[REVIEW]

Mapping Spatial PPs: The Cartography of Syntactic Structures, Volume 6

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1. Introduction

Recently exploring the cartography of syntactic structures has received more attention as a central topic for study and has thus far contributed to the precise articulation of the internal structures of categories such as DP and CP, among others. As is well known, since Abney (1987), many researchers have revealed that DPs involve several functional projections (e.g. Number Phrase). Rizzi (1997) proposes that CPs are split into four functional projections, including Force Phrase, Topic Phrase, Focus Phrase, and Finiteness Phrase. These analyses are made on the basis of both empirical facts about feature agreement, word order variations, occurrences of adjunct modifiers, etc. and theoretical assumptions of head/phrasal-movement, agreement configurations, etc.

Along the same lines, the book under review here, *Mapping Spatial PPs*, a collection of eight individual papers including Chapter 1, an introduction to the book, sheds light on the cartography of PP structures and attempts to outline a universal hierarchical structure of spatial (i.e. locative and directional) PPs by investigating rich data from Romance, Germanic, and African languages. Among the spatial PPs are spatial prepositional PPs, postpositional PPs, circumpositional PPs (with both a preposition and a postposition), complex prepositional PPs, complex postpositional PPs, and particles. Koopman (2000), which is reprinted in Chapter 2, first elaborated

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on fine-grained cartography of PP structures and has had a great influence on other papers in this book. This volume also gives us clues in answer to the question of whether P is lexical or functional, and provides several significant ways of classifying Ps and clarifying what functional categories are involved with Ps cross-linguistically. Consequently there is no doubt that this book is a substantial contribution to our understanding of the syntax of PPs, their extended projections,¹ and their structural parallelism with clausal and nominal extended projections.

This review is organized as follows. Section 2 presents a summary and the core proposals of each contribution in Chapters 1–8; section 3 introduces some convincing arguments for extended projections of spatial PPs; section 4 discusses extended projections of nonspatial PPs in English; and section 5 concludes this review.

2. Summary and Core Proposals of Each Chapter

In Chapter 1, Cinque provides an introduction to this book by classifying spatial prepositions into two types: functional Ps and lexical Ps, in other words, (stative and directional) “simple Ps” and “complex Ps.” Cinque shows that these differ in complement selection, P-stranding, case-assignment, binding domain, etc., and claims that complex Ps correspond to Jackendoff’s (1996) “axial parts” (e.g. *front/back*, *up/down*, etc.)² and are in fact phrasal modifiers of an unpronounced head noun PLACE (Kayne (2004)).³

Cinque argues that directional PPs embed stative PPs that contain axial part Ps and advances the following hierarchical structure for PPs like *from under the table*, in which the stative P *AT* is covert:

- (1) [_{PPdir} from [_{PPstat} AT [_{DPplace} [_{AxPartP} under X⁰ [_{PP} P [_{NPplace} the table
[PLACE]]]]]]]] (p. 8)

Further, Cinque suggests that (1) optionally involves additional projections such as a degree phrase,⁴ a “mode of direction” phrase, an “absolute viewpoint” phrase, a “relative viewpoint” phrase, and a deictic phrase:⁵

¹ The term “extended projection” is taken from Grimshaw (1991) and defined as a collection of functional heads that dominate a category (P in this case).

² For detailed discussion of axial parts, see Svenonius’ analysis in Chapter 4.

³ This idea is put forward by Terzi (Chapter 6) much in line with Kayne (2004) and adopted by Noonan (Chapter 5) as well.

⁴ Cinque adopts Koopman’s and Den Dikken’s analyses of degree phrases in Chapters 2 and 3, respectively.

⁵ Cinque follows Svenonius’ analysis of deictic phrases and axial parts in Chapter 4.

- It should be noted that (2) is realized in different languages by different types of leftward movements and by the (non)pronunciation of some of its components.

(3) $[_{\text{PlaceP}} [\text{r-pronoun}]_i \text{ Place } [_{\text{PP}} \text{P } [_{\text{AgrP}} [\text{non-r-pronoun}]_j \text{ Agr } [_{\text{PP}} t_P t_{i/j}]]]]$
(p. 33)

Further, Koopman suggests that (3) should build two more functional projections above it, i.e. DegP(place) and CP(place), from the fact that r-pronouns either follow or precede adverbial modifiers like *pal* (= right), *twee meter* (= two meter), etc.:

- She claims that CP(place) is similar to a clausal CP and a nominal DP in that it can undergo pied-piping but none of the smaller projections within it can do so.

(5) a. $[_{\text{PathP}} \text{Path} [_{\text{CP}(\text{place})} \text{C} [_{\text{DegP}(\text{place})} \text{Deg} [_{\text{PlaceP}} \text{Place} [_{\text{PP}} \text{P DP}]]]]]$ (p. 44)
 b. $[_{\text{PathP}} \text{Path} [_{\text{PlaceP}} \text{Place} [_{\text{PP}} \text{P DP}]]]$ (pp. 45, 53, 54)
 c. $[_{\text{PathP}} \text{Path} [_{\text{PP}} \text{P DP}]]$ (pp. 45, 59)

Path behaves like a bound morpheme that either incorporates to V or attracts P, so that directional prepositions merge in Path in (5a) and postposi-

tions and particles move from P to Path in (5b, c). Further, Path attracts to its Spec CP(place) in (5a), PlaceP in (5b), and DP in (5c) to allow these categories to be extracted out of PathP.

In Chapter 3, Den Dikken supports but develops Koopman's analysis by inspecting in more detail the wider distribution of Dutch PPs. He points out that Koopman's structure (5a) cannot apply to cases of complex directional PPs, strictly prepositional directional PPs, and two intrinsically directional Ps plus an r-word. He also demonstrates that (5a) does not account for speaker variation in their judgments on P-incorporation and PP-extraction out of circumpositional PPs.

Additionally, Den Dikken indicates that Koopman's structure (5b) cannot account for the fact that the extraction of r-words out of directional PPs is not always possible. This leads him to suggest that (5c) as well as (5b) is necessary for (strictly) postpositional PPs. Similarly, from the fact that complex postpositional PPs exhibit flexibility concerning r-words and extraction of DP complements, he suggests that they build either (5b) or (5c) in a flexible way.

Importantly, Den Dikken shows that r-words and the Path modifiers following them actually appear even in directional PPs. On the basis of this fact, he revises (5a–c) and proposes a full-fledged CP(Path) structure with a lexical directional PP like (6):

- (6) [CP(Path) C [DegP(Path) Deg [PathP Path [PP P_{Dir} [CP(Place) C [DegP(Place) Deg [PlaceP Place [PP P_{Loc} DP]]]]]]]]] (p. 99)

It is worth noticing that Den Dikken claims that P_{Dir/Loc} is a lexical category and that its extended functional categories are selective and thus not always present.

Interestingly he proposes that the extended structures of PPs are identical to those of NPs and VPs and that they all consist of AspectP, DeixisP, and CP. This leads the conversion of (6) to (7):⁶

- (7) [CP C^[SPACE] [DxP Dx^[SPACE] [AspP Asp^[SPACE] [PP P ...]]]] (p. 100)

Given (7), the complete structures of locative and directional PPs are like

⁶ As for the extended structures of VPs and NPs, Den Dikken advances structures like (ia, b), respectively:

- (i) a. [CP C^[FORCE] [DxP Dx^[TENSE] [AspP Asp^[EVENT] [VP V ...]]]]
 b. [CP C^[DEF] [DxP Dx^[PERSON] [AspP Asp^[NUM] [NP N ...]]]] (p. 100)

In (ia) CP decides the force of sentences, DxP corresponds to TP, and AspP specifies whether the verb is stative or dynamic. In (ib) CP denotes definiteness, DxP specifies person like "me," "you," and "other," and AspP is equivalent to NumP.

the following:

- (8) a. $[_{CP} C^{[PLACE]} [_{DxP} Dx^{[PLACE]} [_{AspP} Asp^{[PLACE]} [_{PP} P_{Loc} \dots]]]]$
 b. $[_{CP} C^{[PATH]} [_{DxP} Dx^{[PATH]} [_{AspP} Asp^{[PATH]} [_{PP} P_{Dir} \dots]]]]$ (p. 104)

Den Dikken accounts for the relevant data of Dutch PPs by positing (8a, b).

In Chapter 4, Svenonius analyzes the hierarchical structure of English spatial (Place and Path) Ps by classifying them into four types, including projective Ps, bounded Ps, extended Ps, and particles. These four types are classified according to the possibility of cooccurrence with each other, modification by a measure expression, omission of a ground argument, cooccurrence with a deictic element such as *there* and *here*, interpretation as locative or directional (or both), the way of checking their semantic features, and so forth. Svenonius' analysis is unique in that semantic features, vector spaces, and axial parts of spatial Ps are reflected as extended projections of PPs. He proposes the following layered structure for spatial PPs:

- (9) p -Deg-Deix-Loc-AxPart-K-DP (p. 144)

In (9) Loc denotes a function from regions to vector spaces, AxPart a function from regions to regions, and K a function from DP denotations to regions. Given (9), *in front of the house* and *ten meters behind the house*, for instance, have the following structures:

- (10) a. $[_{pP} p [_{DegP} Deg [_{LocP} in [_{AxPartP} front [_{KP} of [_{DP} the house]]]]]]$ (p. 131)
 b. $[_{pP} p [_{DegP} ten\ meters\ Deg [_{LocP} Loc [_{AxPartP} behind [_{KP} K [_{DP} the\ house]]]]]]$ (p. 134)

In Chapter 5, Noonan examines doubling phenomena in spatial PPs in (colloquial) German, in which the spatial P cooccurs with its undeleted trace, called "shadow P." Noonan advances a cross-linguistic layered structure like (11):⁷

- (11) $V_{DIR} > R_{PATH} > (Mod_{PATH}) > Path > P_{LOC} > R_{PLACE} > (Mod_{PLACE}) > Place > DP$ (p. 162)

Noonan suggests that whether or not each of these categories is pronounced varies from language to language and that unpronounced categories must be licensed by movement. Noonan also accounts for the fact that in German the object DP in (11) is valued as dative in locational PPs whereas it is valued as accusative in directional PPs. Further, Noonan makes a comparative study of the syntactic behavior of *to* in English, *zu* in German, and *à* in French, and concludes that they lexicalize P_{LOC} in (11). Noonan derives the

⁷ In (11) R is an abbreviation for relation, and Mod for modifier.

relevant examples in terms of movements such as $\text{Mod}_{\text{PLACE}}\text{P}$ to $\text{Spec-P}_{\text{LOC}}\text{P}$, $\text{R}_{\text{PLACE}}\text{P}$ to $\text{Spec-R}_{\text{PATH}}\text{P}$, $\text{P}_{\text{LOC}}\text{P}$ to $\text{Spec-V}_{\text{DIR}}\text{P}$, and so on.

In Chapter 6, Terzi explores a structure of locative Ps in Greek by focusing on complex preposition constructions and demonstrates that her suggested structure can hold basically true for those in Spanish and English as well. She proposes that a locative P is a modifier of a lexical element, i.e. a nonphonologically realized noun called Place, which gives the P a nominal character (see fn. 3). This proposal is based on the fact that the locative P in Greek exhibits similar behavior to an adjective modifying a noun. She argues that if Place is modified by the locative P, this yields a narrower, more specific interpretation of location.

Further, Terzi proposes that the DP containing both the locative P and Place is selected by a functional head P_{Loc} , so that P_{Loc} gives the locative P a functional character. Therefore she concludes the locative P is semifunctional/semilexical, a view compatible with Van Riemsdijk (1990, 1998). The structure she advances for the locative P is like the following, where the DP containing the locative P and Place and the PP containing the DP complement of the locative P form a small clause (SC) since they denote a possession relation:

- (12) ... [PPLoc [$\text{PLoc } \phi$] [SC [DP [$\text{D } \phi$] [NP P [N Place]]] [PP [$\text{P } \phi$] [$\text{DP } \dots$]]]] (p. 204)

In Chapter 7, Aboh sheds light on complex structures including two types of adpositions, P_1 and P_2 , in West African languages such as Kwa and Chadic. He shows that Gungbe (Kwa), for instance, has a linear order P_1 -locative DP- P_2 whereas Degema (Kwa), Zina Kotoko (Chadic), and Mina (Chadic), for instance, have a linear order P_1 - P_2 -locative DP. He proposes that the latter order is derived from the underlying structure of the former order by movement of P_2 over the locative DP (which he calls “referential object”).

Aboh argues that P_1 denotes direction, path, goal, and source, functions as a Case-assigner to a new argument, and owes its origin to a verb, whereas P_2 obtains its semantic property from its relation to the reference object DP, is not involved in Case-assignment, and has its origin in a noun denoting an axial part, a region of an object, a body part, etc. He also demonstrates that the sequence, locative DP- P_2 , forms a constituent by virtue of movement and pronominalization and suggests that it builds a possessive predicate structure IP with the reference object DP in Spec-IP as a possessor and P_2 in the complement of I as a possessum, which initially merges as a bare noun. In conclusion, Aboh advances the following structure for P_1 -locative

DP-P₂:

- (13) [P_{1P} [P₁[Direction/Goal/Path]] [IP DP_[Possessor] [I⁰ φ] [NP<sub>[Possessum]]]]
(pp. 226, 231, 235)</sub>

He suggests that the bare N incorporates into the inflectional genitive head I⁰ and surfaces as P.

In Chapter 8, Abraham classifies spatial Ps into two types: 1) lexical Ps that bear spatial features, theta features, and quantifier features, and; 2) grammatical(ized) Ps that do not bear the above three features. Abraham claims that in German the former Ps allow echo extension (pronominal adverbs) and merge as probes for their governing categories outside vP, whereas the latter Ps correspond to morphological case and merge within VP.

Abraham argues against Jackendoff (1973) that German has no syntactic extension PP → P-PP except for one lexical P *von* (= from). This leads Abraham to compare the structure of *von* + P + dative DP and that of the directional verbal particle *hin/her-* + P + accusative DP and to suggest that the latter particle selected by motion verbs licenses accusative case as well as direction and telicity. Abraham also deals with other cases of dative vs. accusative, e.g. P₁ + dative DP + *dr*-P₁ vs. P₁ + accusative DP + *hin*-P₁, and accounts for their different case licensing by adopting Noonan's proposed structure in (11) and positing Case Phrases (C_{ACC}P and C_{DAT}P) in it (pp. 275–277). In addition, Abraham discusses structural variations of spatial Ps in nonstandard German as well.

3. Arguments for Extended Projections of Spatial PPs

Mapping Spatial PPs offers many pieces of interesting and cogent arguments for extended projections of spatial PPs. For instance, Svenonius (p. 130) and Noonan (p. 178) point out that some locative PPs in English allow directional interpretations with motion verbs, as shown in (14a), which implies that there is a null/silent directional *to* above the locative PPs. In fact, the overt *to* is marginally acceptable, as illustrated in (14b):

- (14) a. The boat drifted [PP behind the hill]. (p. 130)
b. The boat drifted (?to) [PP behind the hill]. (p. 130)

Second, Noonan claims that locative Ps in English involve an abstract (silent) locative P_{LOC} AT and an abstract nominal category Place such as TOP, INTERIOR, BENEATH, etc., (e.g. *on the table* = AT TOP (of) *the table*) (p. 163):

- (15) [P_{LOC}P AT [PlaceP TOP [the table]]] (p. 163)

Noonan follows Terzi's idea that place adpositions such as *in*, *on*, *under*,

etc., are modifiers of a silent Place noun (i.e. Mod_{PLACE} in (11)) (pp. 166–168) (see fn. 3). A structure like (15) is morphologically realized in Spanish, Turkish, and Japanese (pp. 163, 164):

- (16) Taro-ga hon-wo teeburu-no ue-ni oi-ta. <Japanese>
Taro-Nom book-Acc table-Gen TOP-Loc put-Past (p. 164)

Third, Terzi shows that locative Ps in Greek and Spanish can be followed by another smaller P called “light P,” thereby forming a complex preposition (pp. 197, 198, 209). Observe the following Greek examples with the light P *apo/se* following the locative P *piso/epano*:

- (17) a. Stathika piso apo ti Maria.
stood-1s behind *apo* the Mary-Acc
‘I stood behind Mary.’ (p. 197)
- b. Kathomun epano ston Petro.
was-sitting-1s on *se*-the Peter-Acc
‘I was sitting on John.’ (p. 198)

She also argues that English too has an equivalent to a light P that follows locative Ps (e.g. *-side* part of *inside*, *-hind* part of *behind*, etc.) (p. 213).

Fourth, Koopman (pp. 29–35) and Den Dikken (pp. 77–79) indicate that r-pronouns in Dutch, unlike non-r-pronouns and regular DPs, surface to the left of P as its complement, which means that they move up beyond the PP. Compare (18a) with a regular DP and (18b) with a locative r-pronoun *er*:

- (18) a. op de tafel ‘on the table’ (cf. *de tafel op ‘the table on’)
b. er op ‘there on’ (cf. *op er ‘on there’) (p. 29)

Interestingly, r-pronouns appear on either side of bare adverbial modifiers of locative Ps like *pal* ‘right,’ *vlak* ‘just,’ etc., as exemplified in (19a), but they must precede place specifications like *boven* ‘up,’ as in (19b) (Van Riemsdijk (1978)):

- (19) a. (er) pal (er) achter ‘(there) right (there) behind’ (p. 35)
b. omdat ik ze er boven (*er) in heb gelegd
because I them there up (there) in have put
‘because I have put them up in there’ (p. 31)

Fifth, Noonan illustrates a doubling phenomenon, in which spatial Ps in German are accompanied by postpositional Ps called “shadow Ps” that are undeleted traces of the displaced spatial Ps (pp. 164, 168, 169). Noonan assumes that this prevention of deletion is due to an affixal element *dr-*, which is analyzed as associated with R_{PLACE} in (11):

- (20) a. Er sitzt *auf* dem Tisch *drauf*.
 he sits on the_{DAT} table DR-on (p. 164)
 b. Sie ist *in* der Kiste *drin*.
 she is in the_{DAT} box DR-in (p. 164)

Furthermore, Aboh shows that many West African languages have complex or bipartite elements that correspond to English single Ps, which establishes that these elements form complex structures (pp. 225, 226). Example (21) from Zina Kotoko (Chadic), for instance, contains two types of adpositions *a* and *gmá*, corresponding to the English simplex *on*:

- (21) Kàrtà dé a gmá táblàl.
 cards DET P₁ P₂ table
 ‘The cards are on the table.’ (p. 226)

4. In Support of Extended Projections of Nonspatial PPs

Mapping Spatial PPs provides a lot of convincing evidence for a layered structure of spatial PPs. This does not mean that nonspatial PPs are simple PPs without their extended projections. Here I would like to suggest that they build a layered structure in the same way as spatial PPs. Let us first consider English nonspatial adpositions such as *ago*, *apart*, *aside*, *notwithstanding*, *through*, etc., which Arts (2011) lists as postpositions, although English is a head-initial language.⁸

- (22) a. [PP [NP Seventeen years] ago] I met a young man called Nat David Schwartz.
 b. [PP [NP College work] aside], I have just ended this strange relationship with ...
 c. ... this strategy, [PP [NP our aloofness from the eurozone] notwithstanding], has served him well at this time of crisis.
 d. I have been real lucky and everything went perfect [PP [NP all year] through] ((a–d) adapted from Arts (2011: 78, 79))

Suppose the bracketed NP is a complement to P and English is fixed as strictly head-initial. Then it is plausible to assume that the adpositions in (22) are originally merged as prepositional heads preceding their NP complements, thus forming the following initial structure:

- (23) [PP ago [NP seventeen years]]

⁸ *Ago* in (22a) and *through* in (22d) may belong to spatial Ps if they are interpreted as denoting “temporal place” and “temporal path,” respectively.

In order to derive the correct word order, the NP in (23) is expected to move to a Spec position of a certain higher projection for some reason.⁹ This yields the following structure, where the extended functional projection is labeled FP for convenience:

(24) [_{FP} [_{NP} seventeen years] F [_{PP} ago [_{NP} ~~seventeen years~~]]]

In (24) the P *ago* may incorporate into F because of their local relation.

It is clear that A'-movement of an NP complement to Spec-FP, as in (24), is obligatory for *ago* in (22a), *aside* in (22b), and *through* in (22d); otherwise, the correct word order cannot be obtained. If so, it is worth noticing that *notwithstanding* in (22c) should be capable of incorporating further into a certain head higher than F and preceding its NP complement. This is because in (22c) the alternate word order *notwithstanding our aloofness from the eurozone* is also possible. This leaves a possibility that NP movement in (24) is optional for nonspatial Ps like *notwithstanding*. I leave this possibility for future research but we see at least that nonspatial PPs as well as spatial PPs involve some additional functional projections.

Importantly, there seems to be an alternative approach to nonspatial adpositions like those in (22), under which the bracketed NP in (22), e.g. *seventeen years*, is not a complement of P but a degree modifier on a par with *two miles*, *two meters*, etc., in Spec-DegP in (2), (4), (6), and (10b). This approach makes it possible to assume that the whole PP in (22a) is part of a larger nominal structure that contains an unpronounced noun head, e.g. TIME (akin to Kayne's silent PLACE), which refers to the utterance time.¹⁰ This allows us to build the following structure:

(25) [_{DegP} seventeen years [_{ago} TIME]] (cf. (23))

The same analysis is expected to hold for the other adpositions in (22b–d).

A comparison between (24) and (25) shows that according to Koopman's and Den Dikken's analyses of extraction of r-pronouns, the former permits a further extraction of the NP complement in Spec-FP, thereby yielding P-stranding, whereas the latter blocks extraction of the degree modifier in Spec-DegP by virtue of the left branch condition, thereby eliminating P-stranding.¹¹ Therefore, the latter analysis readily rules out examples like

⁹ The NP cannot move to Spec-PP because of the economy condition to the effect that X cannot merge with a projection of a head H twice (Collins (2005: 294)).

¹⁰ I am grateful to an anonymous *EL* reviewer for suggesting this alternative analysis. See also fn. 12.

¹¹ I thank an anonymous *EL* reviewer for pointing this out and providing example (26).

(26) as a left branch condition violation, while the former analysis cannot do so and needs to resort to a certain independent condition like the adjunct condition:

- (26) *How many years did you meet David [~~how many years~~ ago]?
 (cf. How many years ago did you meet David [~~how many years~~ ago]?)

More discussion is necessary to decide which analysis is appropriate but this is beyond our present purpose.¹² What is more important here is that both analyses make it clear that nonspatial PPs form a complex structure with their extended projections. *Mapping Spatial PPs* will surely offer us many helpful hints for elucidating their internal structures in more detail.

5. Conclusion

Mapping Spatial PPs is filled with many new significant facts about spatial PPs and accurate and unprecedented analyses of their internal structures, which inspires us to explore the layered projections of these PPs. The papers clarify their uniform extended projections with rich cross-linguistic data and they provide convincing evidence for the structural parallelism between spatial PPs, clausal CPs, and nominal DPs. In this sense, this book makes a great contribution to the study of the cartography of syntactic structures.

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¹² It should be noted that the latter analysis leaves us the question of why the degree modifier in (25), *seventeen years*, is obligatory for *ago* whereas the degree modifier in (2)/(10b), *two miles/ten meters*, is optional for *under/behind*.

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