

Extending the PP hierarchy: The role of bare nominals in spatial predication

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1 Introduction

Several generative analyses of pre/postpositional phrases (PP) have converged in recognizing a strict structural hierarchy with directional adpositions (PathP) above locational adpositions (PlaceP) (van Riemsdijk 1990; Koopman 2000; Ayano 2001; den Dikken 2003). However, characterizing spatial elements within this layered PP that exhibit nominal properties has proven more problematic. Japanese spatial terms such as *ue* ‘top/on/above/up’ and *shita* ‘bottom/under/below/down’ have sometimes been treated as P with nominal properties (Watanabe 1993), sometimes as N (Ayano 2001), or as N which move to a higher P position in the course of a syntactic derivation (Inagaki 2002). French terms such as *haut* ‘top/up’ and *bas* ‘bottom/down’ are often left unanalyzed within larger structures such as *en haut de* ‘on top of’ or *en dessous de* ‘underneath’. In this paper, I argue that such terms in the context of layered PP are unambiguously of the category N, not P, even though they lack certain characteristic aspects of full lexical nouns. In Section 2, I extend the standard analysis of layered PP structure to include a bare NP projection, which hosts this closed subclass of locative nouns, here termed LocN. The following three sections provide a comparative analysis of LocN in Japanese, French and English. In Section 3, it is argued that in each language LocN is syntactically distinct from open-class, lexical N; Section 4 shows that it is categorially distinct from adpositions; and in Section 5, experimental evidence is used to support the hypothesis that this extended PP-hierarchy is available throughout the process of first language acquisition.

2 The layered PP hypothesis

Recent analyses of a higher PathP and a lower PlaceP in syntax have their origins in Jackendoff’s (1983, 1990) theory of Conceptual Semantics, in

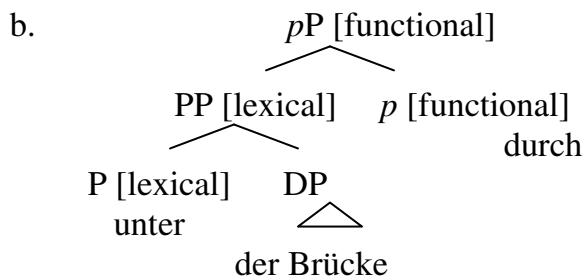
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which sentences like (1a) and (2a) are assigned semantic representations like (1b) and (2b).

- (1) a. The deer came from behind the tree.
 b. $[_{\text{Event}} \text{COME} ([_{\text{Thing}} \text{DEER}], [_{\text{Path}} \text{FROM} ([_{\text{Place}} \text{BEHIND} ([_{\text{Thing}} \text{TREE}])])])]$
- (2) a. Zidane went onto the pitch.
 b. $[_{\text{Event}} \text{GO} ([_{\text{Thing}} \text{ZIDANE}], [_{\text{Path}} \text{TO} ([_{\text{Place}} \text{ON} ([_{\text{Thing}} \text{PITCH}])])])]$

This layered spatial structure has become standard in autonomous semantic representations. However, irrespective of its status in conceptual structure, there is independent evidence that the [PATH [PLACE]] configuration is part of syntactic structure. In van Riemsdijk's (1990) seminal article on this topic, he provides convincing evidence of a higher functional layer in German PPs with circumpositions. In cases where there is a (lower) preposition and a (higher) postposition, the lower lexical P (but *not* the higher functional P) may assign case, may subcategorize the DP, and may impose idiosyncratic selectional restrictions, among other distinctions (van Riemsdijk 1990: 236-237). For example, the preposition *unter* 'under' may assign either dative or accusative case, whilst *durch* 'through' can only assign accusative case. In the following circumpositional structure, it is clearly the lexical preposition *unter* 'under' that assigns case to the object, not the functional postposition.

- (3) a. unter der Brücke durch
 under the-DAT bridge through
 'under the bridge (and out the other side)'



Subsequent work by Koopman (2000) and den Dikken (2003) has bolstered this analysis for directional PPs in Dutch and German, whilst Ayano (2001) provides a comprehensive crosslinguistic survey of previous work that supports an account of PP layers in syntax drawing on data from a broad range of language families including Altaic, Aztecan, Celtic, Finno-Ugric, Germanic, Mayan, Na-Dene and Slavic.

The universality of this structure is further supported by the discovery that in languages that express notions of PATH and PLACE in extended spatial case systems, there is a strict hierarchy of PATH, PLACE and ‘grammatical’ affixes, which exactly mirrors the PP-internal hierarchy. Van Riemsdijk and Huybregts (2001) (following work by Haspelmath 1993) present a paradigm of locative case suffixes in the Caucasian language Lezgian, which includes the following examples.

| | | |
|---------------|---------------------------|----------------------|
| Postesstive | sew-re-q ^h | behind the bear |
| Postrelative | sew-re-q ^h -aj | from behind the bear |
| Postdirective | sew-re-q ^h -di | to behind the bear |
| Subessive | sew-re-k | under the bear |
| Subrelative | sew-re-k-aj | from under the bear |
| Postesstive | sew-re-q ^h | behind the bear |

Table 1. Examples of spatial case-marking in Lezgian (van Riemsdijk and Huybregts 2001: 4).

The full paradigm from which these examples are drawn is striking in its uniformity. In each case, the noun *sew* ‘bear’ is followed by a stem augmentative suffix, which is arguably a morphological analogue of ‘grammatical P’ (English *of*, French *de*, Japanese *no*). This is followed by one or two interpretable morphemes, the first corresponding to PLACE (‘behind’ and ‘under’ in Table 1), and the second corresponding to PATH (‘to’ and ‘from’). Crosslinguistic evidence suggests that there is another plausible candidate for this higher position, as several agglutinative languages have another morpheme in the same slot meaning ‘via’ or ‘past’. Such languages include Inuit (Bok-Bennema 1991) and Walpiri (Hale 1986). As we shall see, this appears to have a syntactic counterpart in prepositions such as French *par* ‘via / through’.

3 Spatial nouns in the PP complex

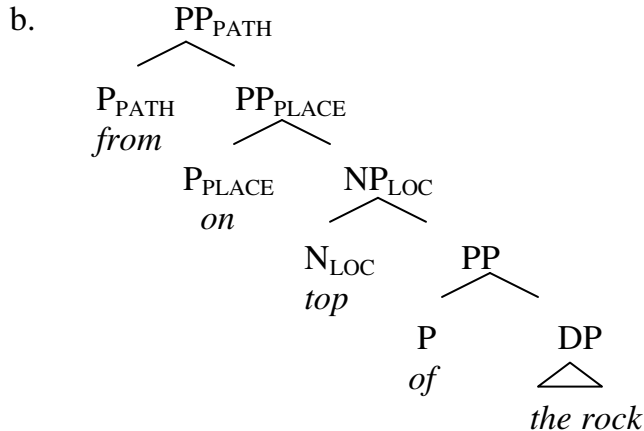
Almost all previous research on elaboration in the PP system has focused on the PathP and PlaceP layers. However, this line of analysis may be extended to include a further common category in a particular, fixed position in the hierarchy: namely, a subclass of spatial nouns here termed LocN. Although several authors have made interesting forays into the role of noun-like elements in PP structure (e.g. Ayano 2001; Holmberg 2002), much work remains to be done on this topic. My own experimentation on the acquisition of the syntax of motion events has focussed on English (which usually express direction in PP), French (which typically expresses direction in either

PP or V), and Japanese (which tends to express direction in V). This particular selection of languages serves to illustrate that the syntactic possibilities discussed hold irrespective of the so-called ‘verb-framed / satellite-framed’ distinction (Talmy 1985). These experiments, to be discussed in more detail in Section 5, furnished the elicited production data from which the following examples are taken. PPs have been italicized for ease of comparison.

3.1 LocN in English

The only elements characterized here as LocN in English are the terms *top* (as in *on top of*), *front* (as in *in front of*), and, in American English only, *back* (as in *in back of*). An example from the elicited production data is given below.

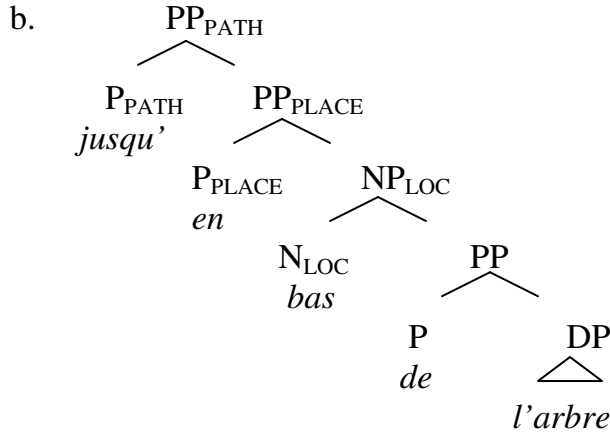
- (4) a. He jumps *from on top of the rock* (English 3-yr-old)



3.2 LocN in French

French terms here treated as cases of LocN include *haut* ‘top’, *bas* ‘bottom’, *dessous* ‘below’, *dedans* ‘inside’ and *dehors* ‘outside’. The only French example in the production data which apparently shows the positions in layered PP all filled is the following.

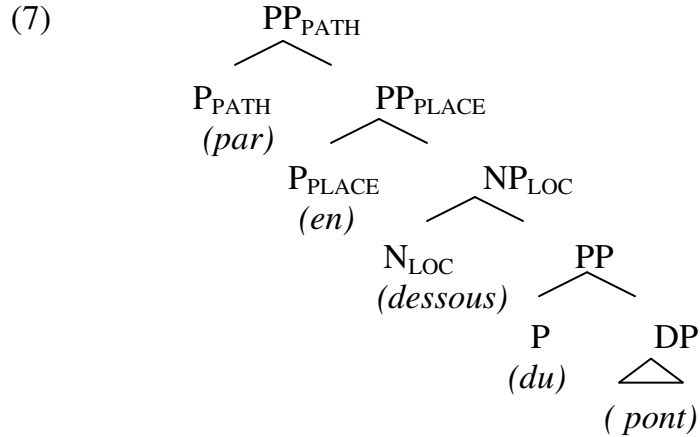
- (5) a. Il glisse *jusqu’en bas de l’arbre* (French adult)
 he slides until-P_{LOC} bottom of the-tree
 ‘He slides to the bottom of the tree.’



However, the status of *jusque* ‘until’ in such cases is controversial. It might be argued that *jusque* is not directional *per se* but rather, like Japanese *made* ‘until’, functions as an ‘event-delimiter’ (Beavers 2003). This does not preclude analyses in which it occupies the same position in the hierarchical structure (a functional P projection above PlaceP). As an alternative, consider the following French utterances describing someone running under a bridge (and coming out the other side).

- (6) a. Il passe *par-dessous* (French 6-yr-old)
 he passes via-underneath
 ‘He goes under it (and out the other side).’
- b. Il passe *en dessous* (French 7-yr-old)
 he passes LocP underneath
 ‘He goes under it (and out the other side).’
- c. Il passe *par en dessous* (French 6-yr-old)
 he passes via LocP underneath
 ‘He goes under it (and out the other side).’
- d. Il passe *en dessous du pont* (French 5-yr-old)
 he goes-via LocP underneath of-the bridge
 ‘He goes under the bridge (and out the other side).’

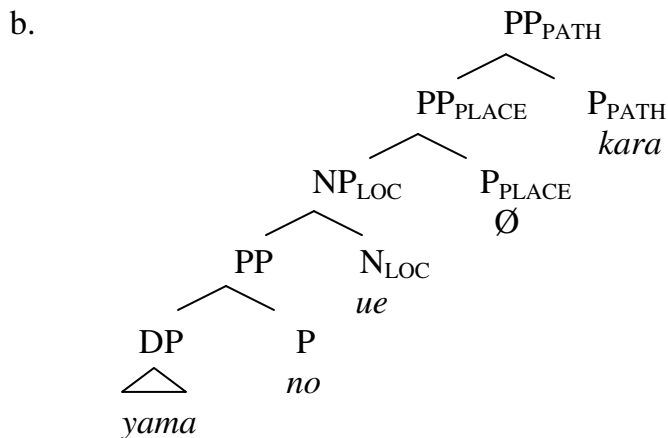
The terms *par* ‘via’ and *en* ‘at/in/on’ (here glossed as LocP) may be used as the sole P above LocN, as in (6a, b), or may stack in accordance with the [PATH [PLACE]] hierarchy, as in (6c). Whilst the former two constructions may be used transitively (6d is one example), the latter, layered PP appears only to be possible in the intransitive form. As mentioned earlier, French *par* ‘via’ is arguably a prepositional equivalent of locative case suffixes in Inuit and Warlpiri, bearing the same semantics in the same syntactic position. A composite example is given below in the form of a tree diagram.



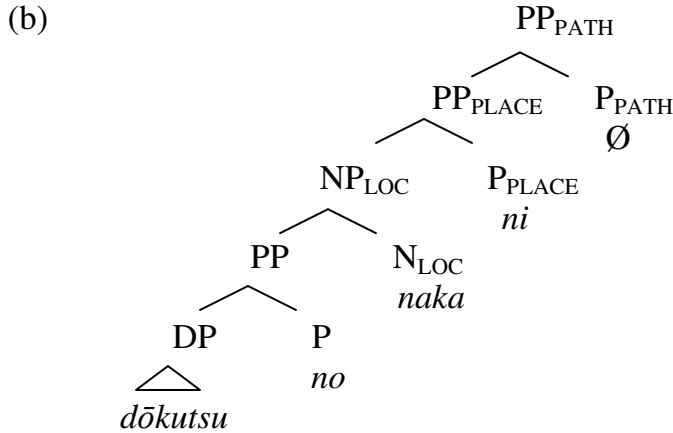
3.3 LocN in Japanese

Despite being occasionally characterized as postpositions, I shall argue that Japanese elements such as *ue* ‘top / above’, *shita* ‘bottom / below’, *naka* ‘inside’, *soto* ‘outside’, *mae* ‘front’ and *ushiro* ‘behind’ are all cases of LocN. Above this nominal position in the hierarchy, Japanese spatial postpositions never stack, so separate examples are given below, with PathP and PlaceP, respectively.

- (8) a. *yama no ue kara korogatta* (Japanese 6-yr-old)
 mountain GEN top from rolled
 ‘He rolled from the top of the mountain’.



- (9) a. *dōkutsu no naka ni haittereru no* (Japanese 5-yr-old)
 cave GEN inside P_{LOC} enter-TE-go-PROG PART
 ‘He’s going inside the cave’



A question remains as to whether *ni* ‘at/in/on’, typically found in locational contexts, stays in the lower position even in directional contexts (this problem applies also to English *in* and *on* in phrases such as *jump in the lake* and *run on the pitch*). Watanabe (1993) assumes that *ni*, interpreted as English ‘to’ in directional contexts, is base-generated in the higher functional projection, whilst elements such as *naka* ‘inside’ are cases of lexical P (albeit with nominal properties), nestled in the PlaceP slot. See Ayano (2001: 72-75) and Stringer (2005: 418-425) for arguments that *ni* is generated and remains in PlaceP, with a null directional morpheme in PathP. Attention here is reserved for the status of elements such as *naka* ‘inside’, which I argue are fundamentally nominal.

3 Differences between LocN and open-class, lexical N

LocN may be distinguished from fully lexical N in such PP contexts by a cluster of properties: it is not preceded by a determiner; it may not be pluralized; and it may not be modified (whether adjectivally, or by means of PPs or relative clauses). Such clustering is indicative of the absence of a DP projection, and I assume that all LocN project a bare NP.¹ The ungrammatical cases in (11) below may be rendered grammatical if the LocN *top* is replaced with a DP *the top*, as in (12).

(10) He climbed on top of the mountain.

¹ The reason that adjectival modification is impossible may be because bare N in this context lacks referential properties associated with the D projection. Ayano (2001: 67) gives the following contrast, exemplifying the LocN *front* in English.

- (i) a. Bill stood in front of the bus. (i.e. outside)
 b. Bill sat in the (very) front of the bus. (i.e. inside)

- (11) a. *He climbed on tops of the mountains.
 b. *He climbed on snow-covered top of the mountain.
- (12) a. He climbed on the tops of the mountains.
 b. He climbed on the snow-covered top of the mountain.

These contrasts are also found in French, as shown below.

- (13) Il a grimpé en haut de la montagne.
 he AUX climbed P_{LOC} top of the mountain
 ‘He climbed on top of the mountain.’
- (14) a. *Il a grimpé en hauts des montagnes.
 he AUX climbed P_{LOC} top-PL of-the-PL mountain-PL
 ‘He climbed on tops of the mountains.’
 b. *Il a grimpé en haut enneigé de la montagne.
 he AUX climbed P_{LOC} top snow-covered of the mountain
 ‘He climbed on snow-covered top of the mountain.’
- (15) a. Il a grimpé sur les hauts des montagnes.²
 he AUX climbed on the-PL top-PL of-the-PL mountain-PL
 ‘He climbed on the tops of the mountains.’
 b. Il a grimpé sur le haut enneigé de la montagne.
 he AUX climbed on the top snow-covered of the mountain
 ‘He climbed on the snow-covered top of the mountain.’

Despite the lack of overt Ds in Japanese, the same restrictions with regard to modification may be observed by replacing the LocN with a *bona fide* lexical N, such as *chōjō* ‘summit’, which accepts modification, as shown in (17b).

- (16) Yama no ue ni nobotte itta.
 mountain GEN top P_{LOC} climb-TE went
 ‘He climbed on top of the mountain.’
- (17) a. *Yama no yuki no tsumotta ue ni nobotte itta.
 mountain GEN snow GEN covered top P_{LOC} climb-TE went
 ‘He climbed on snow-covered top of the mountain’
 b. Yama no yuki no tsumotta chōjō ni nobotte itta.
 mountain GEN snow GEN covered summit P_{LOC} climb-TE went
 ‘He climbed on the snow-covered summit of the mountain.’

² In general French speakers dislike this form, preferring to keep *haut* in the singular; however, some speakers accept it, and all informants agree that there is a definite grammaticality contrast with (14a).

5 Differences between LocN and P

Despite the differences in referential properties between LocN and fully lexical nouns, it can be clearly demonstrated that these elements are of the category N rather than P, using constructed examples. The first two observations concern the relation of LocN to the FIGURE and the GROUND in the motion event. The FIGURE is the object that is moving or located with respect to a reference point, the GROUND. Therefore, in the example below, the boy is the FIGURE, and the hill is the GROUND.

(18) The boy clambered on top of the hill.

First, LocN cannot directly predicate anything of the FIGURE; rather, it requires a true P to ‘relate’ the FIGURE and the LocN. (In his paper on PP structure in Zina Kotoko, Holmberg (2002) refers to these higher elements as ‘relators’). The PP variations on example (18), below, illustrate this in English, French and Japanese, respectively.

- (19) a. *(on) top of the hill
b. *(en) haut de la colline
LocP top of the hill
c. oka no ue *(ni)
hill of top at

Second, LocN cannot directly assign case to the GROUND object, but requires the insertion of a grammatical P (English *of*; French *de*; Japanese *no*), as shown with another set of variations on the same example.

- (20) a. on top *(of) the hill
b. en haut *(de) la colline
LocP top of the hill
c. oka *(no) ue ni
hill of top at

A third observation is that modifiers of P and LocN are distinct. In English, the degree modifier *right* is used only with P (Jespersen 1992 [1924]), as shown below.

- (21) a. Julie fell (right) from (right) on (*right) top of the mountain.
b. The streaker ran (right) in (*right) front of the queen.

Similarly, in Japanese the degree modifier *ma-* ‘right / straight’ is used only with LocN; such modification of uncontroversial cases of the category P results in ungrammaticality.

- (22) a. Tēburu no ma-ue de odotta
 table GEN right top LocP danced
 ‘He danced right on top of the table’
 b. Tēburu (*ma-) de odotta
 table (right) LocP danced
 ‘He danced (right) on the table’
- (23) a. Gakko no man-mae ni hashitte itta
 school GEN right front LocP run-TE went
 ‘He ran straight in front of the school’
 b. Gakko (*ma-) ni hashitte itta
 school (straight) LocP run-TE went
 ‘He ran (straight) to school’

A fourth contrast is found in Japanese only; unlike in English or French, LocN in Japanese may be assigned accusative case, as in the following examples from the elicited production data.

- (24) *ki no naka o tōtte itta no.* (Japanese 3-yr-old)
 tree GEN inside ACC go-via-TE went PART
 ‘He went through the tree.’
- (25) *hashi no shita o kugurimashita* (Japanese adult)
 bridge GEN underneath ACC go-via-under-PST
 ‘He went under the bridge.’

These four sets of observations support an analysis of such elements as N (following Ayano 2001), rather than P (as in Watanabe 1993).

5 The PP hierarchy in first language acquisition

Evidence bearing on children’s knowledge of the PP hierarchy comes from a series of experiments on the acquisition of motion events, reported in full in Stringer (2005). In the elicited production experiment from which several examples in this paper have been drawn, a total of 95 English, French and Japanese monolingual test subjects were divided into 5 age groups from 3 to 7 years, and there was a sixth group with adult test subjects. There were on average 5 participants in each age group (2 groups of 4, 12 groups of 5, 1 group of 6, and 3 groups of 7). Utterances with directional predicates were

elicited using a purpose-designed picture-story, illustrating events with both MANNER and PATH. The narrative runs as follows: a monkey sits in a tree-house about to eat his banana; a parrot swoops in, steals the banana, and flies off. The monkey chases the parrot, determined to retrieve his banana. Their chase takes the monkey through several different spatial environments. On each page relevant to the analysis, he follows a particular trajectory (e.g. ‘down’, ‘under’, ‘over’, etc.), varying with the obstacles he encounters, and he exhibits a particular manner of motion (e.g. he ‘slides’ down a tree-trunk, ‘runs’ under a bridge, ‘jumps’ over a rock etc.). The monkey follows the parrot into a cave, where they encounter a lion. The lion chases them out of the cave, after which the parrot drops the banana and flies away. The monkey recovers it, then retraces his steps back home as fast as he can, going through all the motions a second time, before eating his banana in peace. The experiment made use of a simple and relatively straightforward elicitation procedure. The experimenter introduced each page by describing the location, in order to encourage subjects to focus on trajectory rather than locational setting.³ Subjects were then asked to describe the monkey’s actions; if they did not do so, a prompting strategy was adopted to elicit appropriate responses; the use of directional predicates of any type was scrupulously avoided in the prompts. Each experiment was recorded on micro-cassette, all responses related to the materials were transcribed, and 1608 examples of PATH predication were selected for analysis.

For posited universal structures such as layered PP, assuming the ‘continuity hypothesis’, it is to be predicted that they will be present and inviolable at all stages of acquisition. Thus, despite the range of child errors in the expression of motion events, we should never find the following types of utterance.

- | | | |
|------|---|--|
| (26) | a. * <i>on from</i> top of the rock | *[P _{PLACE} [P _{PATH}]] |
| | b. * <i>from top on</i> of the rock (context: from on top of the rock) | *[N _{LOC} [P _{PLACE}]] |
| (27) | a. * <i>en jusque</i> bas de l’arbre P _{LOC} until bottom of the-tree | *[P _{PLACE} [P _{PATH}]] |
| | b. * <i>jusque bas en</i> de l’arbre until bottom P _{LOC} of the-tree (context: to the bottom of the tree) | *[N _{LOC} [P _{PLACE}]] |

³ Slobin’s (1996) comparative study of English and Spanish motion events indicates that speakers of verb-framed languages may have a locational bias in event descriptions, elaborating on the environmental detail and leaving aspects of the trajectory to be inferred.

(28) *dōkutsu no *ni naka*.⁴
 cave GEN P_{LOC} inside
 (context: into the cave)

*[N_{LOC} [P_{PLACE}]]

The results reveal that in all 1608 examples of path predication in the elicited production data, there was not a single word-order violation. Whilst this cannot be said to be prime verification of the inclusion of layered PP in the theory of Universal Grammar, as word-order violations in first language acquisition are relatively rare in any case, it nevertheless constitutes extremely suggestive evidence to shore up the arguments from comparative syntax summarized in Section 2. Although more research is clearly necessary, it seems justifiable to adopt the hypothesis that the internal structure of PP is something children *never have to learn*: they simply never err when it comes to this aspect of the computational system.

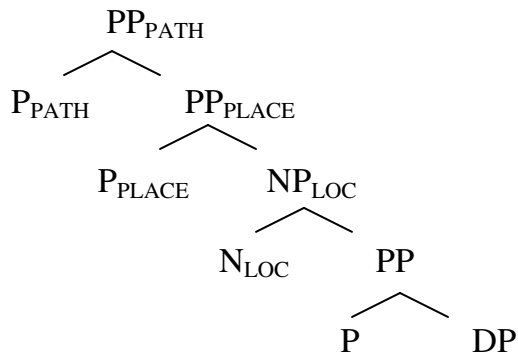
6 Conclusion

The above considerations combine to justify the inclusion of LocN in layered PP, so that Universal Grammar may be understood to make available the following syntactic structure:

(29) [_{PP, PATH} α [_{PP, PLACE} β [_{NP, LOC} γ ([_{PP} δ)]]]]

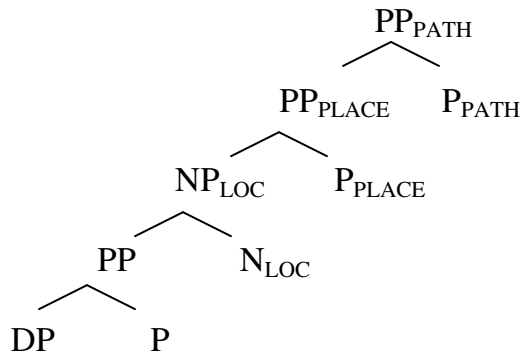
In clear illustration of the head parameter, Japanese layered PP is the mirror image of the same structure in English and French, as shown below.

(30) Layered PP in English and French



⁴ *[P_{PLACE} [P_{PATH}]] in Japanese is ungrammatical in any case due to the independent restriction on co-occurring postpositions mentioned earlier.

(31) Layered PP in Japanese.



The standard analysis of layered PP structure may thus be minimally elaborated to incorporate a bare NP projection, which hosts the closed subclass of locative nouns I have termed LocN. Whilst this element differs in certain characteristics from fully referential, lexical N, it is clearly of the same syntactic category, and is distinct from spatial adpositions in English, French and Japanese. The position of LocN in the PP hierarchy appears to be fixed not only across languages, but at all stages of the acquisition process, making it a plausible component of the machinery of Universal Grammar.

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