

The Emergence of Axial Parts

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Abstract

Many languages have specialized locative words or morphemes translating roughly into words like ‘front,’ ‘back,’ ‘top,’ ‘bottom,’ ‘side,’ and so on. Often, these words are used instead of more specialized adpositions to express spatial meanings corresponding to ‘behind,’ ‘above,’ and so on. I argue, on the basis of a cross-linguistic survey of such expressions, that in many cases they motivate a syntactic category which is distinct from both N and P, which I call *AxPart* for ‘Axial Part’; I show how the category relates to the words which instantiate it, and how the meaning of the construction is derived from the combination of P[*lace*] elements, AxParts, and the lexical material which expresses them.

1. Introduction

Many adpositions include parts which are historically nominal, for example English *beside*, from Old English *be sīdan*, ‘by side.’ The historical source in such cases is a relational noun (‘side’ in this case) referring to a concrete part of an object, used with a genitive dependent expressing the whole, in something like ‘by the side of the house.’ The locative sense would then have been entirely from the locative preposition; however, over time, the relational noun has come to be reanalyzed as a locative expression, referring not to a part of the object, but to a space defined with reference to that part (I return to etymological issues in §7).

In the case of the English expression *in front of*, the decomposition seems transparent as *in* is a preposition and the word *front* still has a use as a relational noun. Consider the pair in (1).

- (1) a. There was a kangaroo in the front of the car.
b. There was a kangaroo on the front of the car.

The front part of a car is conventionally understood either as the part which enters an area first when the car is moving in its usual direction (typically the bumper, grill, front wheels, engine, and hood or bonnet) or else the

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compartment including the driver's seat and any seat beside it. Example (1a) is most naturally understood as stating that a kangaroo is in one of the two front seats of a typical car, but it could also refer to a kangaroo being in a cargo space under the hood or bonnet in a rear-engined car, for example. In both situations, *in* would be appropriate because the kangaroo would be contained within an enclosed space.

In (1b), the kangaroo would be in contact with the top surface of the front part of the car, for example on its hood or bonnet. Now consider (2), which differs from (1) only in lacking the determiner *the* in front of *front*.

- (2) a. There was a kangaroo in front of the car.
b. *There was a kangaroo on front of the car.

Example (2a) refers to something quite different from (1a), namely a kangaroo located in a space projected forward from the car. Example (2b) is ungrammatical. In this paper I argue that the word *front* in (2a) is not a noun, but lexicalizes a functional projection which I call AxPart, based on Jackendoff's (1996) and Marr's (1982) discussion of axial structures in spatial cognition.¹ I argue that AxPart is a category like aspect or modality, realized in many languages. I will henceforth refer to the 'part' sense of *front* as its N use, and to the spatial sense as its AxPart use.

Another test which distinguishes the two senses of *front* is the plural; the N use of *front* can be pluralized, but not the AxPart use. Here the definite article is retained to indicate which example is the N and which is the AxPart.

- (3) a. There were kangaroos in the fronts of the cars.
b. *There were kangaroos in fronts of the cars.

Another distinction between the N use and the AxPart use of *front* is adjectival modification, which is only acceptable with N.

- (4) a. There was a kangaroo in the smashed-up front of the car.
b. *There was a kangaroo in smashed-up front of the car.

Measure phrases are acceptable with many locative expressions, including the expression *in front of*, which refers to a vaguely bounded space. Measure phrases are not acceptable with usual uses of *in*, however, and it can be seen that when *front* is an N, then *in* is a non-measurable P (more specifically, it is category Place).

¹Jackendoff (1996:14): "The 'axial parts' of an object—its *top*, *bottom*, *front*, *back*, *sides*, and *ends*—behave grammatically like parts of the object, but, unlike standard parts such as a *handle* or a *leg*, they have no distinctive shape. Rather, they are regions of the object (or its boundary) determined by their relation to the object's axes. The up-down axis determines top and bottom, the front-back axis determines front and back, and a complex set of criteria distinguishing horizontal axes determines sides and ends."

- (5) a. *There was a kangaroo sixty feet in the front of the car.
 b. There was a kangaroo sixty feet in front of the car.

Another difference between the AxPart use of *front* and the N use is that only the N use admits replacement of its projections by pro-forms; thus, *it* can refer to *the front of the car* in (6a) but cannot refer to *front of the car* in (6b); nor can *one* refer to *front of the car* in (6c).

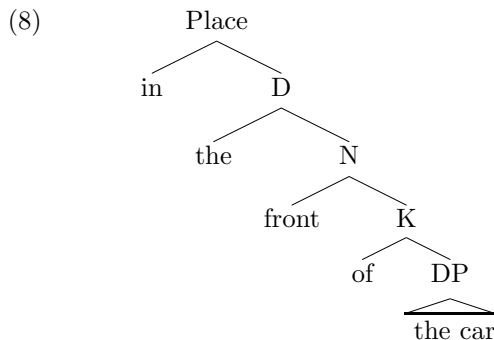
- (6) a. The kangaroo was in [the front of the car]_i, but the koala wasn't in it_i.
 b. The kangaroo was in [front of the car]_i, but the koala wasn't in it*_i.
 c. The kangaroo was in [front of a car]_i, and the koala was in one*_i too.

Finally, DP can move away from a preposition, but AxPart cannot.

- (7) a. It was the front of the car that the kangaroo was in.
 b. *It was front of the car that the kangaroo was in.

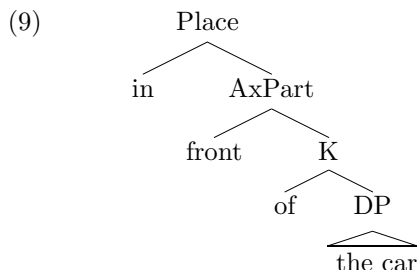
Though the exact diagnostics differ from language to language, the behavior of English *front* is fairly typical of AxPart elements.

Schematically, a relational noun like the N use of *front* might appear in a structure like that in (8); the N appears with a genitive complement, labeled K[ase] here. The Place head *in* takes any DP complement, for example in *in the car*, the Place head *in* combines directly with the DP *the car* (or there is a null AxPart, and/or a null K).



As depicted in (9), AxPart might similarly appear as a complement to N, and with a genitive complement, but lacking the functional structure associated with N, for example D.

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I suggest below specific semantic contributions for the various categories, extending the model outlined in Svenonius (2004b). Briefly, genitive K acts as a kind of type-shifter, lifting DPs to predicates over some projection of N;² in languages in which AxPart combines with genitive K, AxPart must then either be of the same semantic type as N, or else be a predicate over elements of type K.

The semantic function of AxPart is to identify a region (a set of points in space, cf. Nam 1995, Kracht 2002) based on the Ground element (the complement DP; see Svenonius 2004a for discussion of the Ground interpretation of P complements). Typical AxParts refer to the front, back, top, bottom, sides, and middle of an object, though other regions can be defined as well.

Regions are unstructured, like sets of points, and therefore cannot be measured. Examples like (5b) show that PPs containing AxParts can be measured, however. I assume that this extra structure is contributed by elements of the category Place.

The semantic contribution of Place is to specify how space is projected from a region; I will assume a modelling of space in terms of vectors along the lines proposed by Zwarts (1997), Zwarts and Winter (2000). Vectors are one-dimensional objects with direction and length which define points in a space when they are drawn from a region.

Measures and directions can be defined over sets of vectors, so that expressions like (5b) and *diagonally over the doorway* can be translated. The exact conditions on measure and directional phrases are complex (see Zwarts 1997, Zwarts and Winter 2000, Winter 2001); I will assume that even non-measurable locative expressions include a component Place.

There are minimal pairs like *in back of* and *behind*, which mean nearly the same thing. I assume that *in back of* involves an AxPart *back*, and the Place head (lexicalized by *in*) projects vectors away from the Ground from that axial part ('away from Ground' being a common direction for vectors in P semantics). With *behind*, on the other hand, I will assume that there is a default mapping from Ground to a region (what Wunderlich 1991 calls

²The typical relation which results from genitive predication is a vague one, suitable not only for part-whole relations but also various other associations. See Asbury (2006) for further discussion of the categorial status of genitive and its close relation to the D system.

its *eigenspace*), and *behind* is a Place head specifying that vectors point backward. Some of the subtle differences between the two expressions are hoped to follow from these two different ways of identifying essentially the same space, but the details are still murky at this point.

Important members of the category Place are *on* and *in*; *on* specifies that there is contact, which implies that the vectors used to define the space have length zero, and *in* specifies that the space is bounded. The fact that these two combine with AxParts, while other putative Place heads do not, suggests that they may be importantly different. For the purposes of this paper, however, I will treat them as Place heads.

2. Cross-linguistic examples of AxParts

In this section I review the AxPart inventories of several languages. In each of the languages discussed, a set of somewhere around a dozen words has a distinctive syntactic and semantic pattern; the words can be identified as referring to regions or directions, but are used to denote spaces, usually in conjunction with some more generalized locative morphemes. For practical reasons, I divide the languages up into prepositional and postpositional, grouping local case systems in the latter group, and then discuss the range of variation observed.

2.1. Prepositions

For example, Pantcheva (2006a) examines a series of elements in Persian, which she calls Class 2 prepositions, and concludes that they are AxParts in the sense used here. A partial list appears in (10).

(10) PERSIAN CLASS 2 PREPOSITIONS (Pantcheva 2006a)

word	noun gloss	prepositional translation
<i>tu</i>	inside	‘in’
<i>ru</i>	face	‘on’
<i>zir</i>	lower part	‘under’
<i>dour</i>	cycle	‘around’
<i>bala</i>	upper part	‘above’
<i>næzdik</i>	vicinity	‘near’
<i>daxel</i>	interior	‘inside’
<i>tæh</i>	bottom	‘on the bottom of’
<i>posht</i>	back	‘behind’
<i>paiin</i>	below	‘below’
<i>xarej</i>	exterior	‘outside’
<i>birun</i>	exterior	‘outside’
<i>mian</i>	center	‘between’
<i>sær</i>	head	‘on top of’

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Like English *front*, some of these elements have nominal senses (especially the first few in the list), but have developed a specialized use in locative expressions; their locative use is illustrated in (11). Note the ‘ezafe’ linker element or case-marker (Samiian 1994) glossed here as EZ (following Pantcheva 2006a, whence the examples).

- (11) a. Ræft posht-e xane.
went back-EZ house
 ‘She/He went behind the house’
 b. Sib oftad ru(-ye) miz.
apple fell face-EZ table
 ‘The apple fell on the table’

In the example in (11a), the word *posht* ‘back’ is clearly used as an AxPart, as the sentence does not assert that the subject went to a part of the house itself, but to the space behind the house; thus the truth conditions are calculated on the basis of a space projected from the back of the house. In (11b), the ezafe marker is omissible; *ru* meaning ‘on’ can (optionally) assign case directly.

Similarly, Levinson (1994) discusses a class of nouns in Tzeltal (a Mayan language) which he calls ‘relational nouns,’ listed in (12) (with possessive prefixes). Levinson carefully distinguishes these from a distinct class of nouns referring to specific topological shapes, which have a slightly different syntactico-semantic behavior (cf. Jackendoff’s 1996 comment, quoted in n. 1, that axial parts have no distinctive shape).

(12) TZELTAL RELATIONAL NOUNS (Levinson 1994:802,807)

Word	noun gloss
<i>s-ba</i>	‘top surface’
<i>y-ajk’ol</i>	‘uphill region’
<i>y-alan</i>	‘downhill region’
<i>y-anil</i>	‘underneath’
<i>y-util</i>	‘inside’
<i>y-ejtal</i>	‘bottom surface’
<i>s-tojol</i>	‘straight ahead’
<i>y-olil</i>	‘middle’
<i>s-tz’eel</i>	‘side, edge’

A couple of illustrations of the use of these relational nouns are shown in (13).

- (13) a. ta s-ba mexa
at POSS-top table
 ‘on top of the table’ (Tzeltal, Levinson 1994:801)
 b. Tek’el ta y-ajk’ol karo te winik-e.
standing at POSS-uphill car the man-CL
 ‘The man is standing uphill of the car’ (Tzeltal, Brown 1994:751)

In the first example, the locative expression *ta sba mexa* ‘on top of the table’ could involve a simple part-noun ‘top,’ since the location is one of contact with an actual part of the table. In the second example however, the locative expression *ta yajk’ol karo* ‘uphill of the car’ does not locate the man directly at a part of the car, but at a region projected from a part of the car. Since the free P element *ta* ‘at, on’ is the same in both cases, the difference must come from the second element, *(y-)ajk’ol* ‘uphill region.’ Thus, this element clearly has the semantics of an AxPart: a space is projected from the Ground element (the car in this case). Although the semantics of the first example, with *(s-)ba* ‘top’ is more equivocal, I conclude on the basis of general syntactic similarity (discussed in detail in the references cited) that all of the relational nouns in (12) are in fact AxParts.

Muriungi (2006) has also shown that Kĩĩtharaka, a Bantu language spoken in Kenya, has a class of AxParts, which he calls Class B adpositions. Most of them have nominal class marker prefixes, as shown in (14).

(14) KĨĨTHARAKA CLASS B ADPOSITIONS (Muriungi 2006)

Word	nominal gloss	prepositional gloss
<i>ru-ungu</i>	‘space below’	‘under’
<i>rũ-teere</i>	‘side’	‘beside’
<i>ga-tĩgatĩ</i>	‘center’	‘between’
<i>ka-thengengani</i>	‘edge’	‘on the edge’
<i>ĩ-gũru</i>	‘top’	‘above’
<i>mbere</i>	‘front’	‘in front’
<i>nyuma</i>	‘behind’	‘behind’
<i>nja</i>	‘outside’	‘outside’
<i>ndeni</i>	‘inside’	‘inside’
<i>nkoma</i>	‘bottom’	‘at the bottom’
<i>karibũ</i>	‘vicinity’	‘near, next to’

Some illustrations of typical uses of these AxParts are given below (also from Muriungi 2006). Nouns typically have class markers affixed, though in class 9 the segmentation is not clear (the prefix might be a nasal feature); the verb bears a prefix agreeing with the subject in noun class, and the associative marker *a* ‘AS’ agrees with the AxPart which introduces it.

- (15) a. Gĩ-kombe kĩ-rĩ ga-tĩgatĩ k-a metha.
7-cup SM7-be 12-center 12-AS 9.table
 ‘The cup is at the center of the table’
- b. Gĩ-kombe kĩ-rĩ ndene j-a ĩ-kũmbĩ.
7-cup SM7-be 9.inside 9-AS 5-granary
 ‘The cup is inside the granary’

As with previous examples, the case marking on the Ground DP is essentially genitive. The phrase projected by the AxPart can be the complement

to a Path P like ‘to’ or ‘from.’ The AxPart has nominal characteristics, such as occurring with a noun class marker, but when it has its projective, spatial meaning, it cannot occur with the full range of nominal modifiers, such as quantifiers and adjectives.

2.2. Postpositions and local case suffixes

In each of the examples of AxParts presented above, the AxPart preceded its DP Ground complement. There are (unsurprisingly) also many languages in which AxParts may follow the Ground, in a postpositional pattern. I review some such cases here, along with local case systems.³

Takamine (2006) discusses Japanese AxParts in a contribution to this volume. Here I present the closely related system of Korean.⁴

Korean has a set of what I analyze as AxParts, as illustrated in the table in (16).

KOREAN PLACE NOUN		
Word	nominal gloss	prepositional gloss
<i>alay</i>	‘lower part’	‘under’
<i>mith</i>	‘bottom’	‘under’
<i>wi</i>	‘upper part’	‘on’
<i>aph</i>	‘front’	‘in front of’
<i>an</i>	‘interior’	‘in’
<i>pakk</i>	‘exterior’	‘out’
<i>kawuntey</i>	‘center’	‘between’
<i>yep</i>	‘side’	‘beside’
<i>twi</i>	‘back/rear’	‘behind’
<i>kunche</i>	‘vicinity’	‘near’
<i>cwui</i>	‘vicinity’	‘around’

These elements usually appear with a locative case suffix, for example the generalized locative *-ey* as in (17a) or the directional *-ulo* as in (17b).

- (17) a. Inho-ka cip pakk-ey se-e iss-ta.
Inho-NOM house exterior-LOC stand-E be-DC
 ‘Inho is standing outside the house’
- b. Inho-ka kakey ap-ulo ttwi-e ka-ss-ta.
Inho-NOM store front-DIR run-E go-PAST-DC
 ‘Inho ran to the front of the store’

Although Korean has overt case markers (the genitive suffix is *-uy*), Korean

³In the literature on case, ‘local case’ has become the standard term for cases which distinguish locational meanings, as opposed to ‘locative,’ which is usually the label for a single vaguely locational case. See Blake (2001) for an excellent overview.

⁴I am here especially indebted to Minjeong Son, who presented much of this material in the Moving Right Along seminar in Tromsø in 2006, as documented on the website at www.hum.uit.no/mra/, see especially the February 28th summary.

is unlike Japanese in not usually expressing genitive case on the Ground element with an AxPart; the Ground DPs are normally bare, as in (17).

Elaborate local case systems can usually be decomposed into two or more parts, with an inner part expressing basic Place distinctions (such as ‘on’ and ‘in’) and an outer part expressing Path distinctions (goal or ‘to,’ source or ‘from,’ and basic location, here glossed as ‘LOC’); see Hegedűs (2006) for discussion of the Hungarian system. The related Finnish system can be decomposed as follows, where *-C* is an underspecified consonant (assimilating to the preceding consonant), *-A* an underspecified low vowel (participating in vowel harmony):

(18) Finnish (Karlsson 1977)

	Place:	IN	ON
	Path	<i>-s</i>	<i>-l</i>
LOC	<i>-CA</i>	inessive	adessive
FROM	<i>-tA</i>	elative	ablative
TO	<i>-Ce</i>	illative	allative

Thus, for example, the inessive of *talo* ‘house’ is *talo-ssa* meaning ‘in a house’ (or ‘in the house’) and the elative is *talo-sta* meaning ‘from in a house’ (but the illative is not morphologically decomposable). It is unclear to what extent these suffixes correspond directly to semantically interpretable heads, for example the same suffixes appear on nominal dependents in case agreement (see Svenonius to appear for some discussion). But it is clear that functionally, local cases are the equivalent of adpositions. It can be assumed, therefore, that a locally case-inflected noun like *talossa* ‘in a house’ is a PP, more precisely at least a PlaceP and possibly a PathP (see Svenonius 2004b on the issue of whether locative PPs project higher than Place; see Fong 1997, Kracht 2002 on differences between the Finnish outer element and English Path heads *to* and *from*).

When a language with a local case system develops AxParts from nouns, the AxParts will at least initially appear with the local cases. However, since there are semantic restrictions on the kind of Ground that can combine with Place heads like ‘in’ and ‘on,’ a given AxPart may not combine with the full range of cases. For example, Finnish *yläpuole* ‘upper side’ combines with the ‘on’ series (adessive, ablative, and allative) while *viere* ‘side’ combines with the ‘in’ series (inessive, elative, illative).⁵ This is illustrated in (19) and (20) (as noted above, the illative is not decomposable, and is here simply glossed ILL).

(19) a. pöydä-n ylä-puole-l-la
table-GEN upper-side-ON-LOC
‘(at) above the table’

⁵Thanks to Marina Pantcheva for pointing this out to me. Thanks also to Øystein Alexander Vangsnes and Eugenia Romanova for discussion.

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- b. pöydä-n ylä-puole-l-ta
table-GEN upper-side-ON-FROM
 ‘from above the table’
- c. pöydä-n ylä-puole-l-le
table-GEN upper-side-ON-TO
 ‘(to) above the table’
- (20) a. pöydä-n viere-s-sä
table-GEN side-IN-LOC
 ‘(at) beside the table’
- b. pöydä-n viere-s-tä
table-GEN side-IN-FROM
 ‘from beside the table’
- c. pöydä-n viere-en
table-GEN side-ILL
 ‘(to) beside the table’

A similar example can be seen in Kham, a Tibeto-Burman language spoken in Nepal. Watters (2002) identifies a set of what he calls relator nouns, each of which combines with a specific local case suffix. The relator nouns are given with their case suffixes in (21), from Watters (2002:137).

(21) KHAM RELATOR NOUNS

Kham	literal gloss	translation
<i>jĩ:-lə</i>	inside-in	‘inside of’
<i>dũ:h-lə</i>	beneath-in	‘underneath’
<i>khar-lə</i>	center-in	‘between’
<i>bã:-lə</i>	bottom-in	‘at the bottom of’
<i>ŋah-kə</i>	front-at	‘in front of’
<i>chĩ:-kə</i>	behind-at	‘behind’
<i>lap-kə</i>	side-at	‘beside’
<i>khĩ-kə</i>	foot-at	‘at the foot of’
<i>chyo:-ŋə</i>	edge-around	‘at the edge of’
<i>leo-ŋə</i>	whereabouts-around	‘at the place of’
<i>tər-tə</i>	top-on	‘on top of’
<i>sora:-tə</i>	line-on	‘above, in line with’

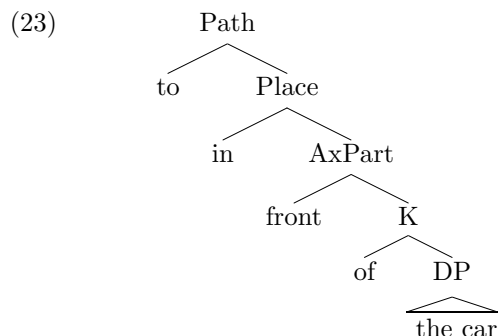
I suggest that the relator nouns, like the Tzeltal relational nouns and so on, are AxParts. As with most of the other languages examined so far, the Ground element is marked in the same way as a possessor: the first person possessor prefix in (22a) is identical to the first person marker in the AxPart construction in (22b).

- (22) a. *ŋa-zihm*
 1POSSR-*house*
 ‘my house’
 b. *ŋa-ŋah-kə*
 1POSSR-*front-at*
 ‘in front of me’ (Kham, Watters 2002)

If each AxPart combines with a limited series of local cases, it is easy to see how the combination of AxPart plus case might become lexicalized and opaque to analysis. This has arguably occurred in Northern Sámi, as discussed in Svenonius (2004a).

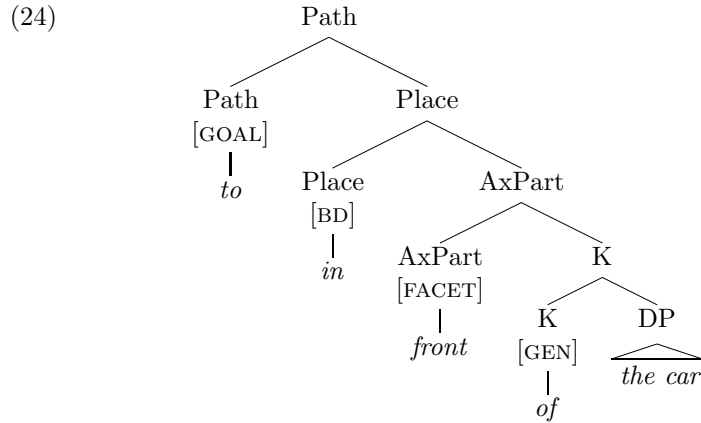
3. AxPart in the functional sequence

Suppose, then, that something about the way that humans construct linguistic representations of space leads to the categorial hierarchy Path–Place–AxPart–K–DP, where DP is the Ground, and there may be other categories as well (cf. Svenonius 2004b on Dir dominating Path, and Svenonius 2003 on a Figure-introducing projection *p*, probably located above Place but below Path). In English, *to* is a lexical realization of the category Path, as schematized in (23).

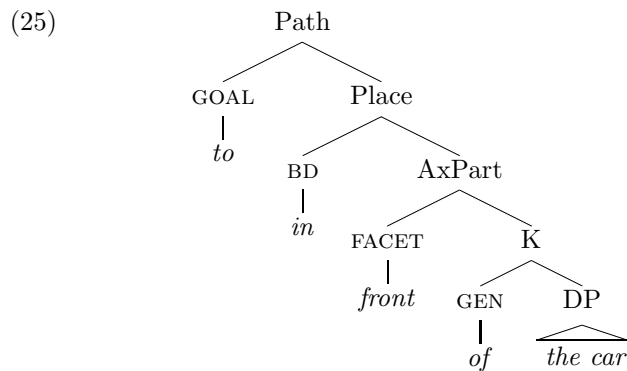


More specifically, we might assume that the categories Path, Place, AxPart, and so on can have different values, and that the words *to*, *in*, *front* and so on express some of these values. This could be schematized as follows, where syntactic categories (Path, Place, etc.) are in normal roman type, semantically interpretable features are written in small caps (e.g. BD for ‘bounded’), and elements corresponding to conceptual and phonological information is given in italics.

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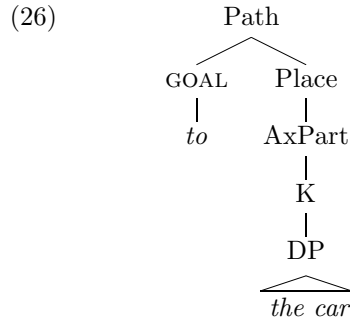


A less cluttered representation simply eliminates the redundant category labels from the heads.

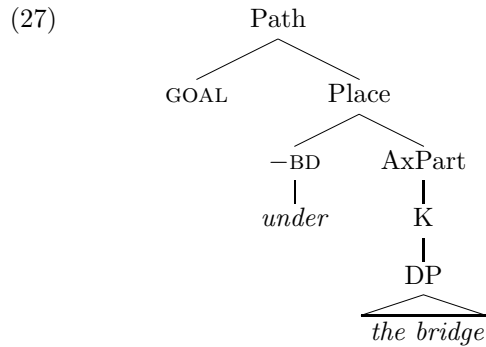


A marked value like FACET would have syntactico-semantic consequences, while the choice of a piece of encyclopedic lexical material such as *front* or *back* to fill it might not, the difference between *front* and *back* being strictly conceptual (like the difference between *camel* and *reindeer*).

Suppose, furthermore, that each category has an unmarked interpretation which it can have when not filled. Then the goal PP *to the car* can be schematized as in (26) (depending on exactly how prepositional case in English is to be analyzed).



Under certain conditions, a marked value might be null, for example the Path head might have a goal value without being overt in *The bottle will float under the bridge* (Carter 1988).⁶



In general, though, a category which is not overtly lexicalized can only have its default interpretation, for the simple reason that null expressions of marked values are difficult to learn.

4. Similarities between AxPart and N

There are many striking similarities between AxParts and Ns, in many languages. It is therefore not surprising that previous researchers have often assumed that AxPart *are* Ns. Here I review some similarities, moving on in §5 to discuss the differences. For some other similarities, see Takamine (2006), who notes for example that when AxParts are coordinated, they take the same coordinator (*to* ‘and’) as nouns do.

4.1. Gender

Only nouns have inherent gender (adjectives, demonstratives, and other elements may agree with a noun in gender, but are not inherently specified

⁶Here I represent the preposition *under* as a spell-out of a marked value of Place, with a default interpretation of AxPart; cf. the discussion in §1 of *behind*.

for it). In many languages, some AxParts are consistently associated with gender values. For example, ten of the eleven Kĩtharaka AxParts in (14) (from Muriungi 2006) belong to particular noun classes, as signalled by agreement on the associative marker (cf. (15)); Bantu noun classes are essentially like Indo-European genders (Greenberg 1978, Corbett 1991).

Similarly, if Roy (2006) is correct that French *tête* ‘head’ has an AxPart use, then at least that AxPart appears to have feminine gender, as indicated by the form of the article which appears with it: *la tête du lit*, ‘the head of the bed’ (the form of the article appearing with most AxParts is *le*, arguably the default).

4.2. Plural

Occasionally, AxParts can appear with plural morphology. One such case comes from Persian, as pointed out by Pantcheva (2006a).

- (28) Shekær rixt in zir-ha-ye miz.
sugar spilled this under-PL-EZ table
 ‘The sugar spilled here all over under the table’

Another case is provided by Muriungi (2006) for Kĩtharaka.

- (29) rungu ~ ndungũ
11.under 10.under
 ‘under’ — ‘unders’

This simple diagnostic seems to demonstrate that these words are nouns.

4.3. Case

AxParts in languages like Finnish regularly inflect with local cases (cf. (19)–(20)). However, if these local cases are analyzed as manifestations of Path and Place heads (as I suggested in §2.2), then they are not indicative of nominal status; that is, Place can quite regularly take an AxPart complement (cf. (26)–(27)).

However, sometimes even apparent structural cases are observed on AxParts, for example in Russian where several AxParts alternate between accusative and locative case forms depending on what Path head they combine with; a goal Path head (‘to’) gives accusative, and source (‘from’) or pure locative senses give locative case (this was pointed out to me by Eugenia Romanova, who also provided the following examples).

- (30) a. v-perəd mašiny ~ v-peredi mašiny
in-front.ACC car.GEN in-front.LOC car.GEN
 ‘(to) in front of the car’ — ‘(at) in front of the car’
 b. na-verx doma ~ na-verxu doma
on-top.ACC house.GEN on-top.LOC house.GEN
 ‘(to) on top of the house’ — ‘(at) on top of the house’

If the prefix in these cases is the Place head, then the locative case suffix is not a manifestation of Place but rather cooccurs with it.

4.4. Articles, Quantifiers, and Demonstratives

4.4.1. Articles

In English, the AxPart constructions *in front of* and *on top of* lack definite articles, distinguishing them from similar constructions involving nominals (as pointed out in §1). However, there are other elements such as *vicinity*, *left*, and *east* which behave in many ways like AxParts but which tend to appear with the definite article.

- (31) a. There was a policeman in the vicinity of the house.
 b. A hooded monk stood to the left of the candelabra.
 c. The mountains to the east shone purplely.

In French, too, many AxParts appear with the definite article *le*, often incorporated into the preposition *à* (*à + le = au*), as exemplified in (32) (based on Starke 1993, and parsing *autour* into *au-tour*).

- (32) a. Il y a du paprika à l'intérieur de la casserole.
it there has of.the paprika at.the.interior of the pot
 'There is paprika in the inside of the pot'
 b. Il tourne toujours au-tour de la maison.
he turns always at.the-turn of the house
 'He always makes a trip around the house'

See Roy (2006) for additional examples and discussion.

4.4.2. Quantifiers

There are examples of what I call AxParts appearing with quantifiers, such as the Kĩitharaka one here discovered by Muriungi (2006), in which a quantifier *onthe* 'all' can quantify over the AxPart *ndungu* 'under.'

- (33) Maria n-a-ciat-ir-e ndungu ci-onthe.
1.Maria F-SM1-sweep-PERF-FV 10.under 10-all
 'Maria swept all the [spaces] under'

Since quantifiers normally combine with nouns, this would seem to confirm the nominal status of *ndungu*.

4.4.3. Demonstratives

Demonstratives appear in AxPart constructions in many languages, including Kĩitharaka, Persian, Korean and Japanese. For example, in the Persian example in (34) (from Pantcheva 2006a), a demonstrative *in* 'this' appears with the AxPart *tu* 'in.'

- (34) Ketab in tu-ye keshu bud.
book this in-EZ drawer was
 ‘The book was here in the drawer’

The Korean example in (35), from Son (2006), shows the difference between a demonstrative with an AxPart (in this case *mit*, ‘bottom’) and a demonstrative with the Ground DP (in this case *oscang*, ‘chest’).

- (35) a. Ku sangca-nun oscang ce mit-ey twu-ess-ta.
the box-TOP chest that bottom-LOC place-PAST-DC
 ‘I put the box over there under the chest’
 b. Ku sangca-nun ce oscang mit-ey twu-ess-ta.
the box-TOP that chest bottom-LOC place-PAST-DC
 ‘I put the box under that chest’

Takamine (2006) provides the following example, showing a demonstrative in Japanese (which regularly appears with genitive case: *ko-no ie* ‘this-GEN house’) appearing with an AxPart (Takamine notes that there is also an elliptical interpretation of (36), i.e. ‘park the car in front of this’).

- (36) Kuruma-o ko-no mae-ni tomete!
car-ACC this-GEN front-LOC park
 ‘Park the car here in front!’

Finally, an example from Kĩtharaka from Muriungi (2006) shows the same effect: a demonstrative on an AxPart contributes a proximal or distal meaning, rather than picking out a specific discourse referent. For comparison, a noun phrase with a demonstrative and some other modifiers is shown in (37b), showing that demonstratives follow the noun they modify.

- (37) a. Nkaarĩ n-ĩ-rĩ mbere ĩ-no kana?
9.vehicle F-SM9-be 9.front 9-this Q
 ‘Is the vehicle here in front?’
 b. nteere ino i-nya ntune ci-onthe
10.side 10.this 10-four 10.red 10-all
 ‘all these four red sides’ (N–Dem–Num–Adj–Quant)

I return to the structures for these examples in §6.

4.5. Head-marking and dependent-marking of the AxPart:Ground relationship

In most of the languages reviewed, the Ground DP is morphologically related to the AxPart in the same way that possessors are related to their possessees, which is often the same way that DP dependents on NP are expressed, for example by genitive case. Overt markers for genitive case are seen for example in Japanese, French, and Kannada AxPart constructions, illustrated here with Japanese.

- (38) a. Taroo-no ie-ga
Taroo-GEN house-NOM
 ‘Taroo’s house’
 b. ie-no mae-de
house-GEN front-LOC
 ‘in front of the house’

In Finnish, the genitive has syncretized with the accusative, and the Ground DP is in that case. In Kĩĩtharaka, there is an associative marker for DP dependents of N, and this is used with AxParts, illustrated below (example from Muriungi 2006), and in French the marker *de* also functions both to mark possessors and Grounds.

- (39) a. ga-tĩgatĩ k-a metha
12-center 12-of 9.table
 ‘the center of the table’
 b. gĩ-kombe ki-a Maria
7-cup 7-of 1.Maria
 ‘Maria’s cup’

In Chinese and Persian, the marker used to link Ground DPs with their AxParts is a generalized marker for nominal dependents (including possessors and thematic complements but also adjectives and other modifiers). In Tzeltal and Kham, morphology also signals a possessor or genitive-like relation between the AxPart and the Ground, illustrated for Kham in (22) above, and again (with different examples) below.

- (40) a. u-dũ:h-lə
3POSSR-beneath-in
 ‘underneath it’
 b. u-kwi:-ye jə-ke-o
3POSSR-hand-INSTR make-PFV-3S
 ‘He made it with his hands’ (Kham, Watters 2002:57, 132)

Thus it can be said that it is a typical property of AxParts that the Ground DP is marked with genitive case, or otherwise as a nominal dependent, as if the AxPart were a noun.

5. Differences between AxPart and N

Given all the similarities between AxParts and Ns noted in §4, it may not be surprising that AxParts are often analyzed as nouns. In this section, I note various differences between N and AxPart which suggest that they should be distinguished.

To say that AxParts are a subcase of N is essentially to say that there are some sufficient diagnostics for N-hood, for example gender, and the AxParts have it. Here I present three different types of argument against this. The

first is that there are elements in each language which do not pass these diagnostics, e.g. there is one AxPart in Kĩĩtharaka which does not belong to any gender class, therefore there must be a category AxPart, distinct from N. The second type of argument is that even when morphology appears which is from a nominal paradigm, it does not have the same semantic content as when it appears with a noun. The third argument is that many of the items which I have identified as AxParts may have N *uses* as well as AxPart uses; I argue that these uses show that even a word which has a gender or other typical nominal characteristics can be used as an AxPart (as identified by the special characteristics noted above) rather than as a noun. The relationship between N and AxPart in such cases may be either historical or derivational.

5.1. AxParts which do not have gender

Muriungi (2006) identifies a single AxPart in Kĩĩtharaka which does not have a noun class prefix, namely *karibu* ‘near’ (cf. English *vicinity*). Compare *karibu* ‘near’ with the noun class 11 AxPart *rũ-teere* ‘side’ (examples from Peter Muriungi, personal communication).

- (41) a. Mbea îrĩ karibu na i-buku.
 9.mouse is near with 5-book
 ‘The mouse is near the book’
 b. Mbea îrĩ rũ-teere rũ-a i-buku.
 9.mouse is 11-side 11-of 5-book
 ‘The mouse is beside the book’

Of course, it is possible that these two elements are not of the same category; more careful investigation will be necessary to be sure. But assuming that they are, the example of *karibu* ‘near’ shows that not all AxParts have noun class features in Kĩĩtharaka. Assuming that all nouns do have noun class features, AxParts will then have to be distinguished from nouns in general.

5.2. Different interpretation of plural

Generally, AxParts do not pluralize, as noted for English in §1 and for other languages in the various articles cited above. Although an example was given above in (29) of a plural AxPart from Kĩĩtharaka, that example was exceptional; normally, AxParts in Kĩĩtharaka do not pluralize, or if they appear in the plural it is only with their nominal meaning, as illustrated here, from Muriungi (2006).

- (42) î-gũrũ ~ ma-gũrũ
 5-top 6-top
 ‘on top’ ~ ‘legs’

Thus, (29) can be said to be exceptional at best. Possibly, (29) can also be understood as a nominal use of *ndungu*, rather than an AxPart, though this needs to be investigated further.

The Persian case discussed by Pantcheva (2006a) is very interesting in that the interpretation of the apparently plural form of AxParts is distinct from a nominal plural interpretation. Her example from (28) above is repeated here.

- (43) Shekær rixt in zir-ha-ye miz.
sugar spilled this under-PL-EZ table
 ‘The sugar spilled here all over under the table’

Note that the plural marker does not have its ordinary interpretation here—the plural of *zir* ‘under’ does not refer to plural spaces underneath, nor to plural Grounds—but gets a kind of distributive reading, translated as ‘here and there’ (see Pantcheva 2006b for discussion).

The general pattern is that plural is absent from AxParts, surprising if they are nouns. Even more surprisingly for a nominal analysis of AxParts, when plural morphology does appear it seems not to have its usual meaning.

5.3. Articles, quantifiers, and demonstratives

5.3.1. Idiosyncratic Determiners

As noted above, determiners appear with some AxParts. If all AxParts required articles in the same contexts that nouns do, then clearly a generalization would be missed if AxParts were claimed to be distinct from nouns; but the distribution of articles with AxParts is highly idiosyncratic; even in French, where articles are ordinarily obligatory with nouns, there are many AxParts which lack them. Roy (2006) notes that for example *à côté de* ‘at side of’ and *à travers de* ‘at traverse of’ (‘across from’) allow the omission of the article, while others do not. Furthermore, some AxParts which are not nouns appear with the article nonetheless (Roy notes *au long de*, ‘along,’ and *au delà de*, ‘beyond’).

The definite articles in these AxPart constructions do not seem to have the semantic contribution of definite articles with nouns; for example they do not presuppose familiar discourse referents.

5.3.2. Idiosyncratic Quantifiers

Quantificational determiners are even more restricted. A Persian example from Pantcheva (2006a) illustrates the general tendency.

- (44) (*hær) ru-ye eshkaf
every on-EZ wardrobe
 ‘(*every) on the wardrobe’

An example from Kîtharaka was given in (33) of a quantifier with an apparent AxPart. However, that case was like the French and English ones involving the definite article in that it is highly lexically idiosyncratic. As Muriungi notes, only certain AxParts admit the modification of only certain nominal modifiers. If the patterns must be lexically listed in any case, then no generalization is gained by calling all AxParts nouns.

Consider, in this light, the distribution of *all* in English, in combinations like *all over the floor*, *all around the house*, *all along the river*. The fact that *all* is primarily a quantifier in the D-system has not led investigators into English to call *over*, *around*, and *along* nouns. I maintain that examples like (33) provide no greater reason to call *ndungu* a noun.

5.3.3. Phrasal Demonstratives

As noted above, demonstratives are normally part of the D-system. However, there is reason to suspect that they may in many cases be phrase-like rather than head-like; for example, the order N-Dem correlates statistically with VO and prepositions, while Dem-N correlates with OV and postpositions.⁷ If the category demonstrative is a phrasal dependent of a projection of D, then it is possible that the same category can also be merged as a phrasal dependent of some projection of P (much as PP is standardly assumed to be a possible adjunct both to NP and to VP).

5.4. Adjectival modification

AxParts, even those with nominal etymology or morphology, generally do not accept adjectival modification, as illustrated for English in (4a). I illustrate here with Korean. First, consider the Korean pair in (45), which corresponds to the English difference between *in the front of* and *in front of*; the noun in Korean is a compound *ap-pwupwun*, ‘front-part,’ and its complement appears in the genitive case; the AxPart in Korean is simply *ap(h)* ‘front’ and does not take the genitive, as indicated.

- (45) a. Kay-han mali-ka cha-uy ap-pwupwun-ey anc-a iss-ta.
dog-one CL-NOM car-GEN front-part-LOC sit-CONN be-DC
 ‘A dog is sitting on the front of the car’
- b. Kay-han mali-ka cha ap-ey anc-a iss-ta.
dog-one CL-NOM car front-LOC sit-CONN be-DC
 ‘A dog is sitting in front of the car’

⁷For example, looking at the 872 languages that WALS (Haspelmath et al. 2005) lists as either VO or OV and as either Dem-N and N-Dem (i.e. excluding mixed cases, free word order, etc.), about 70% of VO languages are N-Dem, and about 70% of OV languages are Dem-N; similarly, of the 725 languages listed both as either prepositional or postpositional and as either Dem-N or N-Dem, about 70% of prepositional languages are N-Dem and about 70% of postpositional languages are Dem-N. See Svenonius (2006) for more discussion of the ordering of elements in the DP.

Compare the English minimal pairs in (1)–(2) in §1. The pair in (46) shows that the noun, but not the AxPart, can be modified by a suitable adjective such as *kunulcin* ‘shaded, shady.’

- (46) a. Kay-han mali-ka cha-uy (kunulcin) ap-pwupwun-ey
dog-one CL-NOM car-GEN shady front-part-LOC
 anc-a iss-ta.
sit-CONN be-DC
 ‘A dog is sitting on the (shady) front of the car’
 b. Kay-han mali-ka cha (*kunulcin) ap-ey anc-a iss-ta.
dog-one CL-NOM car shady front-LOC sit-CONN be-DC
 ‘A dog is sitting in (*shady) front of the car’

This generalization is fairly robust; for most of the languages examined in the survey here it holds absolutely; see Pantcheva (2006a) regarding Persian, Muriungi (2006) regarding Kiitharaka, Takamine (2006) for Japanese, and Roy (2006) for French.

An exception appears to be the English adjective *immediate*, which appears with certain spatial words which otherwise show the syntax of AxParts, for example *vicinity* or *left*, as shown in (47).

- (47) a. There was a policeman in the (immediate) vicinity of the house.
 b. The towels are to the (immediate) left of the sink.

As noted above, these words also deviate from the syntax of *in front of* and *on top of* in taking a definite article. Interestingly, the possibility of the definite article and of the adjective appear to be linked.

- (48) a. The towels are left of the sink.
 b. *The towels are (immediate) left of the sink.

Nonetheless, despite the apparent counterexample of *immediate*, the robust ungrammaticality of adjectives with AxParts suggests that AxParts are not nouns, or not fully nouns, or not ordinary nouns.

5.5. The underspecified meanings of head-marking and dependent-marking

In §4.5 I discussed the fact that Ground dependents of AxParts are often related to them morphologically in the same way that possessors are related to possessees, for example in the case-marking on the Ground and possessor, or on agreement marking on the possessee and AxPart.

A full understanding of this situation would require a more detailed analysis of the possessor-possessee relationship than will be possible here; I will simply comment on the outline of the solution.

THE EMERGENCE OF AXIAL PARTS

Generally, the morphological cases available to a language underdetermine the grammatical relations that the cases are used to express; thus, for example in Icelandic the dative is used to mark benefactive indirect objects, experiencer subjects, and direct objects which are themes of ballistic motion, for example (see e.g. Maling 2001). Thus, that the genitive case is used in some languages for both Grounds and possessors does not automatically motivate a collapse of the two. Of course, the *systematic* patterning of Grounds with possessors bears explanation.

But the point of this section is to argue against the notion that AxParts are identical to nouns, and to that end it is important to point out that the nominal-like head or dependent-marking is often present even when the AxPart is not derived from a noun; some of the French examples, for example, have *de* even when they are not etymologically nouns (e.g. Roy 2006 notes *au delà de* ‘at beyond of’ (‘beyond’) and *au long de* ‘at long of’ (‘along’)); and Icelandic also shows cases of genitive with what are plausibly AxParts derived from directional particles.⁸

I mentioned above that Korean shows genitive case on possessors but not on Grounds appearing with AxParts (cf. (17)). Kham is similar in this respect. A full DP Ground in Kham appears to the left of the AxPart with no overt case morphology (as illustrated in (49)).

- (49) a. hã: khĩ:-kə
cliff foot-AT
 ‘at the foot of the cliff’
 b. zihm lap-kə
house side-AT
 ‘beside the house’
 c. juhr dũ:h-lə
boulder beneath-IN
 ‘under the boulder’ (Watters 2002:138)

A full DP possessor, on the other hand, is marked with genitive case and the possessed N is marked with a possessor prefix.⁹

- (50) a. mi:-ra-e ya-sun-rə ya-cã:-di-rə
person-PL-GEN 3P-gold-PL 3P-silver-PL
 ‘the people’s gold and silver’
 b. la:-ra-e ya-raja
leopard-PL-GEN 3P-king
 ‘the leopards’ king’ (Watters 2002:435–436)

⁸This is an argument that I am developing in ongoing work, presented among other places at the Workshop on Comparative Germanic Syntax in Santa Cruz, California in April 2006.

⁹Examples are also found without one or the other, e.g. ‘Manlal’s blanket’ p. 423 with no genitive case, ‘leopards’ meeting-place’ p. 436 with no possessor prefix. I have not been able to determine the exact conditions.

Thus, a nominal analysis of AxParts in Kham would have to stipulate that these nominals are special in allowing DP dependents with no overt case marker.

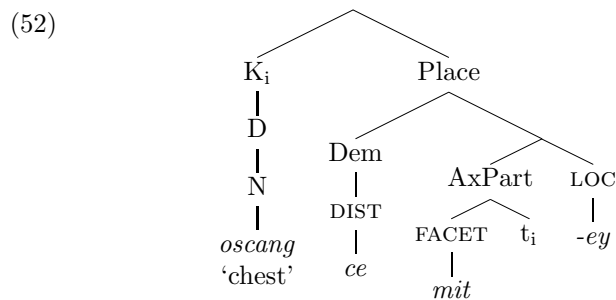
6. Refining AxParts

I am assuming what Borer (2005) calls ‘Neo-Constructivism,’ the hypothesis that certain aspects of meaning are contributed by syntactic structure, while other aspects of meaning come from the lexical content of the words inserted into the syntax. A lexical item like English *front* is polysemous. Inserted under an N node in a tree, it expresses a noun, and will combine with plural and determiners and so on. It has other features as well, for example it is count and not mass, and this will restrict what sort of N structure it is inserted in. Inserted under an AxPart node, it will express an Axial Part, and combine with Place and Path and so on. Here, too, it has certain properties, for example it requires the Place head to be *in*.

In those languages which allow demonstratives with AxParts (discussed in §4.4.3), the lexical semantic contribution of the demonstrative could be characterized as consisting entirely of its proximal or distal deictic content; when inserted in a projection of D, it is interpreted as a nominal demonstrative (*this* or *that*); and when inserted into a projection of P, it is interpreted as locative (*here* or *there*).

The Korean example in (51) would have the universal hierarchical structure as depicted in (52), presented with the heads on the right though obviously it could be translated into a roll-up structure. Note, though, that if the demonstrative is hierarchically higher than the AxPart, as suggested by the interpretation, then the Ground (or the KP containing the DP Ground) must have moved across it, as suggested in the following diagram.¹⁰

- (51) Ku sangca-nun oscang ce mit-ey twu-ess-ta.
the box-TOP chest that bottom-LOC place-PAST-DC
 ‘I put the box over there under the chest’



Now, the distal element *ce* ‘that’ which is also merged in DPs is identified

¹⁰Takamine (2006) suggests for a similar configuration in Japanese that the case head originates higher than AxPart, rather than being moved there as I have depicted here.

THE EMERGENCE OF AXIAL PARTS

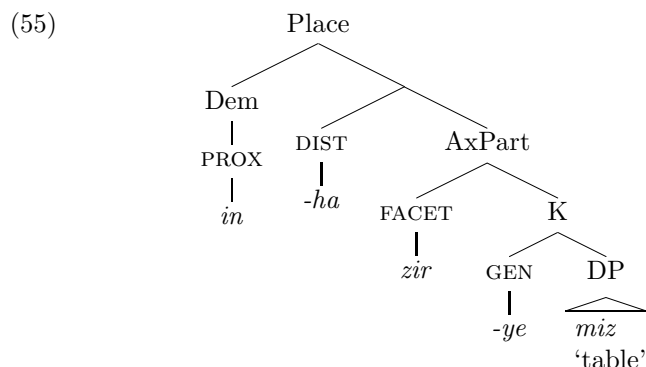
as the lexicalization of a distal feature somewhere above AxPart but below the landing site of the leftward-moved KP.

Tortora (2005) argues, on the basis of data from Italian and Spanish, for an aspectual element in the extended projection of P, which can be used to express a notion of boundedness. She argues that the *a* in (53a) represents that element, and that the preposition *dentro* ‘inside’ has moved across it.

- (53) a. Vai dentro a-lla stanza.
go inside at-the room
 ‘Go inside the room’ (bounded)
- b. Vai dentro la stanza.
go inside the room
 ‘Go inside the room’ (unbounded) (Italian, Tortora 2005:314)

Arguably, the ‘distributed’ reading of the Persian plural marker, when appearing with AxParts, is of the same general type as Tortora’s bounded marker. Suppose, then, that these are both examples of Place, as illustrated in (55), for the Persian example in (54) (repeated from (28) above). The marked value for Place here is DIST for ‘distributed.’

- (54) Shekær rixt in zir-ha-ye miz.
sugar spilled this under-PL-EZ table
 ‘The sugar spilled here all over under the table’

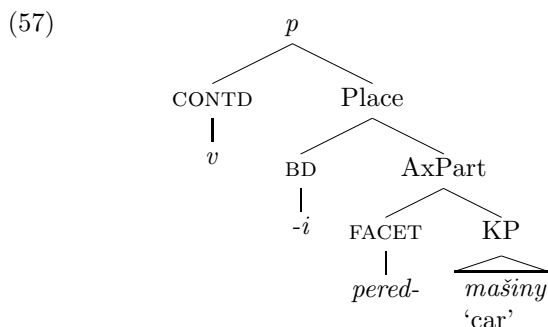


The surface order of the AxPart and Place heads is reversed; this can be modelled in terms of head-movement or in other ways.

In Russian, the unexplained nominal affix was a case marker. The two options are sketched for an example from (30a) in §4.3 above, repeated in (56) below. The case value itself is determined by the higher context (a Path head with the value TO controls Accusative case). Thus, the semantic contribution of the case is made at a higher level, and the spell-out of locative or accusative on the AxPart represents agreement.

- (56) v-perëd mašiny ~ v-peredi mašiny
in-front.ACC car.GEN in-front.LOC car.GEN
 ‘(to) in front of the car’ — ‘(at) in front of the car’

An interesting difference between these examples and the previous ones is the presence of an overt preposition in addition to the case head. Possibly, the head *v* in these cases is a relational head introducing the Figure of the prepositional phrase. I label it *p*, in the tentative representation in (57), and give it the value CONTD for ‘contained.’



The French and Kĩtharaka examples can be treated similarly, with the noun class prefixes and definite articles being dummy expressions of a head above AxPart, possibly Place. Lexical items inserted in the tree which happen to also be nouns bear gender features, and this can control agreement, but they are not inserted under N nodes and therefore there is no NP or DP to host adjectives and quantifiers and to establish reference and so on.

To sum up this section, I suggest that a Neo-Constructivist approach to PP structure can accommodate the many nominal elements that appear in the PP. The reasons for the various polysemies needed for such an analysis would be likely to be historical and external to the system of UG itself. For an interesting alternative involving a null nominal element PLACE, see Terzi (2004), Pantcheva (2006b) and references there.

7. The historical emergence of AxParts

There is a seemingly simple historical explanation for many cases in which an adpositional element has nominal characteristics, namely that a noun has been reanalyzed as an adposition. A case I mentioned in §1 is *beside*, originally from *be sīdan*, ‘by side,’ where *sīdan* is a dative form of *sīde*, ‘side.’¹¹ However, this explanation turns out to have serious limitations. Other Old English adpositions with this same basic form include *be+nīðan* ‘beneath,’ *be+foran* ‘before, in front of,’ and *be+twēonum* ‘between’; but apparently none of these involves a noun. The words *nīðan*, a form of *nīðer*

¹¹Etymologies here are mainly based on the *Oxford English Dictionary*, the *American Heritage College Dictionary*, 3rd ed., and the *Bosworth-Toller Anglo-Saxon Dictionary*.

‘down’ and *foran*, a form of ‘forth,’ are directional particles or adverbs and *twēonum* ‘two each’ seems to be some sort of quantifier (related to *twā* ‘two,’ cf. Watkins 1985:16). Thus, it cannot be said that the *be-* series of adpositions in English comes from a reanalysis of a preposition plus a noun.

I speculate that instead, *be* served in these examples as a Place head, and different lexical elements were recruited to serve as AxParts. These elements might be recruited from the ranks of nouns, adverbial directional particles, or quantifiers.

Another illustrative series is the one beginning with *a-*:¹² *about*, *above*, *along*, *among*, *across*, *around*, *atop*, and so on. Historically, some of them can be traced back to an origin starting with a form of the preposition *on* ‘on, in.’ Again, however, it would be wrong to think that they systematically consisted of a preposition plus a noun, which became reanalyzed as an adposition. Their history is more complex.

About and *above* are formed from *butan* ‘outside’ and *bufan* ‘over,’ which themselves include *be* plus the directional particles *utan* related to ‘out’ and *ufan* related to ‘up,’ just as with *beneath* and *before*. *Among* comes from *on gemang* ‘in crowd,’ with a collective prefix *ge-* on a root which is apparently verbal (cf. *mengan* ‘mix,’ Watkins 1985:38).

The forms *across*, *around*, *atop* appeared much later, along with forms that have never become complement-taking prepositions, such as *abed*, *afoot*, *asleep*, *ashore*, *afield* (cf. *atop the dresser* but **ashore the island*). In some cases it is not clear that the element after *a(n)-* was ever a noun; consider for example *afloat*, which appears to be formed on a verb, or the now-defunct *alow*, which appears to be formed from the adjective *low*. Again, if *a(n)* was a Place head, then it seems that material from different categories was recruited to serve as AxParts.

Clearly, a more careful historical investigation into these elements is warranted. The tentative conclusion, however, is that there are other sources for complex prepositions than P+N. This is expected if UG provides a functional lattice on which to build spatial constructions, and various lexical material is recruited to fill this lattice.

8. Conclusion

I have suggested that a striking cross-linguistic pattern of prepositional syntax be provided with a uniform analysis in terms of a category AxPart, which translates semantically as a region on the basis of which a vector space is constructed. I have argued against the idea that AxParts are a subclass of category N, though N is undeniably an important source for AxParts diachronically. On this Neo-constructivist analysis, lexical material is inserted into a syntactico-semantic structure. Polysemous lexical material can be inserted under nodes of different categories, retaining its conceptual

¹²Thanks to Ans van Kemenade for helpful discussion.

and phonological content, but showing different syntactic behavior in the different syntactic environments.

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