Complex Prepositions

Isabelle Roy and Peter Svenonius
CASTL, University of Tromsø

Abstract

Complex spatial prepositions of the type *in front of* in English and *à côté de* in French can be decomposed into three pieces: PLACE, AXPART and K, an analysis supported on the one hand by their morphosyntax, on the other by their compositional semantics, and which accounts for complex prepositional expressions in a wide variety of languages, even those not genetically connected. Beyond the domain of space expressions, this paper aims at investigating how the tripartite analysis can be extended to two other areas where complex Ps are commonly found: temporal Ps and causal Ps.

Les prépositions spatiales complexes du type *in front of* en anglais et *à côté de* en français peuvent être décomposées en trois parties: PLACE, AXPART et K, une analyse motivée à la fois par leur forme morphosyntactique et par leur sémantique compositionnelle, et qui permet de rendre compte des expressions prépositionnelles complexes dans une variété de langues souvent non reliées génétiquement. Au-delà du domaine de l'espace, nous nous intéressons dans cet article à examiner comment l'analyse tripartite peut être étendue à deux autres domaines où les prépositions complexes sont fréquemment utilisées: le temps et la causalité.

1 Decomposition of P

Many languages have complex prepositional expressions to express spatial notions, for example *à l'intérieur de, à côté de, en bas de* and in English *in front of, on top of*, and so on. These can often be decomposed, morphosyntactically, into three parts: [i] a case-head such as French *de* or English *of*, which we will refer to as K (for Case), [ii] a region based on an axial part-whole decomposition, which we call AXPART, and [iii] a PLACE. These can be arranged in a tree structure as in (1).

(1)
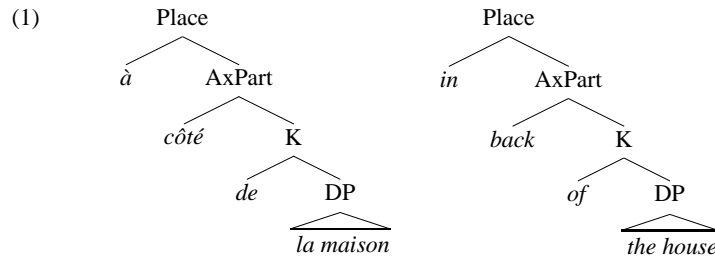
Each of these nodes has a syntax and a semantics. The syntax can be detected by, for example, selection by predicates (e.g. *put* subcategorizes or c-selects for a Place complement, Emonds 2000). The semantics can be expressed in terms of 'regions' (contiguous sets of points in space, Kracht 2002).

For example, K is semantically a function from a 'Ground' object (in the sense of Talmy 2000) to an associated region (what Wunderlich 1991 calls the EIGENPLACE). The AxPart is a function from K to related regions. Typically, for spatial expressions, it is specified as an axial part of the Ground, such as a top, bottom, front, back or side (see Jackendoff 1996, Svenonius 2006), but it may also be a 'vicinity,' a nearby space.

A Place head like *à* is defined as a function from AxParts to vector spaces of the sort developed in Zwarts (1997). For example, in *à côté de*, the nominal *côté* selects an AxPart (the side) of the Ground object introduced by the case-head *de*, and the Place element *à* projects a vector space from the *côté* of the Ground, i.e. a set of vectors of differing lengths pointing away from the AxPart (the side). *Paul est à côté de Marie*, means, accordingly, that Paul is located at the end of one or more vectors projected from Mary's side.

Ruwet (1969) argued that all spatial prepositions are decomposed into a spatial function (*à*) and a locative relation. Bennett (1975) similarly developed syntactico-semantic decompositions of monomorphemic English prepositions such as *in* and *under*.

Since e.g. *behind the house* means exactly the same thing as *in back of the house*, and we have assigned meanings to the Place and AxPart components (plus a licensing component K) it stands to reason that a simple preposition like *behind* consists of the same three parts abstractly, essentially following Ruwet.

2   Cross-linguistic motivation

Traditionally, complex prepositions are usually treated as unanalyzable idiomatic units. The decompositional analysis of complex spatial prepositional constructions makes stronger predictions, for example that the middle part should identify an axial part (compare *in back of* with *in front of*), and that the outer part should determine such notions as proximity versus contact versus projection (compare *in front of* with *on top of*). In other work (Svenonius to appear; 2008), we show how the decompositional structure makes other accurate predictions, when coupled with an appropriate semantic analysis of the individual parts (see also Starke 1993).

An analysis based on this decomposition has been extended to many languages, including Japanese and Korean, Persian, Kannada, Bantu languages, and many others (e.g. Pantcheva 2006, Muriungi 2006, Svenonius 2006, Amritavalli 2007). To give two examples, a Japanese PP (as discussed by Ayano 2001, Takamine 2006) is illustrated in (2a), and a Tzeltal relational noun (as discussed by Brown 1994 and Levinson 1994) is exemplified in (2b).

(2)   a.   Mary-wa   ie-no   naka-de   hashit-ta.
              Mary-TOP *house*-GEN *inside*-LOC *run*-PAST
              'Mary ran in the house' (Japanese, Takamine 2006)

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 (2a), K is genitive case, the AxPart is *naka* 'inside', and Place is spelled out by the locative suffix or postposition *-de*. In (2b), the AxPart is expressed by *-ajk'ol* 'uphill', and the Place head is *ta* 'at.' K is the possessive *y-*. Brown and Levinson note differences between Tzeltal relational words and body part nouns like *chikin* 'ear', for example the fact that the latter are sensitive to the shape of the Ground. On our account, such differences follow from the fact that AxParts like *ajk'ol* are not nouns.

We suggest that such PPs have the same compositional structure as their French and English counterparts, which accounts for their having the same kinds of denotations. The surface differences have to do with the order of the terminals: Japanese is head-final, and the K morpheme in Tzeltal cliticizes to the AxPart head.
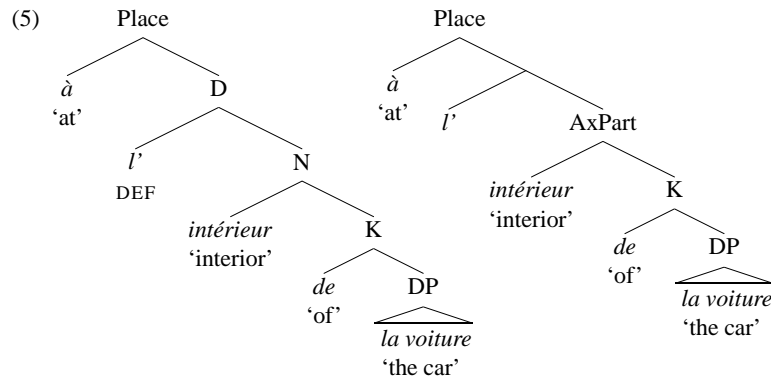
(3)
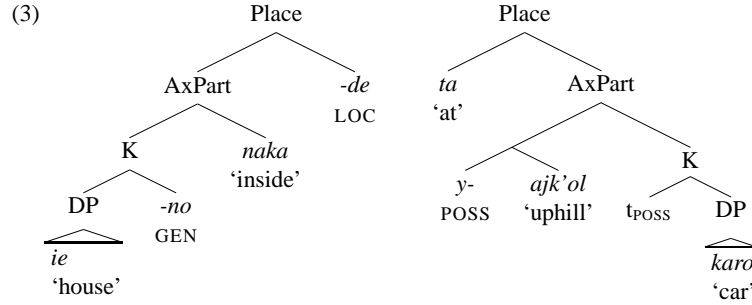
3   French Complex Spatial P

The words identified by Borillo (1988; 1999; 2001), Aurnague (1996) as *noms de localisation interne* (NLIs) are presented in (4). They are based on what we are calling AxParts; cf. also Roy (2006) on body part expressions used as AxParts.

(4)

	P	NLI	P comp régime	
'in'	dans	le dedans	au dedans de	en dedans de
'on'/'above'	sur	le dessus	au dessus de	par dessus
'under'	sous	le dessous	au dessous de	en/par dessous (de)
'in front of'	devant	le devant	au devant de	
'before'	avant	l'avant	à l'avant de	en avant de
'behind'	derrière	le derrière		par derrière
'behind'	arrière	l'arrière	à l'arrière de	en arrière de
'around'		?le tour	autour de	
'along'		?le long	au/le long de	
'across'		?le travers	au travers de	à travers
'beside'		le côté	au/du côté de	à côté de
'at the base of'		le pied	au pied de	
'in front of'		la face		en face de
'in the front part of'		la tête	à la tête de	en tête de

For several of the AxParts here, it is clear that they have been reanalyzed historically from noun phrases, and in fact, several of them retain the definite article. What this means is that a structure like that on the left in (5) can be reanalyzed by a generation of speakers into a structure like that on the right; at this point, a word like *intérieur* is grammaticized as an AxPart and will have AxPart semantics, rather than or in addition to its use as a noun (we are unsure about the structural status of the vestigial definite article, and so leave it unlabeld in the tree on the right).

(5)

Place
- *à* 'at'
- D
  - *l'* DEF
  - N
    - *intérieur* 'interior'
    - K
      - *de* 'of'
      - DP
        - *la voiture* 'the car'

Place
- *à* 'at'
- *l'*
- AxPart
  - *intérieur* 'interior'
  - K
    - *de* 'of'
    - DP
      - *la voiture* 'the car'

Synchronically, AxParts can be distinguished from nouns by a host of syntactic tests. For example, only nouns can form plurals, be modified by adjectives, be substituted for by pro-forms like *one*, and so on. When a word is grammaticized as an AxPart, it loses these capabilities (Svenonius 2006).

For a while, of course, a word may retain an ambiguity. Thus a word like *côté* can be used as a noun, as in (6a), but when it is used as an AxPart, it cannot be modified by an adjective, as illustrated in (6b) (Roy 2006).

(6)   a.   Le côté ombragé de la maison est couvert de vigne.
           the side shady   of the house is covered of vines
           'The shady side of the house is covered with vines'
      b.   Il y a   des   vignes à côté (*ombragé) de la maison.
           it there has of.the vines at side shady   of the house
           'There are vines beside the house'

The theory, developed for spatial prepositions, can be extended to other classes of complex prepositions as well. We will consider two cases below, temporal prepositions of the type *autour de* 'around', *à la fin de* 'at the end of', and causal prepositions of the type *à cause de* 'because', *afin de* 'in order to'.

4   Extension to Temporal P

It is well known that temporal expressions can develop historically from spatial ones (for a discussion of Romance prepositions in particular, see Fagard 2006). A notable difference between the spatial dimension and the temporal dimension is the switch

from three dimensions to one. This difference aside, however, the tripartite analysis developed above for spatial Ps can be easily shown to accurately decompose temporal Ps, as illustrated in (7) as well (assuming that *autour* is decomposable into the Place head *à*, the article *le* and the AxPart *tour*):

(7)   autour   de Noël
      at.the.turn of Christmas
      'around Christmas'

In these cases, the element that we referred to as KP denotes not a set of points in space, but a set of points on the time line. AxPart is a function from the temporal 'region' denoted by KP (a portion of the time line) to some subpart of that, named by the word lexicalizing AxPart.

For example, *tour* in space will select a kind of circle around the Eigenplace, while *tour* in time (as in (7)) will select the temporal equivalent, i.e., the temporal 'region' directly before and after the referred-to event denoted by the Ground. Concretely, this means that in *autour de Noël* the Ground is *Noël*, the KP is a particular interval on the time line conventionally related to *Noël* (probably its duration), the Region denoted by the AxPart *tour* is the set of points which are 'around' that interval (on either side) from which the Place element *à* projects a time period before and after Christmas.

While certain temporal prepositions allow ambiguously spatial senses (like (7) above, as well as examples (8) to (10), below), others are purely temporal (cf., (11) — *début* does not have a distinct spatial use, assuming that expressions such as *au début de la rue* 'at the beginning of the street' involve 'fictive motion' in the sense of Talmy 2000:Ch. 2).

(8)   a.   aux   environs   de 17h
           at.the surroundings of five.o'clock
           'around five o'clock'
      b.   aux   environs   de la rue   St. Jacques
           at.the surroundings of the street St. Jacques
           'around St. Jacques Street'

(9)   a.   tout au   long de la nuit
           all   at.the long of the night
           'all throughout the night'
      b.   au   long de la rivière
           at.the long of the river
           'along the river'

(10) a.   à l'entrée de l'hiver
           at the.entry of the.winter
           'at the beginning of winter'
      b.   à l'entrée de la maison
           at the.entry of the house
           'at the entrance of the house'

(11) a. au   terme de ses efforts
          at.the end   of his efforts
          'after his efforts'
      b. à la fin du   siècle
          at the end of.the century
          'at the end of the century'
      c. au   début   de sa carrière
          at.the beginning of his career
          'at the beginning of his career'

The specialization of *terme*, *fin* and *début* for time, however, seems to be a matter of semantic selection (s-selection) rather than featural or syntactic subcategorization (c-selection) (see Chomsky 1965 on the distinction). If this is correct, then this selection is similar to the case of a verb like *drink* selecting for liquids exclusively (s-selection), rather than the case of a verb like *dine* subcategorizing for a PP (c-selection).

5   Extension to Causative P

The extension of the tripartite analysis to complex causal prepositions of the type illustrated in (12) is possible at the relevant level of abstraction.

(12) a. à cause de
          at cause of
          'because'
      b. afin   de
          at.end of
          'in order to'
      c. de façon   à
          of manner at
          'in order to'

As observed by Talmy (2000), the GROUND expresses the CAUSE, while the FIGURE designates systematically the *resulting event* (or effect, consequence) (cf. also Iordanskaja and Arbatchewsky-Jumarie 2001).

Just as a Ground in physical space is surrounded by various regions which can be named by an AxPart in order to locate a Figure of interest (the *above* region, the *behind* region, etc.), an event can be conceptualized as a Ground in a causal space, surrounded by event classes which can be named — those which are *motivated* by the Ground, those which are *enabled* by the Ground, those which are *forced* by the Ground, and so on.

Concretely, in (13), for instance, the Figure expresses a *consequence*, and the Ground a *cause*; in (14) the Figure expresses a *preparatory event*, and the Ground a *motivation/goal/objective*; in (15), the Figure expresses a *successful event* and the Ground an *ineffective hindrance*; in (16) the Figure expresses a *conditional event* and the Ground a *requirement*; and in (17) the Figure expresses an *enabling event* and the Ground a *goal/motivation*:

(13) [Paul a annulé son voyage]$_{Figure}$ à cause de [Marie]$_{Ground}$
Paul has cancelled his trip at cause of Mary
'Paul cancelled his trip because of Mary'

(14) [Les sans-papiers doivent s'unir]$_{Fig.}$ afin de [défendre leurs
*the.*PL *without-papers must* REFL.*unite at.end of defend their*
droits]$_{Gr.}$
rights
'Illegal workers must unite in order to defend their rights'

(15) [Nous sommes allés voir le film]$_{Fig.}$ en dépit des [mauvaises
*we are gone see the film in despite of.the.*PL *bad*
critiques]$_{Gr.}$
reviews
'We went to see the movie despite the bad reviews'

(16) [Nous pouvons encore arriver à l'heure]$_{Fig.}$ à condition de [partir
we can still arrive at the-hour at condition of leave
maintenant]$_{Gr.}$
now
'We can still arrive on time on the condition that we leave now'

(17) [La veine a été nettoyée]$_{Fig.}$ de façon à [laisser le sang circuler]$_{Gr.}$
the vein has been cleaned of manner at let the blood circulate
'The vein has been cleaned in such a way as to let the blood circulate'

The causal relationships expressed by the various French causal prepositions are summarized in the table below:

(18)

Resulting event (Figure)	Causing event (Ground)	P
Consequence	Cause	*à cause de* 'because'
Preparatory event	Goal/Motivation	*afin de* 'in order to'
Enabling event	Goal/Motivation	*de façon à* 'in order to'
Enabling event	Goal/Motivation	*de manière à* 'in order to'
Conditional event	Requirement	*à condition de* 'on/upon condition that'
Temporally ordered (natural) consequence	Cause	*à la suite de* 'as a result of'
Successful event	Ineffective hindrance	*en dépit de* 'despite/in spite of'

Compare the categories postulated by Talmy, in his work on Force dynamics (2000:Ch. 6–8), given in (19):

(19)   a.   Reason: Figure happens *because of* Ground (Reason)
        b.   Concession: Figure happens *although* Ground (Hindrance)
        c.   Substitution: Figure happens *instead of* Ground (Model)
        d.   Causation
             (i)   Nonagentive: Figure happens *from* Ground (Cause)
             (ii)   Agentive: Figure happens *by* Ground (Action)
             (iii) Enabling: Figure happens *as a result of* Ground (Enabling cause)

For causal Ps, KP has to function as a mapping not from objects to the spaces they occupy (spatial Ps), nor from events to the times that they occupy (temporal Ps), but rather from objects or events to other events, e.g. the events that they cause. For example, *cause* selects a simple Cause, *manière* selects an Enabling Cause, *fin* selects a Goal Event, *condition* selects a Requirement, and so on. From the set of (all possible) events caused by the Ground, the AxPart selects a subpart. The Place expressions *à* and *de* express a relation between the Cause identified by the AxPart and the Resulting event (i.e., the Figure).

Concretely, in (20), KP is the set of all possible event-types which are 'downstream' of *les décisions récentes du gouvernement* in a causally structured conceptual domain (mapping of the Ground event into all events that it can cause) and the AxPart *suite* 'continuation' selects a subpart, the set of all consequences in that domain. Place establishes a relation between *les manifestations* (the Figure) and the causally related consequences identified by the AxPart:

(20)   Les   manifestations ont commencé à la suite   des
       the.PL *demonstrations have started* *at the continuation of.the*.PL
       décisions récentes du   gouvernement
       decisions recent   of.the government
       'The demonstrations started as a result of the government's recent decisions'

The truth conditions of the sentence, then, require that the demonstrations be among the 'consequence' subset of the set of all events which are causally downstream of the decisions.

6   Conclusion

Our investigation leads us to identify a common strand running through the collection of spatial, temporal and causal French complex prepositions, despite their apparent heterogeneity (cf. Gross 1981, Gaatone 1976, Adler 2001, for instance). Complex prepositions have a common semantic core represented by the same three pieces, namely Place, AxPart and K, at the relevant level of abstraction.

The account supports a division between two components of meaning. The first is a conceptual component contributed by individual morphemes in the lexicon, including rich descriptive content sufficient to distinguish *front* from *back* but also the various entailments and implicatures of *à cause de* from those of *à condition de*, and also *cat* from *dog*. The other is a lattice of what Talmy (2000:Ch. 3) calls the 'fine structure', with relatively less descriptive content but with an important contribution

to truth conditions. Here resides the difference between regions and vector spaces, between paths and locations, between predicates and arguments.

References

Adler, Silvia. 2001. Les locutions prépositives: questions de méthodologie et de définition. *Travaux de linguistique* 42-43: 157–170.

Amritavalli, R. 2007. Parts, axial parts, and next parts in Kannada. In *Tromsø Working Papers on Language and Linguistics: Nordlyd 34.2,* Special issue on Space, Motion, and Result, edited by Monika Bašić, Marina Pantcheva, Minjeong Son, and Peter Svenonius, pp. 86–101. University of Tromsø, Tromsø. CASTL, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Aurnague, Michel. 1996. Les noms de localisation interne: tentative de caractérisation sémantique à partir des données du basque et du français. *Cahier de Lexicologie* 69 2: 159–192.

Ayano, Seiki. 2001. *The Layered Internal Structure and the External Syntax of PP*. Ph.D. thesis, University of Durham.

Bennett, David C. 1975. *Spatial and Temporal Uses of English Prepositions: An Essay in Stratificational Semantics*. Longman, London.

Borillo, Andrée. 1988. Le lexique de l'espace; les noms et adjectifs de localisation interne. *Cahiers de Grammaire* 13: 1–22.

Borillo, Andrée. 1999. Partition et localisation spatiale: les noms de localisation interne. *Langages* 34 136: 53–75.

Borillo, Andrée. 2001. Il y a prépositions et prépositions. *Travaux de Linguistique* 42-43: 141–155.

Brown, Penelope. 1994. The INs and ONs of Tzeltal locative expressions: The semantics of static descriptions of location. *Linguistics* 32: 743–790.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. MIT Press, Cambridge, Ma.

Emonds, Joseph. 2000. *Lexicon and Grammar: The English Syntacticon*. Mouton, Berlin.

Fagard, Benjamin. 2006. *Evolution sémantique des prépositions dans les langues romanes: Illustrations ou contre-exemples de la primauté du spatial?*. Ph.d., Université Paris 7 René Diderot - Università Roma 3.

Gaatone, David. 1976. Locutions prépositives et groupes prépositionnels. *Linguistics* 167: 15–33.

Gross, Gaston. 1981. Les prépositions composées. In *Analyse des prépositions, 3e colloque franco-allemand de linguistique théorique du 2 au 4 février 1981*, edited by C. Schwarze, pp. 29–39. Constance.

Iordanskaja, L. and N. Arbatchewsky-Jumarie. 2001. Quatres prépositions causales du français: leur sémantique et cooccurrence. *Linguisticae Investigationes* 23 1: 115–159.

Jackendoff, Ray. 1996. The architecture of the linguistic-spatial interface. In *Language and Space*, edited by Paul Bloom, Mary A. Peterson, Lynn Nadel, and Merrill F. Garrett, pp. 1–30. MIT Press, Cambridge, Ma.

Kracht, Marcus. 2002. On the semantics of locatives. *Linguistics and Philosophy* 25: 157–232.

Levinson, Stephen C. 1994. Vision, shape, and linguistic description: Tzeltal body-part terminology and object description. *Linguistics* 32: 791–855.

Muriungi, Peter. 2006. Categorizing adpositions in Kîîtharaka. In *Nordlyd, Tromsø Working Papers in Language & Linguistics: 33.1, Special Issue on Adpositions*, edited by Peter Svenonius and Marina Pantcheva, pp. 26–48. University of Tromsø, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Pantcheva, Marina. 2006. Persian preposition classes. In *Nordlyd, Tromsø Working Papers in Language & Linguistics: 33.1, Special Issue on Adpositions*, edited by Peter Svenonius and Marina Pantcheva, pp. 1–25. University of Tromsø, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Roy, Isabelle. 2006. Body part nouns in expressions of location in French. In *Nordlyd, Tromsø Working Papers in Language & Linguistics: 33.1, Special Issue on Adpositions*, edited by Peter Svenonius and Marina Pantcheva, pp. 98–119. University of Tromsø, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Ruwet, Nicolas. 1969. A propos des prépositions de lieu en français. In *Mélanges Fohalle*, edited by Charles Hyart, pp. 115–135. Duculot, Gembloux.

Starke, Michal. 1993. Notes on prepositions and clause-structure. Memoire de Diplôme, University of Geneva.

Svenonius, Peter. 2006. The emergence of axial parts. In *Nordlyd, Tromsø Working Papers in Language & Linguistics: 33.1, Special Issue on Adpositions*, edited by Peter Svenonius and Marina Pantcheva, pp. 49–77. University of Tromsø, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Svenonius, Peter. 2008. Projections of P. In *Syntax and Semantics of Spatial P*, edited by Anna Asbury, Jakub Dotlačil, Berit Gehrke, and Rick Nouwen, pp. 63–84. John Benjamins, Amsterdam.

Svenonius, Peter. to appear. Spatial prepositions in English. In *Cartography of Syntactic Structures, vol. 6*, edited by Guglielmo Cinque and Luigi Rizzi. Oxford University Press, Oxford.

Takamine, Kaori. 2006. Categorical properties of space expressions in Japanese. In *Nordlyd, Tromsø Working Papers in Language & Linguistics: 33.1, Special Issue on Adpositions*, edited by Peter Svenonius and Marina Pantcheva, pp. 78–97. University of Tromsø, Tromsø. Available at http://www.ub.uit.no/baser/nordlyd/.

Talmy, Leonard. 2000. *Toward a Cognitive Semantics: Concept Structuring Systems*, vol. I. MIT Press, Cambridge, Ma.

Wunderlich, Dieter. 1991. How do prepositional phrases fit into compositional syntax and semantics? *Linguistics* 29: 591–621.

Zwarts, Joost. 1997. Vectors as relative positions: A compositional semantics of modified PPs. *Journal of Semantics* 14: 57–86.