of expression to one of the two dynamic relations (ablative vs. allative) and which allow for both.

The centrifugal model is consistent with Talmy's concept of *access path*: the projections correspond to paths of fictive motion that start at the Ground (more precisely, at the Ground's center) and lead to the Figure. One of the questions further research has to address is whether this model is indeed universal, as Talmy's concept of access path seems to predict, or whether languages can be found where spatial relations are projected consistently in other directions (toward the Ground or toward the Ground's center).

Finally, the impoverished system of dynamic projections in modern Indo-European languages (with the exception of Slavic, see Nikitina in prep.) stands in sharp contrast with the wide use of dynamic expressions in Ancient Greek or Latin. The decline of the dynamic model may be related to a reorganization of systems of spatial representation, in which prepositions gain a more important role over time, while directional adverbs become less prominent (cf. Coleman 1991, Nikitina and Spano forthc., inter alia). Correspondingly, directional adverbs are no longer involved to the same extent in the encoding of static spatial relations, leading to a simplification of the original sophisticated dynamic projection models and a greater prominence of the dynamic vs. static distinction in the modern languages (cf., for example, Papahagi (2002) on French). To test this hypothesis, a more systematic investigation is required of the dynamic types of encoding attested across languages with various spatial relations.

More generally, the development described in this study demonstrates once again that the distinction between dynamic and static expressions is not as straightforward as some accounts seem to suggest (cf. the discussion in Nikitina 2009). Further research is needed to assess the prominence of dynamic projection models in other languages and identify factors that lead to their development.

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Abbreviations

ABL – ablative; ACC – accusative; AOR – aorist; ART – article; DAT – dative; DEF – definite marker; GEN – genitive; FUT – future; IMPF – imperfect; INF – infinitive; MID – middle; MP – medio-passive; NOM – nominative; PASS – passive; PL – plural; PPRF – pluperfect; PRES – present; PRF – perfect; PRT – particle; PTCP – participle; SG – singular

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