

## PART IV

# ADNOMINALS: TOPOLOGICAL-FUNCTIONAL ADPOSITIONS, SPATIAL PHRASES AND SPATIAL CASES

## INTRODUCTION

### What does a spatial adposition do?

**a) It relates an object or place (target) to another (landmark)**, cf. Parisi & Castelfranchi (1970: 332) ‘in language a place cannot be identified *per se*, but must always be identified in reference to an object’. Indeed, for Talmy (1983: 230), an object is localized in terms of distance or relation with the geometry of a second object. With projective adpositions (e.g. *I can see a car behind the tree*), a third element is needed, i.e. a point of view (Herskovits 1986).

**b) It qualifies the spatial relationship between the two objects**, cf. ‘How is it that we can classify an open-ended number of spatial situations as instances of a limited set of relational concepts such as IN, ON, AGAINST, or AROUND? One possibility is that such concepts come built in (...) developmentalists have typically assumed that concepts like ‘containment’ and ‘support’ are the universal outcome of spatial cognitive development (...) there is now growing interest in the possibility that the spatial concepts associated with words are, at least in part, a *linguistic* invention – a particular way of structuring space for the purpose of talking about it (...) Different languages are sensitive to different properties, and they make different ‘choices’ (...) languages categorize topological relations strikingly differently’ (Bowerman 2007: 177-178)

**c) It doesn’t qualify the landmark** (or at least this is not a common feature of adpositions): ‘while in European languages one does not have to specify that tables have four legs and are usually made of wood, or that oranges are fruits and are of a spherical shape, or that a tree is long and rigid, vertical or standing, in certain languages of the world this type of information is systematically given.’ (Grinevald 2007: 93).

## IV.1 POSITION, NATURE AND PARADIGMS

### IV.1.1. ADPOSITION, PREPOSITION, POSITION

The traditional name of adpositions is *prepositions*, because they were preposed in classical IE languages (cf. Dionysios Thrax’s *prothésis*, Auroux 1989-2000, II: 583). In IE, ‘pre’positions actually take their origin in elements which could be used as adverbs, preverbs or prepositions. This multifunctionality is still found in classical IE languages, cf. Saussure’s well-known example (1916: VIII, 179)

- (1) *óreos*                    *bainō*            *káta*  
    mountain.G.SG    walk.1SG    down  
‘I come down from the mountain.’

which can also be phrased

(1b) *katà óreos bainō*.

or

(1c) *kata-bainō óreos*.

Only in the second version is *katá* a preposition; in the first one it is used as an adverb, while in the last one it is used as a preverb. This multifunctionality is still found in some modern IE languages, while it has let up in others, cf. the contrast of English *trespass* (from Old French *trespasser* ‘beyond-pass’ ‘go beyond’) vs French *trépasser* ‘die’, which shows that the spatial use of preverbs declined from Old to Modern French (see Kopecka 2006 for an analysis of French spatial preverbs).

There are actually also quite a few adpositions in IE languages which appear *after* the noun or pronoun; however, they do not have a prototypical adpositional pattern of use, cf. Greek *Athénaze* (<*Athénas-de*) ‘towards Athenes’, Lithuanian *sod-uos-na* ‘towards the gardens’ (Garde 2004: 6-7), Latin *mecum* ‘with me’, Spanish *conmigo* ‘with me’, *calle arriba* ‘up the street’, French *des années durant* ‘during many years’...

Is the distinction between pre- and postpositions meaningful? ‘Lyons (1967:302) observes that the difference between prepositions and postpositions is trivial and that ‘many linguists would say that it is mere pedantry to maintain the terminological distinction’. Research on the order of meaningful elements carried out four years earlier (Greenberg 1963d) had established that this terminology is not all that trivial.’ (Heine 1989:78).

Some postpositions also appear in prenominal position; this variability may be a factor of their low degree of grammaticalization, cf. French *durant des années* (= *des années durant*). The range of possibilities also includes circumpositions, as in German *um... willen* ‘for the sake of’:

- (2) *Um*    *welches*    *Vorteils*            *willen?*  
    for    which.G    advantage.G    will  
‘For the sake of which advantage?’

The adpositional status of postpositions, ambipositions and circumpositions is generally less prototypical than that of prepositions, with a lower degree of grammaticalization. Of course, this is true of languages which have mostly *prepositions* (Di Meola 2000: 63, 86), whereas in languages which have mostly *postpositions*, for instance Turkic languages, the reverse is true (Libert 2008: 230).

**Origins of grammaticalization:** mostly verbs (gerunds), nouns, adverbs, see PART VI.

#### IV.1.2. NATURE AND EXISTENCE OF ADPOSITIONS

##### *a) Adpositions and other ways of expressing space*

Most languages use adpositions for the expression of spatial relations (of course in combination with other devices), but some languages use prevalently other devices such as verbs, preverbs, case

endings, locativized nouns, etc. The absence of adposition can be restricted to canonical spatial relations, as in the following examples:

Yéli Dnye (Levinson 2006)

- (3) *kpidi pee pi kêpa* ————— *ka t:a.*  
cloth piece person forehead (postposition slot) TAMP hanging  
'The piece of cloth is hanging (around) the person's forehead.' (= headband)

Zulu (Taylor 1996: 291)

- (4) *Inyoni isemuthini*  
bird it-tree-LOC (locativized noun)  
'The bird is in the tree.'

vs.

- (5) *Inyoni iphezulu emuthini*  
bird it-up tree-LOC  
'The bird is in the top of the tree.'

or

- (6) *Inyoni iphezulu komuthi*  
bird it-above of-tree \$gloss  
'The bird is above the tree.'

→ 'locativized nouns do not contain any notion of 'to' or 'from', i.e. they denote a 'pure' place concept, not a place construed as goal, source, or place on a path' (ibid.: 303)

Louisiana French (Klingler 2003: 355-6)

- (7) *Mo kou Paten Daik*  
I run Patin Dyk  
'I went to Patin Dyke'

- (8) *Li sòti la Frans*  
he exit the.F France  
'He's from France.'

vs.

- (9) *Le ponn, se plu annavon d la sikleri*  
the pond be more in\_front-of the.F sugar\_factory  
'The pond is farther **in front of** the sugar factory.'

### **b) Types of adpositions**

Languages which do have adpositions can display more or less complex adpositional morphemes, from simple to complex adpositions and even adpositional phrases.

#### **i) Simple adpositions**

There are **simple spatial adpositions**, such as English *in, on, at*, etc.: *The cup is on the table, in the chest, above the plates, under the napkin...*

Note that the use of multiple simple case affixes is not very different, from a semantical/functional point of view:

Hungarian

- (10) *a csésze az asztalon van.*  
DEF cup DEF table-SUP is

‘The cup is on the table.’

- (11) *az alma a tálban van.*  
DEF apple DEF bowl-INESS is

‘The apple is in the bowl.’

compare also

- (12) *a nagy házakban*  
DEF big house-PL-inside

‘In the big houses.’

with

- (13) *in den grossen Häusern*  
in DEF.D.PL big.D.PL house.D.PL

(id.; Moreau 2001: 119)

## ii) *Complex adpositions* (higher compositionality)

There are also **multiple complex adpositions**. These typically combine a lexical stem (noun, adjective, verb, adverb) and a simple adposition or a case affix. Languages with simple *and* complex adpositions have a much greater paradigm of *complex* adpositions (less grammaticalized, less frequent, larger paradigm) than of *simple* adpositions (more grammaticalized, more frequent, smaller paradigm).

Here is an example from Japanese, with a complex adposition made up of an adverb with a case ending (*naka-de* ‘inside-LOC’), and genitive marking on the complement (*-no*):

- (14) *Mary wa ie-no naka-de hashit-ta.*  
M. TOP house-GEN inside-LOC run-PRES

‘Mary was running in the house.’

Similar constructions are found e.g. in Romanian, with a noun or adverb + genitive marking on the complement. Thus of Classical Romanian *pren lăuntru de* ‘[by interior of =] through’:

- (15) *mai pre lense iaste cămilei pren lăuntru*  
more more easy be-PRES.3SG camel-GEN by interior

*de urechile acului a trece*  
of ear-PL needle-PL-GEN INF pass  
'It is easier for a camel to go through a needle' (Fagard 2010: 101)

In languages without a case system, the lexical stem is often linked to the complement by a simple adposition marking the genitive, such as *of* in English (*on top of*), *de* in French, Spanish, Portuguese, Provençal and Catalan, *di* in Italian, *von* in German...

In languages with a case system, there are also complex adnominals; they include the combination of case endings, as in Tabasaran (see below, section IV.4):

*nir-i-q (χ) -an-di*  
river-OBL-AT-FROM-VIC  
'From the direction of the river.'

These are interesting because their status can be ambiguous between complex adpositions and complex cases; this is the case namely in Hungarian (Creissels 2006b), namely on account of the stability of the radical stem and case endings. This is true of Permian languages in general, but also of Mari and of Mordve (Moreau 2001: 119); the boundary between affix and adposition is not so clear in Turkic languages either (Libert 2008: 230).

Besides, in Hungarian, the limit between postpositions and cases is also problematic. Moreau (2001:120) thus asks whether *-ig* and *mellett* in the following examples should really be considered different:

(16) *a házig*  
DEF house-up\_to  
'All the way to the house.'

(17) *a ház mellett*  
DEF house next\_to  
'Next to the house.'

Moreau insists on the fact that, though *mellett* is analysable as *mell* 'breast' + locative *-t*, this is not enough to differentiate cases from postpositions, since other 'postpositions' are non-analysable (such as *miatt* 'on account of', *ellen* 'against', *óta* 'since').

### **iii) Adpositional phrases** (highest compositionality)

Adpositional phrases = free constructions with adpositional uses; very low grammaticalization and frequency, and large paradigm.

Simple vs complex, complex vs phrasal = a matter of degree (and a diachronic link, cf. Lehmann 1985), cf. French *à travers* 'through', written as a complex adposition (compare Italian *attraverso*) but used as a simple adposition.

### **c) Polyfunctional morphemes**

Many adpositions (whether simple or complex) are in fact adpositional uses of polyfunctional morphemes. In IE languages, adpositions (as a word class) originate from particles with various uses: adverb / preverb / adposition, and also have these three uses; cf. Rice (1996: 135-136):

Head of prepositional phrase	She hid his letters <i>in</i> a box. They met <i>in</i> 1989. He got the guarantee <i>in</i> writing.
Head of adverbial phrase	This park is so pretty with the trees <i>in</i> bloom.
Adverb/adjunct	Despite the weather, they continued <i>on</i> .
Component of phrasal verb	He was yelled <i>at</i> by his supervisor.
Component of verb particle construction	Can you pick his face <i>out</i> in the crowd?
Verbal prefix	He <i>outran</i> the competition.
Nominal prefix	They've moved to the <i>outskirts</i> of the community.
Predicate	They <i>outed</i> him in the magazine and he sued.

Table 1: various uses of English adpositional morphemes

However, the most frequent case (at least in IE languages) seems to be the use of the same morpheme as an adposition and an adverb, conjunction or preverb, or various combinations thereof. Another point is that ‘recently’ grammaticalized adpositions tend to coexist with a non-grammaticalized variant, or to have ambiguous uses:

#### Italian

(18) *Lungo* (\**lunghetto*)    *la*        *strada*    *che*    *mi*        *porterà*        *lontano*  
 along (/ \*longish)    the.F    road        that    me.A    take.FUT.3SG    far

*penso*                    *alle*                    *lotte*                    *disperate*  
 think.PRES.1SG    at-the.F.PL    struggle.PL    desperate.F.PL

‘Along this road, which will take me far away, I think of the desperate struggles...’ (Milva, *Lungo la strada*)

(19) *Bel*                    *film,*        *un*                    *po'*    *lungo*    / *lunghetto*  
 nice.M.SG    movie    a.M.SG    bit    long    longish

‘A nice movie, a bit long(ish).’ (Internet – both versions)

This explains why the distinction between grammaticalized adpositions and other word classes such as adjectives, nouns or converbs is not always easy to make, as shows Libert (2008: 231) for Turkic languages. Jean-Michel’s examples (18) to (23) in yesterday’s lecture show that the limit between serial verb or converb and adposition is not always very clear either, cf. in particular the case of Thai and Chinese.

### IV.1.3 SYSTEMS OF ADPOSITIONS

#### INVENTORIES

Systems of simple adpositions vary from possibly 0 (Klamath), 1 (Tagalog, Samoan, Burmese, Siamese, Tzeltal, Likpe), just a few (Longgu), a few dozens (Portuguese, cf. Jakubowicz Batoréo 2000: 496, and Romance in general)... to more than 100 (Tiriyó).

No adposition?

DeLancey (2005) claims that Klamath has probably no adposition at all (a comitative marker might be a candidate, but this is far from obvious). Spatial relations are encoded in the verb, in Locative Directive Stems (LDS). For ex. (the LDS is underlined):

(20) *c-eq'ya honk doo wqepl'aqs-dat.*  
 sit-in.doorway DEM over.there summer.house-LOC

‘She sat at the door of the house.’

There are around 120-150 LDS, enough to convey quite specific details about a Figure’s location, motion, and some facets of the Ground. DeLancey argues that given the richness of LDS, adpositions would be vacuous.

Table 2: The case of Klamath.

Some languages have **only one simple adposition**, like Tzeltal (Brown 1994, 2006; Grinevald 2006) Lipke or Tagalog. Of course, in such languages, the only adposition has no specific spatial meaning; instead, it has a generic meaning. For instance, Tzeltal *ta* ‘covers’ the uses of *at*, *in*, *on*, *to*, *into*, *from*, etc.

(21) *ay-∅ ta k'altik.*  
 EXIST-3A PREP cornfield

‘He’s in (the) cornfield.’ (Brown 2006: 238)

[Note that this existential construction (with *ay*) is a marked construction, which occurs in specific contexts: with a new topic, a change of location or a Figure placed either beyond visibility or on the downhill – uphill axis]

Having a generic meaning, this kind of adposition is used alone **only for canonical spatial relations**, just as Tagalog *sa* below:

(22) *na sa silya ang kanya-ng damit.*  
 REAL PREP chair NOM 3sg.OBL-LNK dress

‘Her dress is / was on the chair.’

Noncanonical spatial relations, on the other hand, require a complex prepositional formed with the generic preposition and a spatial noun (or a positional in Tzeltal). For ex. *mula' sa* ‘ORIGIN AT’ = ‘from’, *sa ilalim* ‘AT UNDERNEATH’ = ‘under’, *sa ibabaw* ‘AT TOP’ = ‘on’, *sa harap* ‘AT FRONT’ = ‘in front’, *sa likod* ‘AT BACK’ = ‘behind’ etc.

Another possible feature of generic adpositions is **optionality**: in Likpe, the postposition specifying the part or region of the G where the F is to be searched is omissible if the relation to this part or region is encoded in the verb:

(23) *kópu á-má íáħ lə ɔ-pono (əsiá)*  
 cup AGR-DET be.on.surface LOC CM-table (surface)

‘(lit.) The cup is at (the surface of) the table.’

## BASIC SEMANTIC DISTINCTIONS

Other languages, like the I-E languages, have relatively large inventories: English has around 50 simple ‘transitive’ spatial prepositions, at least around 25 ‘intransitive’ ones, like *downward*, and many compounds; Spanish has around 15 simple spatial prepositions, etc. In theory, such adpositions could mark completely different (and random) spatial relations. However, it seems that this is not the case, and that there is some interlinguistic overlap as to what spatial relations are typically expressed by adpositions. More precisely, there seems to be a small subset of spatial relations which *tend* to be expressed even by a minimal system of adpositions or, when there are simple and complex adpositions, by the subsystem of simple adpositions. What are these ‘minimal’ distinctions and how can we go about identifying them?

In a survey of 9 languages based on material elicited with the TRPS pictures, Levinson et al. (2003) have attempted to identify semantic features that are cross-linguistically recurrent. The languages of the sample were: Basque, Dutch, Ewe, Lao, Lavukaleve, Tiriyo, Trumai, Yéli Dnye, Yukatek.

Recurrent features correspond to clusters of responses, i.e. to scenes that subjects treat alike in the sense that they tend to describe them with the same adposition.

The recurrent clusters are:

ATTACHMENT – ON / OVER (movable, mostly inanimate F, superadjacent with / without contact to a relatively immovable G which has its base at ground level) ON-TOP (F on elevated G, or covering the G) IN (relatively small, moveable F more or less wholly contained in the G object) UNDER / NEAR (small cluster, almost merged with IN; cf. the fact that in Australian languages IN and UNDER are frequently expressed with the same adp.).
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Table 3: Recurrent semantic clusters in Levinson et al. (2003)

Simple adpositions (generic ones being a special case) tend to refer to topologico-functional relations, while more complex adpositions tend to encode intrinsic and relative relations (in other words, if a language has a simple adposition for IN FRONT, e.g. German *vor*, it will also have a simple adposition for AT / IN / ON). Similarly, in Romance languages, simple adpositions are restricted to a series of subtypes, while complex adpositions and adpositional phrases have a wider range of uses; some spatial relations, such as *far from*, *all the way to*, are never expressed by simple adpositions in these languages (Fagard 2010: 271, 284). This is not, however, a universal fact: Modern Lhasa Tibetan has a small set of postpositions, none of them encoding a specific topological relation (the set comprises erg/instr *gis*, locative/dat *la*, genitive *gi*, ablative *nas*, associative *dang*; DeLancey 2005: 188).

According to Levinson et al. (in a study inspired by Berlin & Kay 1969’s work on color terms) the fractioning of basic adpositional categories proceeds along the following scale:



Figure 1: An implication scale for adpositions, in Levinson et al. (2003).



Vandeloise (2010: 175) proposes a different representation of this implication scale:

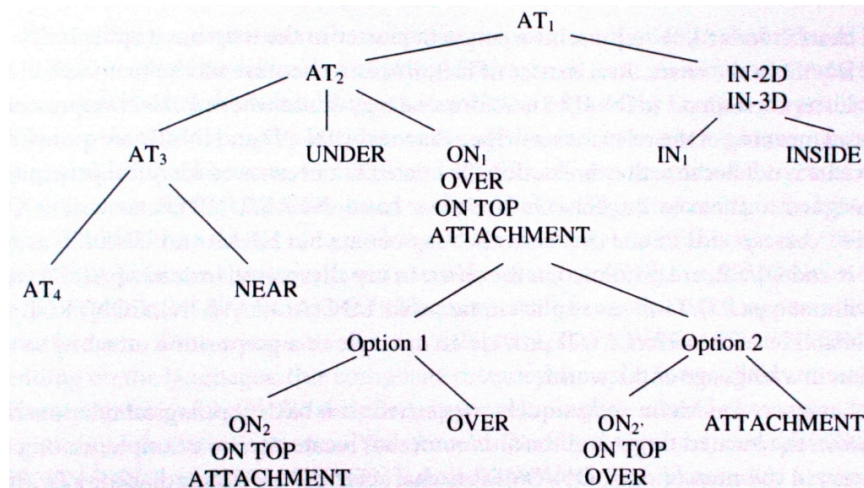


Figure 2: Vandeloise's representation of Levinson et al.'s implication scale.

He also points out that AT, IN, ON, etc. in Levinson et al. are not adpositions, but 'central meanings', and proposes an alternative scale (2010: 179):

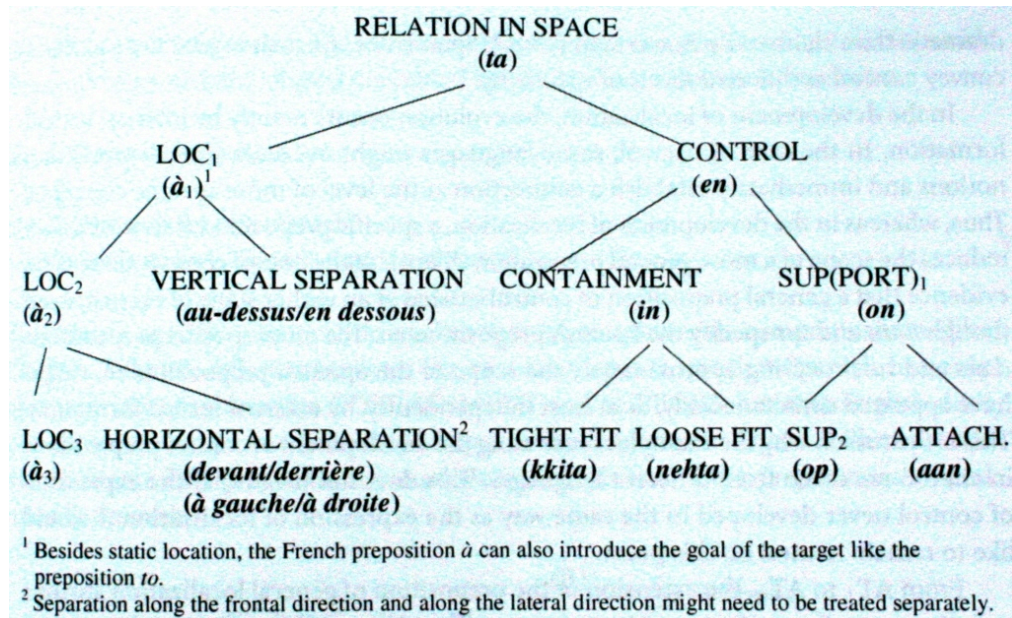


Figure 3: Vandeloise's implication scale for adpositions.

Finally, Vandeloise (2010: 183) emphasizes the fact that Levinson & Meira include *over* in their chart though it is found only in English (in their sample), and 'the pictures illustrating OVER in Levinson and Meira's data might as well be described by *above*.'

The expression of *containment*, *support*, *adhesion* and *attachment* by adpositions is also investigated by Bowerman & Choi's (2001: 485). They show that these relations, all expressed by one adposition in Spanish (*en*), are distributed in English over *on* and *in*, and in Dutch over three distinct prepositions, *in* (containment), *op* (support and adhesion) and *aan* (attachment) (ibid:196):

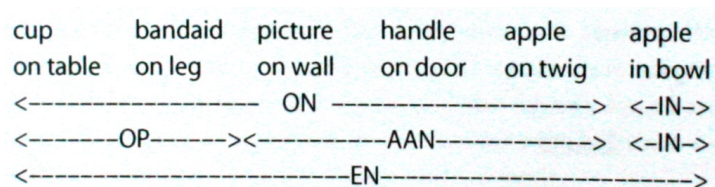


Figure 4: Containment, support, adhesion, attachment in Spanish/Dutch/English (Bowerman & Choi 2001, in Zwarts 2010: 210).

There is thus *partial* overlap between languages. It seems clear that, though there are universal tendencies, ‘languages differ in the number of topological categories they recognize, and in where they draw the boundaries between categories’ (ibid: 182), as illustrated in the following figure:

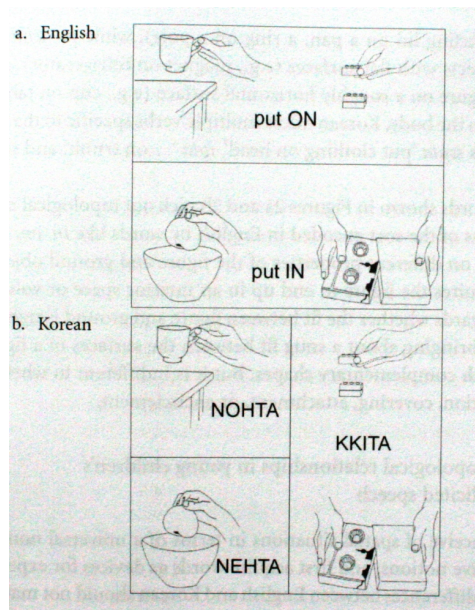


Figure 5: English and Korean semantic distinctions for containment and support (Bowerman 2007:185)

It seems that the most basic distinctions encoded in adpositions generally correspond to relations found in spatial cases too.

However, judging from Hill’s (1996) data on Longgu, this does not hold universally, since Longgu has basically three spatial prepositions, *i* ‘at’, *mi* ‘until’ and *vu* ‘to, towards’:

(24) *mwane e la vu komu*  
 man 3SG go to village

‘The man went to his village.’ (ibid.: 310)

### WHAT ABOUT LANGUAGE ACQUISITION?

Psychologists and psycholinguists have looked at the way children learn to make and verbalize such distinctions. Experiments have shown that, in the acquisition of spatial cognition as well as in the acquisition of language, more or less the same set of distinctions is found very early. They have shown in particular two things:

a) there are universal tendencies, and ‘children acquire spatial prepositions in a regular order (...) they mark containment relations (*in*) and relations involving the vertical axis (first *on/under*, then *above/below*) before they mark relations involving the sagittal axis (first *behind*, then *in front of*)’ (Hickmann 2007: 208).

early-acquired spatial words revolve around relationships of containment (e.g. for English, *in*, *out*), contiguity and support (*on*, *off*), accessibility (*open*, *close*, *under*), verticality (*up*, *down*), and posture changes (*sit*, *stand*, *lie*). Only later come words for proximity (*next to*, *between*, *beside*), and still later

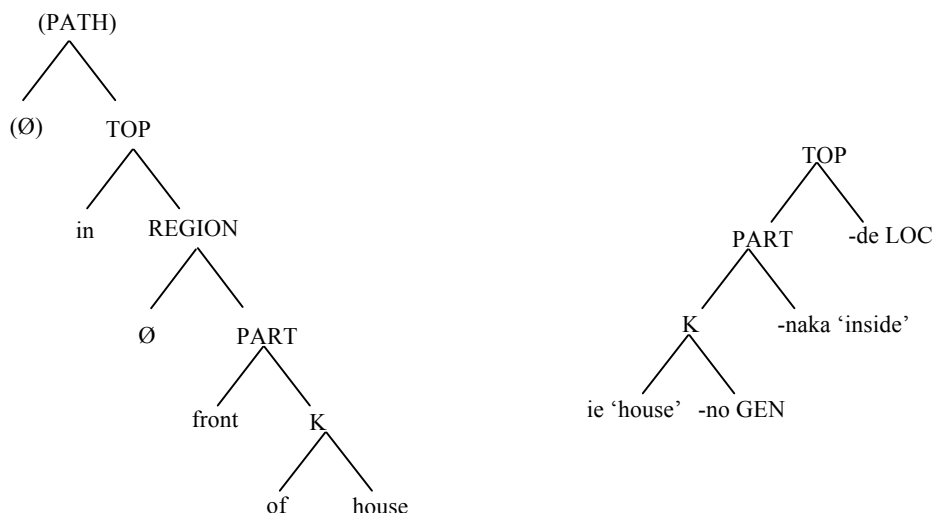
words for projective relationships (*in front of, behind*)' (...) '*in* is learned earlier than *on*, and *on* is learned earlier than *under*. (Bowerman 2007: 180-1)

b) there are also interlinguistic discrepancies; for instance, in Johnston (& Slobin)'s experiments, acquisition was easier in some languages than in others, maybe due to language-specific properties; cf. also Bowerman & Choi's experiments. However, these differences apparently do not affect preverbal infants in their cognitive distinctions: 'infants are sensitive not only to the spatial distinctions that are lexicalized in their native language but also to spatial distinctions that are lexicalized in other non-native languages' (Hespos & Spelke 2007). Further discussion of these issues can be found in the appendix of this part.

## IV.2. SPATIAL ADNOMINAL PHRASES

Paradigms of complex adpositions are much larger, though precise counts are hard to come by on account of their lesser frequency and degree of grammaticalization. For each Romance language, a rough estimation would be in the hundreds. As we said above, their structure is obviously more complex than that of simple adpositions. Not all have spatial meaning (e.g. Romanian *cu excepția* 'with the exception of', *în ipoteza* 'in the hypothesis of', *cu condiția* 'on the condition that', *în raport cu* 'in relation with'...). *Spatial* complex adpositions, or 'spatial adpositional phrases', refer to functional-topological relations (AT, IN, ON, NEAR), to relations with parts of armatures, like *front*, or to directions like *north*.

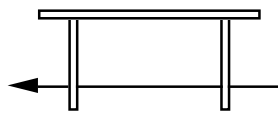
The semantics of simple adpositions are very general – which explains why they can be so polysemic –, and the meaning of a given adposition can be described as restricted to one main feature (with, however, countless pragmatic extensions), such as CONTAINMENT for *in*, SUPPORT for *on*, LOCATION for *at*, and so on. The meaning of adpositional phrases is different, and they can be said to indicate complex spatial relations. Their semantic structure could be reconstructed as illustrated below – with fully expanded structure of spatial phrases (left) and reduced structure (right) (inspired by Roy & Svenonius 2009, modified; K stands for *case*):<sup>1</sup>



*Mary wa ie-no naka-de hashit-ta.*  
 'Mary ran in(side) the house.'

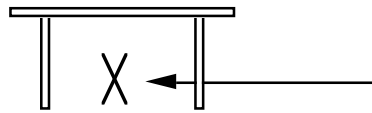
<sup>1</sup> Roy and Svenonius use *Axial Part* where I use *Part* and *Place* where I use *Top(ology)*. This substitution is motivated by the fact that spatial parts are not necessarily based on axes, and by the vagueness of the term *Place*. I have added the *Path* and *Region* nodes.

1. *To* is an example of an overt path preposition: *he walked to the front*. Jackendoff (1983) argues that path specifying ‘operators’ (a kind of conceptual primitives) boil down to FROM, AWAY FROM, VIA, TOWARD, TO and thus constitute a finite set. These operators represent trajectories on a conceptual level, they have scope over the region / part specifying markers, and map ambiguous surface sentences to their interpretations. For ex., for *The ball went under the table* (1983: 164-6):



Under (1)

[Path VIA([Place UNDER([Thing TABLE])))]



Under (2)

[Path TO([Place UNDER([Thing TABLE])))]

[VIA] is a concept, ([Y]) is an argument of a function and [Thing] is an ontological class.

Are topological / directional static relations always in the scope of path relations? In Jaminjung, specific spatial relations are encoded in ‘floating’ coverbs, and indications of source / location / goal are attached to the G nominal (Schultze-Berndt 2000: 425):

(25) *nindu biligirri-wari walthub ga-yu yard-gi.*  
 horse white-QUAL inside 3S-BE.PRS yard-LOC

‘A white horse is inside the yard.’

(26) *dibard ga-w-ijga walthub langiny-bina.*  
 jump 3sg-FUT-GO inside wood-ALL

‘It will jump into the trees.’ (frog in Frog Story)

2. In languages with a generic adposition that covers all topological relations, regions are specified by spatial nouns (ON = ‘at upper surface’; cf. Tagalog, Samoan, Burmese, Siamese, Tzeltal, Likpe). In Ewe (Ameka 1995: 171), the topological relation of (approximate) coincidence is encoded in a spatial verb *le* ‘be.at’ while the specifics of the relation are expressed in a spatial noun. Thus, the TOP node is missing from the AP:

(27) *fóto lá le gli lá nù.*  
 picture DEF be.at wall DEF side

‘The picture is at the side [surface] of the wall’ = ‘The picture is on the wall.’

By analogy with these languages, another possibility would be to say that there is only one topological relation, AT. ‘In front of’ would correspond to ‘at the inside part of a region extending from the front part of an object’. In effect, TOP would reduce to the coincidence relation (‘at’) and in would be further decomposed in ‘AT IN’. This would make allowance for the fact that English configures the front region like a bounded part (hence *in front*) while Japanese merely indicates coincidence with the region (*mae-ni* ‘at the front’, or ‘to the front’ with a directional verb).

Alternatively, we might regard AT, IN, ON as topological primitives (perhaps corresponding to prototypical coincidence, containment and support) for languages that rely on these relations. I will leave this question open.

3. REGION stands for the space projected from an inherent or relatively or absolutely construed part or direction (Cf. Svorou). Not all languages extend parts to regions (for ex. Taba does not: a term for an intrinsic part cannot be used to locate an object in the vicinity of this part but necessarily refers to a contact between the Figure and the Ground part; Bowden 1997: 258-9). There might be languages in which REGION is systematically marked by a special morpheme. The REGION node makes a provision for this possibility.

REGION is sometimes marked as different from PART in Tagalog: *paa* ‘foot’ vs *paanan* ‘foot.LOC’.

(28) *matarik ang paa ng bundok.*  
 steep NOM foot GEN mountain

‘The foot of the mountain is steep.’

(29) \**matarik ang paanan ng bundok.*  
 abrupt NOM pied.LOC GEN montagne

‘The (region around the) foot of the mountain is steep.’

This variation is unsystematic. Cf. *harap / harap-an* ‘front / front-LOC’. Little difference (both designate regions) though *harapan* is favored in case of a face-to-face relation and excluded when the extensive region defined by the frontal part is irrelevant (cf. (33), where only relative order matters).

(30) *na sa harap ng silya siya.* [*harapan* is possible too, but *harap* is preferred]  
 REAL PREP front GEN chair 3SG.NOM

‘S/he is in front of the chair.’

(31) *um-alis ka sa harap-an ko!* [*harapan* favored]  
 SAV-leave 2SG.NOM PREP front-LOC 1SG.GEN

[lit.] ‘Leave from my front’, ‘get out of my sight!’.

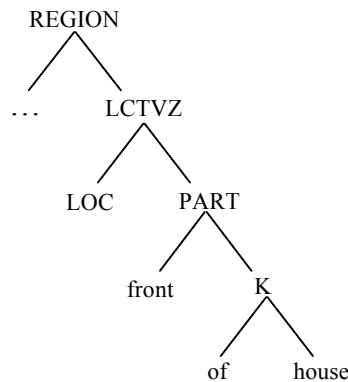
(32) *mananalo siya kasi na*  
 CAV.PROSP.win. 3SG.NOM because REAL

(33) *sa harap/\*harapan siya.*  
 PREP front 3SG.NOM

‘S/he will win because s/he is in front.’

4. In a number of languages, a part which functions as a spatial noun must be ‘locativized’ (receive a locative marker), as Heine (1989: 103-4) remarks for Bantu languages, in which “locativizers” are commonly found, in the form of locative class prefixes or locative suffixes. For ex., Swahili *mbele* ‘front’ is formed from the locative class prefix *mu-* + *\*-bele* ‘breast’.

The structure above could be expanded further to account for this marking:



5. Some features are deleted: REGION for *in* or *on*, for ex. *the ring in the box*, *the cup on the table*, where a Figure is located with respect to a part, not to a region extending from it; PATH for static situations which are non dynamically construed (for ex. static: *the cathedral is in the heart of the old town* ≠ dynamic: *the cathedral rises above the old town*).

6. In some languages, K varies with the ontology of the nominal's referent. Basque distinguishes a locative genitive from a possessive genitive. A spatial meronym takes a locative genitive when the part it refers to is possessed (Aurnague 1996):

(34) ?? *mahaiko zangoa.*  
 table.GEN.LOC leg  
 'The leg of the table.'

(35) *maihairen zangoa.*  
 table.GEN leg  
 'The leg of the table.'

(36) *mahaiaren aitzineko zangoa.*  
 table.GEN front.GEN.LOC leg  
 'The leg of the front of the table.'

(Some languages locativize an argument when it refers to a place rather than to a 'thing'; cf. Zulu: *ngaya endlini* 'I went to the house' and *ngaphuma endlini* 'I left the house' where *endlini* is house.LOC; Taylor 1996; there might be languages which systematically locativize the nominal under K in locational phrases).

7. Some features are left unexpressed (∅).

There are also *conflations* when features are coexpressed in the same lexical item. A coexpressed and optional feature is in parentheses, for ex. (PATH) in *in front of*, which may be used statically and dynamically (*The dog is in front of the camera / the dog went / ran in front of the camera*).

REGION + PART: *front* (REGION: *in front of*; PART: *sit at the front* ≠ French, respectively *devant / avant*)

TOP + REGION: *devant* (*il est devant la maison*)

PATH + TOP + PART: *into* (*he walked into the house*)

PATH + K: *ACC* (*eine Reise in die Schweiz*)

PATH + TOP: *to*

Conflations with V: BE + TOP: locative verbs (Ewe *le* ‘be.at.PRES’ and *nɔ* ‘be.at.NPRES’; cannot be elided in a BLC, implies that TOP is obligatory ap. Ameka & Essegbey 2006: 372)

MOVE + PATH + TOP: Swahili *enda* (*ni-li-enda Lyon* ‘1SG.PRES.go L.’ i.e. ‘I went to Lyon’)

8. Different analyses are sometimes possible. E.g. for French *devant*: (1) *devant* conflates TOP + REGION + PART, and PATH is contributed by the verb (*il est / est allé devant la maison*); or (2) French *devant* has two versions, static *devant* which conflates TOP + REGION + PART, and dynamic *devant* which conflates PATH + TOP + REGION + PART; or (3) *devant* conflates PATH + TOP + REGION + PART and PATH is deleted in static contexts.

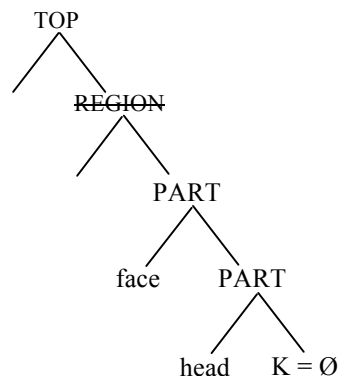
9. Several parts can be concatenated:

*I climb onto the top of the couch, above the cushions, on top of the back of the couch.*

Zapotec (MacLaury 1989: 143)

(37) *b-zaby-ma gik lo yag.*  
 CMP-fly-3=animal head face tree

‘The bird flew to the treetop’ [‘head tree’ would be ambiguous between ‘over the tree’ or ‘to the treetop’; face = AT surface, head = top (REGION or PART)]



Regions can be concatenated: *use the quarter-pipe on the back of the left of the house.*

10. K may be  $\emptyset$ , as is the case in Arrernte and Trumai. However, in both languages, K is realized as ABL when the F is removed from the G (that is, is located in a region extending from the part, and is not in contact with this part; Wilkins 2006, Guirardello-Damian 2007).

Arrernte (Wilkins 2006: 33)

(38) *panikane- $\emptyset$  tipwele akertne-le (ane-me).*  
cup-NOM table up/top-LOC (sit-npp)

‘The cup is on top of the table.’ [the G has no overt K]

(39) *alkngenthe- $\emptyset$  tipwele-nge akertne-le.*  
light-NOM table-ABL up/top-LOC

‘The lamp is above the table.’

(11) a frequent alternative to PART OF GROUND (an instance of PART K GROUND) is ITS-PART GROUND (for ex. in Tzeltal ‘at its-head mountain’ = ‘on the top of the mountain’).

### IV.3. THE SEMANTICS OF ADPOSITIONS: “TOPOLOGICAL” AND FUNCTIONAL FEATURES

Up to this point, ‘spatial’ adpositions have been envisaged as morphemes whose semantic import is essentially ‘spatial’, where ‘spatial’ means related to topology, geometry and direction. But the semantics of adpositions is more complex than that. In fact, the spatial nature of adpositions is often questioned (see e.g. Cadiot & Visetti 2001) and, as we will see in this section, adpositions with spatial meanings are never purely topological (Vandeloise 1986).

This is probably true of all spatial elements in language, and ‘linguistic space’ can hardly be said to be geometric; it is actually true of the conception of space by human beings in general: ‘Perceptive space is originally topological and only very much later metric.’ (López García 1980: 82; cf. also Cifuentes Honrubia 1989: 31-36, Miller & Johnson-Laird 1976, Wunderlich 1982, etc.)<sup>2</sup>.

Piaget described *proximity*, *separation*, *order* (or *succession*), *enclosure* (or *surrounding*), and *continuity* (in that order, cf. Piaget & Inhelder 1956: 5-8) as the main topological relations which children learn to distinguish in their natural development; these relations are quite close to the ‘basic’ semantic distinctions of adpositions we saw above: ‘Our study of drawing and haptic perception showed that the simplest topological relationships such as proximity and separation are also the first to emerge in the course of psychological development’ (Ibid: 80).

#### ARE TOPOLOGICAL NOTIONS SUFFICIENT TO DEFINE THE CORE MEANING OF TOPOLOGICAL ADPOSITIONS?

Studies on prepositions anterior to the 80s generally define *at* / *in* / *on* in purely topological or geometrical terms. For ex. Miller & Johnson-Laird (1976: 385):

IN(x, y): A referent x is ‘in’ a relatum y if:

<sup>2</sup> Cf. also “Space seems to be an ametric formal structure which we project onto the world, or which is imposed on us by the world through experience, or both things at a time.” (López García 1980: 92); “Space is not an empirical concept we extract from external experiences but an *a priori* representation in which we base all our external intuitions.” (Cifuentes Honrubia 1989: 31, about Derviller-Bastuji 1982).



[PART(x, z) & INCL(z, y)]

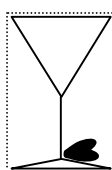
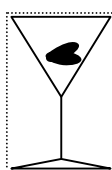
The provision PART(x, z) makes allowance for the fact that for *in* to apply the F x need not be entirely contained in the G y (only a *part* of x must be contained in the G). Cf. *a spoon in the cup* or *a club in the hand*. Miller & Johnson-Laird remark that their ‘schema’ leaves uncertain how much of the referent must be inside the G, but they do not attempt to formulate further constraints on *in*.

How is inclusion to be defined? Vandeloise (1986: 47) argues that a strictly topological definition of inclusion is inappropriate. For ex.

*La mouche est dans le verre.*

‘The fly is in the glass.’

Assuming that inclusion means *convex hull*, *the fly is in the glass* correctly describes scenes 1 and 2. Note that restricting the convex hull to the containing part of the ground would not work either for *dans / in* (see scene 3), though it would for *à l’intérieur de / inside* (full containment).



(40) ‘The fly is in the glass.’      (41) # ‘The fly is in the glass.’      (42) ‘There are flowers in the vase.’

For Vandeloise (1986), the crucial feature of *dans* is CONTROL: contained objects are not necessarily completely included in their container but their motion is typically controlled by the container.

Although the same kind of topological relation obtains in both situations below, *in* is acceptable only in the first case. According to Vandeloise, (1986, 2005: 223), *\*a bottle in a cap* is unacceptable because the cap, unlike the socket for the bulb, does not control the figure’s location.



- ( ) *A bulb in a socket.*
- ( ) *\*A bottle in a cap.*

Similarly, Evans (2010b: 232sq.) defines English *in* as denoting [ENCLOSURE], i.e. ‘containment’ + [LOCATION WITH SURETY] (using the same examples).

**Other constructions are problematic for topological definitions:**

- non-prototypical spatial uses:
  - o There are flies *on* the ceiling, Dutch *De vlieg zit op de mur / op het plafond* ‘the fly is (lit. sits) on the wall / the ceiling’ (Zwaarts 2010: 207),
  - o I splattered paint *on* the wall.
  - o He loves to have art *on* his walls.
- ‘functional’ spatial uses, in which the spatial meaning is simply backgrounded, while a given functional (or notional) feature is foregrounded:
  - o I learned that *in/at* school.
- and of course the many non-spatial uses of spatial adpositions:
  - o temporal: *in* the room / *in* Summer

- o notional: *unter* anderen; Das Kind stellte Fragen *über* Fragen (Bellavia 1996)

Vandeloise argues that, in ‘functional’ uses, *on* is valid because of a semantic feature including the notion of ‘support’. This type of definition is not only valid for *in*, *on*, *at* (i.e. ‘basic’ adpositions): prepositions like French *contre* are also clearly highly functional, with very important force / tension factors, as in the following example:

(43) *Il lutte toute la nuit contre les assauts*  
he fight.PRES.3SG all.F the.F night against the.PL assaults

*des vagues*  
of-the.PL wave.PL

‘He fought all night long against the breaking waves.’ (Borillo 2007: 54).

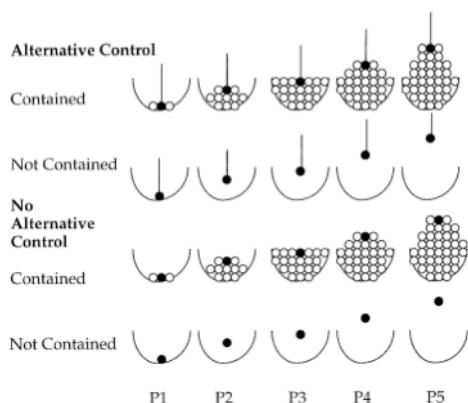
Besides, such functional definitions seem valid cross-linguistically, cf. Jakubowicz Batoréo (2000: 500 sqq.) on ‘basic topological Portuguese prepositions’ defined in functional terms, for instance *em* ‘in, on’ as a marker of generic localization, for relations of inclusion and superiority with support.

### Some experimental evidence on the cognitive relevance of functional features:

Vandeloise (1991, 1994) proposes three sets of description for *in*:

- geometric (3-d, inclusion)
- topological (2-d, inclusion) *the cow is in the meadow*
- functional (containment) *he has an umbrella in his hand*

He claims that only the functional description is valid. Experiments by Garrod et al. (1999) confirm the importance of functional elements, and show that speakers’ judgments on the acceptability of *in* / *on* rely on functional features of the situations described.



“Alternative Control” refers to the condition in which the bowl is not only the only potential controller of the black ball’s position.

When the black ball was below the rim, subjects were indifferent to the presence of an alternative control (they found it appropriate, whether the black ball was attached to a wire or not). When the black ball was at rim level or above, subjects were far less confident that it was appropriate (but more so when the black ball was in the “contained” condition).

> the use of *in* reflects an interplay of topological and functional factors

When the G has no controlling function, topology is the dominant factor (*a bird in a cloud*).

Similarly, objects that satisfy the topological conditions on the *on* relation (contiguity with a surface facing up) but with the F having an alternative controller (for ex. hanging from the ceiling with the base lying on a table) are far less likely to be described with *on* (Coventry & Garrod 2005).

Similarly, *between* is judged more felicitous when the F has a potential blocking effect and no other object has the same effect (no ‘alternative control’; Coventry & Garrod 2005).



*The ball is between the blocks.*

The importance of control is also attested in non-linguistic experiments, cf. the fact that we perceive a tool as part of our body only if we are using it or going to use it.

### **The differential relevance of functional features: other prepositions**

In English, all prepositions do not appeal to functional features to an equal degree. Intrinsic prepositions like *in front of* / *behind* are expected to rely more heavily on functional features than absolute ones like *above* / *below*, for the reason that in a number of cases the intrinsic front and back of an entity are determined by its potential interactions. In fact, subjects are more likely to use *in front* when an interaction is involved than when it is not (for ex. when shown a picture of a mailman facing a mailbox and having free access vs the same picture but with the mailbox blocked from the mailman’s view; Carlson-Radvansky & Radvansky 1996)). Similarly, functional features are more relevant for *over* / *under* than for *above* / *below*: subjects’ ratings of *the man under the umbrella* are high if on a picture the umbrella fulfills its protecting function, even if it is not vertically aligned with the F, whereas vertical alignment is more decisive for *below* (Coventry et al. 2001). *John is under the ball* strongly suggests that John is in a position to catch the ball, while *John is below the ball* is not as compelling.

Similarly, English *into* ‘brings together (...) the spatial domain and the force-dynamic domain, each of which comes with its own intricate system of concepts and relations’ (Zwarts 2010: 193).

Other prepositions are more topological, as *à* ‘at’ which Vandeloise (2010) associates with *localization*.

Other experiments investigate the centrality of spatial meanings for ‘spatial’ adpositions, cf Svorou (1996):

- simple production task: *in* → 60% spatial sentences, *at* and *on* 57%, other produced sentences = temporal (7 to 21 %), abstract (16 to 33%) and phrasal verbs (for *at* and *on*, 6 to 9%).
- ‘virtual’ card-sorting task with 50 sentences of spatial, abstract and temporal *in/on/at* (either more spatial, more abstract or mixed) → more groups are made in the abstract condition, i.e. subjects have more difficulty making groups of abstract sentences than groups of spatial sentences.
- the author concludes (p. 159) ‘The findings suggest that there are indeed prototypical semantic values for the English prepositions *at*, *on*, and *in*, which are definitely spatial in meaning’ (with temporal meanings just as salient and equally concrete and independent, however).

Or Teixeira (2004):

- experiment with cat and mouse drawings, which also shows the importance of non-topological features, such as visibility, for adpositions such as *behind*: non-visibility triggers *atrás* instead of *ao lado* in the sentence

(44) *O rato escondeu-se do gato \_\_\_\_\_ do móvel*  
 the mouse hide.PST.3SG-REFL of-ART cat \_\_\_\_\_ of-ART furniture

‘The mouse hid from the cat \_\_\_\_\_ the furniture.’  
(Teixeira 2004:102)

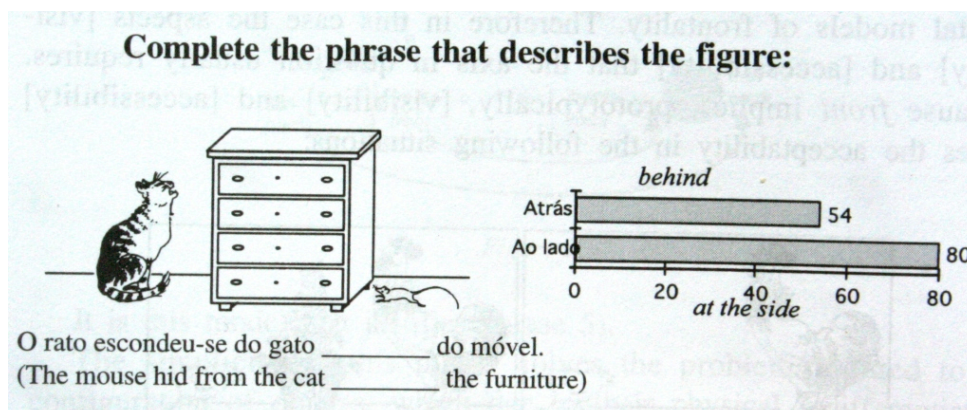


Figure 6: Sample of Teixeira's stimuli (2004:102)

#### IV.4. SPATIAL CASES

Creissels (2007) proposes a threefold classification of case systems: **unidimensional** (based on dynamicity), **bidimensional** (combining dynamicity with “topological” relations), **tridimensional** (where the dimension of “orientation” or “vicinity” combines with the preceding dimensions). This classification draws its inspiration from Hjelmlev (1935-7), though it is not identical with it.<sup>3</sup>

Creissels (2007) observes that spatial cases are sometimes omissible :

“Geographical names often have a ‘lighter’ spatial marking than most other nouns and tend to be more conservative in evolutions affecting the expression of spatial relations. This is quite obviously the consequence of their predisposition to represent the reference point in a spatial relation, and of the frequency of their use as spatial complements or adjuncts. In Latin, the nouns that maintained spatial uses of prepositionless ablative and prepositionless accusative were mainly town names. In Tswana, names of towns or countries have no locative form, and occur in the absolute form in contexts in which, with very few exceptions, other nouns must take the locative form. In Hungarian, some town names maintain an ancient locative ending *-ett/ött/ott* that has been eliminated from regular noun inflection.” Cf. English *go home* and Brit. English *go hospital*.

##### Unidimensional systems

Unidimensional spatial case systems tend to be organized according to a threefold distinction :

between location, destination of movement, and source of movement (i.e. locative, allative, ablative).

Ex. : Basque (cases attached to spatial nouns ; Creissels 2007) :

<sup>3</sup> The first dimension of contrast is for Hjelmlev that of *direction*. The second dimension pertains to the “intimacy” of the locative relationship (i.e. *in* vs *on*, *on* vs *above*), or, in Hjelmlev's words, to the *coherence / incoherence* of the relation which associates two entities. Finally, the third dimension involves an opposition between subjectively construed relations and objective ones (depending on whether a situation is conceptualized in a relative frame or not).

	<i>gain</i> ‘top’	<i>azpi</i> ‘bottom’	<i>ondo</i> ‘side’
<b>location</b>	<i>gain-ean</i>	<i>azpi-an</i>	<i>ondo-an</i>
<b>goal</b>	<i>gain-era</i>	<i>azpi-ra</i>	<i>ondo-ra</i>
<b>source</b>	<i>gain-etik</i>	<i>azpi-tik</i>	<i>ondo-tik</i>

### Bidimensional systems

Bidimensional spatial case systems combine an indication on relative orientation with a distinction of the type locative / allative / ablative (or essive / lative / elative). The indication on relative orientation carried by spatial cases is most of the time limited to three basic configurations that can be symbolized as IN, ON, and AT : Hungarian :

	IN	ON	AT
location	<i>-ban/ben</i> (inessive)	<i>-(o/e/ö)n</i> (superessive)	<i>-nál/nél</i> (adessive)
goal	<i>-ba/be</i> (illative)	<i>-ra/re</i> (sublative)	<i>-hoz/hez/höz</i> (allative)
source	<i>-ból/ből</i> (elative)	<i>-ról/ről</i> (delative)	<i>-től/től</i> (ablative)

Creissels notes that such systems may result from earlier stages in which spatial nouns are inflected for spatial cases encoding location / source / goal. In Hungarian, the complex postposition *mell-öl* ‘from beside’ is recognizable as appending a spatial case SOURCE to a morpheme *mell* that was once a spatial noun (cognate with *mell* ‘chest’).

### Tridimensional systems

Tabasaran (Comrie & Polinsky 1998) has a complex system of spatial cases which combines three dimensions : (1) topology / orientation (AT, IN, ON, BEHIND, NEAR...); (2) direction (FROM, TO) ; (3) vicinity (toWARD, fromWARD...; with AT, the resulting meaning is ALONG).

Tabasaran morphemes of spatial orientation	
‘in (hollow space)’	-ʔ
‘on (horizontal)’	-ʔin
‘behind’	-q
‘under’	-kk
‘at’	-χ <sup>y</sup>
‘near, in front of’	-h
‘among’	-ʏ <sup>y</sup>
‘on (vertical)’	-k

All of these suffixes are attached to the oblique form in *-i*, for ex. *cal-i-q* ‘behind the wall’.<sup>4</sup>

The direction encoding morphemes are *-na* (allative) and *-an* (ablative). They follow the orientation

<sup>4</sup> Comrie and Polinsky gloss *-i* as ergative. A. Rostovtsev-Popiel (p.c.) has pointed out to us that this would better be described as an oblique.

suffixes, for ex. *cal-i-q-na* ‘to behind the wall’. The suffix *-di* locates a F in the vicinity of the search domain determined by the orientation and direction suffixes. It is postposed to the latter. For ex. *nir-i-q (χ) -ri (di)* ‘river-OBL-AT-VIC’ i.e. ‘along the (bank) of the river’ ; *nir-i-q (χ) -an-di* ‘river-OBL-AT-FROM-VIC’ i.e. ‘from the direction of the river’. Finally, the dative may also function like an allative, for inst. *xula-z* ‘(to) home’, *xula-z-di* ‘homewards’ (Comrie & Polinsky 1998 : 110).

Tsez (North Caucasian too) is another illustration of a 3-dimensional system. The three dimensions of spatial cases in Tsez involve orientation, direction (as in Tabasaran) and distality (Comrie & Polinsky 1998).

Parameters of variation :

- “grammatical” cases may encroach on the domain of spatial cases (cf. the dative of .
- many languages combine cases and adpositions.
- not all combinations may be attested, there may be default case forms and forms of different levels of genericity (with more specific marking used in contexts that pragmatically require them, or with specific nouns etc.). For ex., in Avar a series of cases (glossed as encoding ON + location / directions) tends to function as the default local cases.
- some languages have cases encoding rather uncommon features : posture (in Páez: *-te* ‘standing’, *-ka* ‘lying’, *-khe* ‘hanging’, *-su* ‘leaning’). Terminative or “Goal Allative” (‘up to, as far as’) in Basque (ALL *-ra* + TERM *-ino* (SG) > *-raino* ; for a presentation of Basque local cases, cf. Ibarretxe-Antuñano 2001).

## CONCLUSION

There is evidence that functional features do play a role in the semantics of prepositions, even though some cognitive linguists maintain that spatial uses in themselves are at the core of their meaning (e.g. Langacker 2010). Data from acquisition suggest that containment and support underlie the initial understanding of *in / on* (though they do not seem to be universal prelinguistic notions; more on this in ‘What is universal?’).

To sum up, spatial features which enter into the semantics of adpositions can be classified into (Herskovits 1986: 55):

- (1) Topological: coincidence, contiguity, enclosure, order (between), boundedness.
- (2) Geometrical: straight, plane, cross-axis (across), alignment (above), orthogonality.
- (3) Projective: directions projected from an entity (intrinsic frames) or mapped from to an entity from another (relative frame).
- (4) Functional: support, containment etc.
- (5) Distance: deixis (here / there).

Of course, this is true also of other word-classes referring to space. For instance, Serra Borneto (1996) shows that functional features such as control play a role in the use of *stehen* vs *liegen* in German, cf.

(45)	<i>Die</i>	<i>Apfelsine</i>	<i>liegt</i>	(* <i>steht</i> )	<i>auf</i>	<i>dem</i>	<i>Tisch</i>
	the.F	orange	lie.PRES.3SG	(stand.PRES.3SG)	on	the.M.D	table

‘The orange is on the table.’

(46) *Der Ball liegt (\*steht) auf dem Boden.*  
the.F ball lie.PRES.3SG (stand.PRES.3SG) on the.M.D floor  
'The ball is on the floor.'

(47) *Die Sonne steht (\*liegt) hoch am Himmel.*  
the.F sun lie.PRES.3SG (stand.PRES.3SG) high at-the.M.D sky  
'The sun is high in the sky.'

(48) *Die Sonne steht (\*liegt) schon sehr niedrig/tief.*  
the.F sun lie.PRES.3SG (stand.PRES.3SG) already very low/deep  
'The sun is already very low.'

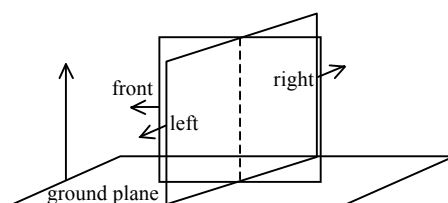
**PART IV**  
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**APPENDIX**

**5. ARE THERE UNIVERSAL SPATIAL MEANINGS ?**

**IV.5.1. CLARK (1973)**

Perceptual space imposes constraints on linguistic space.

The perceptual space consists of 3 “vectorized” reference planes (gravity determines the ground level, the L/R asymmetry of the human body determines the L/R plane and the vertical front/back, based on an symmetry in the perceptual apparatus of man and the forward direction of motion; Clark follows Kant 1968 [1768]).



Linguistic space reflects the fact that reference planes are “vectorized” (e.g. *high* is positive and unmarked, *low* is negative and marked, *tall / high* distinguish extension vs position, *deep* does not, *wide / thick* cannot be applied unless *long / tall* are already assigned etc., i.e. markedness patterns follow the directionality of perceptual space). This vectorization of linguistic space is also apparent from expressions such as *high off (\*to) the ground* or *at a great distance from (\*to) here*: distances and extensions are metaphorically represented as movements toward the positive perceptual field.

Distinguishes “neutral” prepositions (*at, in, on*) from “relational prepositions” (*above, below, ahead, behind...*), which specify a direction from the point of reference (= Ground) in which the object is located. Relational prepositions make reference to “intrinsic properties of the reference object” (top, bottom, front, back) derived either from the canonical position of an object along an axis (top, bottom) or via more complex criteria (front, back).

(Re)introduces the time-as-space metaphor (which is in fact a cover term for two distinct images : the moving time and the moving ego metaphors).

Acquisition should mirror the increasing complexity of spatial markers and the metaphorization process, i.e. *ceteris paribus*, the order of acquisition should be *at / in / on* > *front / back...* > *temporal relations*.

**Problems : Frames of reference** : Levinson et al. have demonstrated that egocentricity did not play the major role that Clark assigned to it.

**“Neutral” vs “relational” prepositions** : there does seem to be a widespread distinction betw. topological vs intrinsic / relative relations (cases do not encode intrinsic / relative relations, languages with reduced inventories of adpositions retain topological distinctions).

**Dimensional adjectives** : we lack cross-linguistic data.

**Acquisition** : Initially, the universalist claims of Clark (i.e. the idea that children map spatial words onto pre-established spatial concepts) were buttressed by research on the acquisition of spatial adpositions. Many studies found that the course of acquisition of spatial adpositions matched the evolution of spatial concepts as it had been described by Piaget (Piaget & Inhelder 1956) :

Spatial concepts : topological-functional<sup>5</sup> (containment, support and contiguity), proximity > projective relations > Euclidean notions (metrics).

<sup>5</sup> Vandeloise (1986, and other authors) have pointed out that *in*, French *dans* etc. cannot be given a strictly topological definition and that the meaning of *in* involves the notion of control of the Figure’s position by the Ground. Functional notions



Spatial adpositions : IN, ON > BESIDE / BETWEEN > BACK<sub>INT</sub>, BEHIND<sub>INT</sub>, FRONT<sub>INT</sub> > FRONT<sub>REL</sub>, BACK<sub>REL</sub>, BEHIND<sub>REL</sub> (Johnston & Slobin 1979, Johnston 1988, who lists 19 converging studies) [note that AT is absent].

Another piece of evidence came from a study by E.V. Clark (1973), in which children were instructed to place objects *in*, *on* or *under* other objects. Regardless of the preposition, the youngest children tended to put X *in* Y, if Y afforded containment (e.g. a crib or a pickup truck), or were inclined to put X *on* Y, if Y had a supporting surface ; they consistently failed for *under*. Clark concluded that *in* and *on* were first to be acquired because they coincided with nonlinguistic spatial strategies.

The importance of topological notions, esp. of IN / ON receives further support from the observation that IN / ON (besides AT, UNDER and ATTACHMENT) are recurrent, perhaps basic semantic categories of adnominal systems, even in non I-E languages (Levinson, Meira et al; 2003). See above, section IV.1.3., p. 8.

#### IV.5.2. ARE CONTAINMENT AND SUPPORT ETHNOCENTRIST ILLUSIONS?

However, focusing on adnominal systems leads to underestimate linguistic variation. This was pointed out by Bowerman in comparative studies on the acquisition of English and Korean (Bowerman 1996, Bowerman & Choi 2001, Bowerman 2007). In Korean, topological spatial relations are expressed in verbs and categorized quite differently from English. First, Korean makes a broad distinction between caused and spontaneous motion. Second, situations involving caused motion and corresponding to IN / ON relations are classified along the following parameters :

*Kkita* : fit tightly (ring on finger, cap on pen etc.).

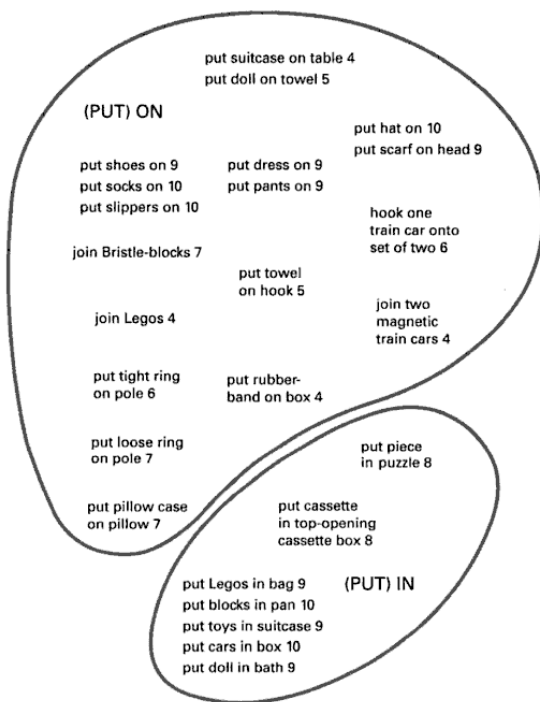
*Nehta* : put loosely in or around (book in bag, apple in bowl).

*Nohta* : put on horizontal surface (cup on table).

*Ssuta / Ipta / Sinta*: put clothing resp. on head / trunk / feet.

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like ‘control’, ‘support’ and ‘protection’ have been shown to influence subjects’decisions about the acceptability of *in*, *on*, *over*, *under* (cf. the experiments by Coventry, Garrod and Carlson-Radvansky).



a. English



b. Korean

Children's categorization of some spatial situations in English and Korean  
 (Bowerman & Choi 2001 : 492-3)

Korean children follow the groupings set up by the spatial categories of their own language and there is no stage at which they would appear to be biased toward supposedly universal IN / ON relations. Conversely, English children, from the beginning, adhere to the discriminations made by their own language (essentially related to containment and support). Further, “spontaneous speech data suggest that language-specific learning takes gets under way by at least the second half of the second year of life” (Bowerman & Choi 2001 : 490) and that infants who do not yet produce the target words seem to group together situations that their language treats alike (Choi et al. 1999, in a preferential looking study).

Patterns of overgeneralization confirm the language specificity of children's production / comprehension : For ex., English speaking children overgeneralize *open* to *separating*, *spreading sth out*, *unscrewing sth*, *pulling sth out*, *taking off sth*, *turning sth on* etc., but Korean children do not (Bowerman & Choi 2001 ; Bowerman 2007). In fact, Korean lacks a word with a meaning as broad as *open*, which may explain why Korean children do not overgeneralize any of the narrower range terms to the same extent as English children do with *open*.

#### IV.5.3. SO, WHAT IS UNIVERSAL?

Topological relations come first in speech and comprehension, “projective” relations are mastered later, and this sequence is presumably determined by cognitive maturation.

Regarding finer language-specific discriminations, there are three possible hyp. :

- (1) some categories are prelinguistically available (cognitively determined), other ones are not and must be constructed.
- (2) all categories are prelinguistically available, and the job of infants is to select those that are relevant in their own language.
- (3) all categories are constructed.

Against (2) and (3) : containment / support might be prelinguistically available, but the tight / loose fit distinction appears to be different : 10-month old infants (learning English) do not seem to perceive a situation of tight fit as different from a situation of loose fit when both involve containment or support (looking-time procedure with habituation ; cf. Casasola & Cohen 2002), i.e. they are apparently not sensitive to the tight / loose fit distinction. On the other hand, children can learn to associate tight fit with a word in a very short time, merely by being provided a label in the right syntactic frame ('put the doggie *keet*' after having heard the word *keet* in the context of tight fit situations ; Casasola et al. 2006; Bowerman 2007 for discussion).

Therefore, hyp. (1) would be the correct option : there are prelinguistically available concepts, and children learn how to circumscribe their range of application; other concepts and distinctions are constructed. Perhaps some relations are prelinguistically available (for ex. 'movable, mostly inanimate F, superadjacent with / without contact to a relatively immovable G', cf. Korean *nohta*) and in some cases “dismembered” and partly superseded by language-specific and non prelinguistically available categories (as in Korean).

#### IV.5.4. TALMY : *HOW LANGUAGE STRUCTURES SPACE* (1983)

Talmy's universals revolve around two central ideas :

- (1) spatial markers are expected to ascribe a limited range of spatial properties to F and G, and to treat F and G differently in this respect ;
- (2) a punctual F in motion, a linear F in motion and a static F in relation to a G should be expressed in similar ways.

**(1) “spatial elements generally characterize the Figure's geometry much more simply than the Ground's”** or in other words “the seeming majority of spatial elements schematize the Figure solely as a point or related simple form” (1983 : 233-4), with some exceptions, for ex. *across / along in the board lay across the railway bed* (which configure the F as a linear object). Or : “linguistic closed-class elements — while they usually treat the Figure as point or simple extension thereof — mark an elaborate range of geometric distinctions for the Reference Object” (Talmy 1983 : 238). Ex : G is a set of two points for *between*, aggregates (of variable numerosity) for *among / amidst*.

Cf. the 50 G-specifying suffixes of Atsugewi ('into a liquid', 'into a fire', 'into an areal enclosure', 'down into an enclosure in the ground', 'into a corner' etc.).

**Objections** : One may wonder why there should be a necessary relation between being in a closed class and underspecifying a Figure. Talmy does not take into account other classes of “spatial elements”. Classifiers<sup>6</sup> (with the exception of numeral classifiers, which typically refer to relatively abstract outlines : stick-like, leaf-like, 3-Dal round objects ; cf. Grinevald 2007), posture and positional verbs (and other posture markers) do not underspecify Figures to the extent Talmy says they should, yet they are members of closed sets.

Regarding adpositions (the “spatial elements” that Talmy seems to have in mind), it seems reasonable to assume

<sup>6</sup> Grinevald (2007 : 110) notes that Jakalteq has a noun classifier for dogs, corn and wheat products, water, salt and fire (these classifiers being repeaters, i.e. forms homophonous with the corresponding lexemes or a truncated versions thereof).

that since they must indicate where to look for a F, they must provide indications on the G. Their functional role is a sufficient explanation for the kind of asymmetry noted by Talmy.

**(2) “spatial expressions” represent schemas that abstract away from concrete and detailed properties of referents. These “schemas are largely built up from some rudimentary spatial elements as points, bounded and unbounded lines, bounded and unbounded planes, and the like” (1983 : 258).**

For ex. *across* : horizontal path-line running perpendicularly from one edge to the other of a planar object bounded by two opposite and parallel edges, with the edge-aligned dimension longer than the path-aligned dimension.

*Across* is indifferent to detailed shape, boundaries in the edge-aligned dimension (*across a river*), the medium (*across a river / a field*), and metric properties (*across the palm of my hands, across the country*).

**Objections** : once again, what is referred to by “spatial expressions” is overly restrictive. Positionals should be counted in, and their semantics is fine-grained (recall for ex. : *pachal* means something like ‘be located (of hemispherical container), or be located in hemispherical container’ and *mochol* ‘being located (of animal lying curved on its side)’ (Brown 1994). Cf. also languages with many meronyms and complex armatures.

**(3) “Languages allow a term referring to a point Figure that is in motion, and therefore describing a linear path, to apply as well to a linear Figure moving co-axially along the same path, and sometimes also to a stationary linear Figure positioned in coincidence with such a path” (Talmy 1983 : 236) as in**

*The ball rolled along the ledge / The ball rolled past the rock* [motion of a point F]

*The trickle flowed along the ledge / The trickle flowed past the rock.* [co-axial motion of a linear F]

*The snake lay along the ledge / \*The snake lay past the rock.* [co-axial location of a linear F]

**Objection** : See Tzeltal (Brown 2006 : 260-1) : static configurations are typically expressed with positionals but motion events are not :

*ya x-balch’oj-Ø jelowel ta be te pelota-e.*

ICP NEUT<sub>A</sub>-roll-3A crossDIR PREP trail ART ball-CL

‘The ball rolls across the path.’

*k’atal ta be te chan-e*

crosswise PREP path ART snake-CL

‘The snake is positioned across the path.’

No lexical commonality : 14 intransitive motion verbs / 100 or more stative positional predicates - no overlap, e.g. “going up” (*mo*) unrelated to “being up” (*kajal*) “going downhill” (*ko*) unrelated to “being downhill” (*ta alan*) “going across” (*jelow*) to “being across” (*k’atal*).

This shows that language may describe static configurations with lexical resources that are different from those used in the description of dynamic situations.

**(4) Motion is primary** in the sense that some stationary Figures that are not licensed with a stative verb are licensed with a motion verb :

*This road runs / \*lies past the factory.* This might be an argument for considering that motion is primary (if a spatial prep. applies to stationary objects in a stative sentence, it applies to stationary objects in sentences with nonstative verbs, i.e. in cases of “fictive motion” in the sense of Talmy 1996).

**Objections** : not all Grounds are compatible with these prepositions (*\*The snake goes / ??extends past the rock* ; this shows that the Ground might be partly responsible for the nonstative interpretation, e.g. that in the example above *road* is what licenses *run*).

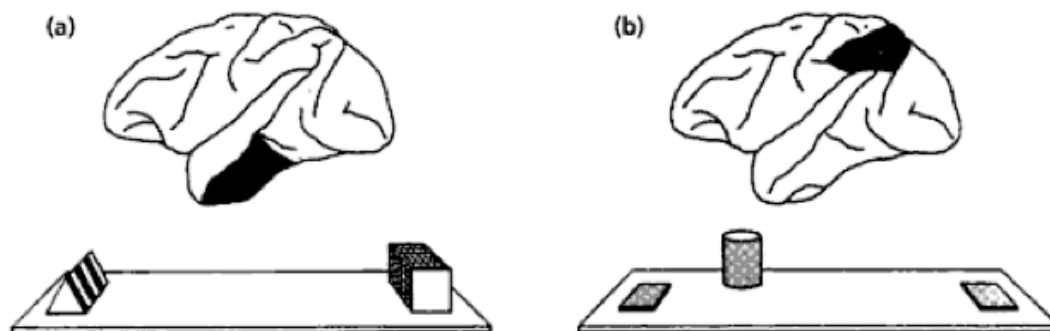
“Fictive” motion sentences are not equally acceptable cross-linguistically.

This problem requires further study.

#### IV.5.5. COGNITIVE UNIVERSALISM: LANDAU & JACKENDOFF (1993)

According to Landau’s and Jackendoff’s influential paper (1993), object names and “spatial” markers form two distinct systems : object names reflect fine discriminations of the detailed geometric properties of objects (e.g., cup and mug correspond to finely differentiated shapes), while “spatial” markers abstract away from object shape and impose only coarse geometric / dimensional or quantitative constraints on their relata. Landau and Jackendoff relate this opposition to the two neural pathways known as the “what” and “where” systems (Ungerleider and Mishkin 1982), suggesting that language reflects this neurocognitive distinction. They base their linguistic generalizations on an analysis of English spatial prepositions, arguing (true enough for English)

that this is essentially where the spatial information is.



- (a) Object discrimination task. Bilateral removal of temporal area TE disrupts performance in monkeys.  
(b) Landmark discrimination task (monkey has to choose the foodwell closer to the cylinder). Bilateral removal of posterior parietal cortex produces severe impairment in this task (Mishkin et al. 1983).

L & J propose the following universal constraints :

“There seem to be no prepositions with a figure or reference object [= Ground] that must be analyzed in terms of a particular geon [= a cone ; from Biederman 1987]. A hypothetical example would be the preposition *sprough*, “reaching end to end of a cigar-shaped object””, e.g. *the rug extended sprough the airplane* (L & J : 226).

“there are no prepositions that insist on analysis of the figure or reference object into its constituent parts”, e.g. the hypothetical preposition *betwaft* which would require the reference object to have a protruding part, as in *the bug crawled betwaft my face*. As another example, prepositions referring to a containment relation do not pick out a specific part of a container. For inst., “there is no preposition *plin* that describes contact with the inner surface of a container, so that one can say (...) Bill spread paint *plin* the carton, in the sense ‘Bill spread paint on the inner surface of the carton’.” (ibid.)

English prepositions set very few restrictions on F and G. These restrictions pertain to the F and G being conceptualized as volumes, surfaces, lines or points (*at* vs *in* vs *along*), as having an axial structure (ex. *front / back*), as being massive or aggregative (*among*) or “distributed” (*all over*). Similarly, the parameters that define the regions projected from F and G are essentially reduced to distance (inclusion, adjacency or gap) and direction (ex. *front / back*). Other parameters such as occlusion (for *behind*) or force dynamics (for *against*) would play a minor role.

## Objections

- Even if we restrict ourselves to adpositions, these are sometimes more fine-grained than L & J assume them to be : “For example, Yéli Dnye has a postposition, *nedê*, glossed as ‘attached by spiking’, which presupposes a scenario (given an expression of the form: Y X-*nedê* positional) where Y is some relatively soft material pierced by some sharp instrument which also pierces the Ground X, thus attaching X to Y” (Ameka & Levinson 2007 : 849). Another illustration is provided by Tiriyo, which has a postposition *awêe* for a F “astride” a G, or for a F in/on a liquid element (*hkao*). The coexpression of a spatial relation and of a medium (water) is also found in Abkhaz, Dakota, Haka and Karok (Svorou 1993).
- The kind of semantic distinction that L & J claim to be absent from adnominals is attested in some languages : e.g. in Karok, there is a form *-vara* which means ‘in through a tubular space’ (for inst. in gloves ; Svorou 1993 : 215).
- If “spatial” marker means everything that contributes to specifying and identifying a spatial relation, then “spatial” markers form a set which extends far beyond the class of adpositions. Once again, see positional systems.
- There are languages which discriminate intrinsic parts on the basis of their shape. Since these parts serve a localizing function, shape-processing can hardly be divorced from the ‘where’ functional system (Brown 1994 for Tzeltal).

#### IV.5.6. CONCLUSION

Linguistic diversity has long been underestimated simply because the focus was on adpositions and specifically on adpositions in I-E languages. True, adpositions generally conjure up spatial properties that are fairly abstract but more detailed specification of F and G would entail a certain amount of redundancy simply because adpositions are relators and F and G are encoded elsewhere. For these reasons, appealing to a specialized “where-system” is a premature move.

Likewise, the conception that linguistic spatial categories reflect a prelinguistic conceptualization of space has been only partly vindicated. It is fairly well established that spatial markers are acquired in an order that mirrors their conceptual complexity (topological-functional before projective). But this does not mean that languages categorize spatial situations according to a set of universal concepts. Linguistic categories never have the same extension from language to language.

Some concepts like containment and support do seem to be prelinguistically more available than other distinctions like tight and loose fit. However, they can be dismembered and superseded by language-specific categories.