

On the Types of Prepositions and Their Projections in Syntax

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1 Introduction

A preposition in general expresses a relation between two entities and characteristically selects an NP:

- (1) a. (a book) on [the table]
b. (a message) from [what he said]
c. (peace) by [signing a peace treaty]
- (2) a. John relies on his success.
b. *John relies on that he will win the game.
c. *John relies on to win the game.

One simple way of representing this requirement is by a phrase structure rule like (3):

- (3) $PP \rightarrow P NP$

The paper assumes that there is no independent evidence for moving the selectional properties of prepositions into the phrase structure rules like (3). Instead, adopting the idea of Jackendoff (1973) and Emonds (1982) among others, I claim English prepositions show various complementation patterns as shown in (4).

- (4) a. Intransitive P selecting zero complement: around, in, out, away,
*into, *toward,...

- b. Transitive P selecting an NP complement: in [the box], into [the room], without [a trace], *away [the room]...
- c. Transitive P selecting a PP complement: out [into the garden], from [under the bush], *into [toward the garden], ...
- d. Ditransitive P selecting an NP and a PP complement: from [A] [to B], down [A] [toward B], into [A] [from B],

These variations in complement selection are analogous to variations in verb complementation, indicating that they should be lexicalized. The paper discusses that prepositions, in parallel with verbs, select various kinds of complements, and this information is encoded in the lexicon. Once we rely on the well-defined lexical properties of prepositions, several related phenomena also follow naturally.

2 Types of Prepositions

2.1 Intransitive Prepositions

As argued by Emonds (1985) and others, adverbs such as *home*, *downstairs*, and *afterward* or post-verbal particles seem to be better treated as prepositions. It is not difficult to note that post-verbal particles behave just like ordinary prepositional phrases, too:

- (5) Tom ran $\left. \begin{array}{l} \text{into the opera house.} \\ \text{in.} \end{array} \right\}$

One simple way of capturing the similarity between PP and particle in (5) is to assume that the particle *in* here is lexically specified to be an intransitive preposition projected into a PP as represented within the feature system of HPSG in (6):

- (6) $\left[\begin{array}{l} \langle \text{in} \rangle \\ \text{HEAD preposition} \\ \text{COMP(LEMENT)S} \langle \quad \rangle \end{array} \right]$

There are also cases where particles behave just like a PP. One often observed case concerns verbs such as *put* that require a directional adverb or a particle (Emonds 1985, Quirk et al. 1985):

- (7) John put some toys $\left\{ \begin{array}{l} \text{in the garage.} \\ \text{downstairs.} \\ \text{away.} \\ \text{down.} \\ \text{back.} \end{array} \right\}$

If these elements were not intransitive prepositions, the complementation pattern of verbs like *put* would be much more complicated.

Even in cases with verbs selecting an optional adverbial element, we note that intransitive prepositions are identical to ordinary prepositions selecting an NP (Emonds 1985):

- (8) He didn't play the harp $\left\{ \begin{array}{l} \text{after the first act.} \\ \text{afterward.} \\ \text{before.} \\ \text{inside the hotel.} \\ \text{inside.} \end{array} \right\}$

By lexically specifying that *afterward*, *before* and *inside* require no complement, we can easily predict their occurrence in the position of PP in cases like (8).

One supporting argument for this intransitive prepositional treatment centers on inversion. As observed in (9), unaccusative verbs like *race* and *stood* can trigger locative inversion (Emonds 1985, Jackendoff 1973):

- (9) a. [Into the opera house] raced Tom.
 b. [On the corner] stood a frightened little boy.

Given the assumption that particles like *away* are prepositions projecting to a PP directly, data like (10) follow naturally where they trigger locative inversion (Jackendoff 1983, Emonds 1985):

- (10) a. [There] goes John.
 b. [Downstairs] rolled the two little boys.
 c. [Away] flew the remnants of John's hat.
 d. [Down] rolled the carriage.

Another similarity between PP and particle can be found in constructions that constitute a directional phrase, *with*, and a definite NP in order (Emonds 1985):

- (11) a. [Into the dungeon] with that traitor!
 b. [To the river] with those sandbags!
 c. [Out the door] with it!
 d. [To hell] with this assignment!

Again we can observe that particles behave just like directional prepositions that selecting an NP (Emonds 1985):

- (12) a. [Off] with his head!
 b. [Down] with the leadership!
 c. [Out] with what you know!
 d. [Away] with them!

As for the syntactic properties of prepositional phrases, they alone can be intensified by the word *right* in the sense of ‘completely’ or by *straight* in the sense of ‘directly’ (Radford 1997).

- (13) a. *He right/straight despaired.
 b. *She is right/straight pretty.

- (14) a. Go [right/straight [up the ladder]]
 b. He walked [right/straight [into a wall]].

As expected, we observe that intransitive prepositions behave identically (Radford 1997, Jackendoff 1973, Emonds 1982).¹

- (15) a. John came [right/straight [in]].
 b. John put the toys right [back/straight [back]].
 c. John brought the bottles [right/straight [down]].

In sum, the grammar will be much more simplified if we accept the existence of intransitive prepositions that select no complement and hence project up to the prepositional phrase.

¹Words like *right* and *straight* cannot be of the category of Degree:

- (i) a. *The squirrel ran right/straight quickly up the tree.
 b. *The squirrel is straight/right angry.

2.2 Transitive Prepositions

Central prepositions in English select an NP as its complement and cannot have a *that*-clause or an infinitive clause as a complement:

- (16) a. *He was surprised at (that) she noticed him.
b. *He was surprised at to see her.

However, prepositions combining with a PP are quite common though often overlooked (Jackendoff 1973, Radford 1997, Lobeck 2000):²

- (17) a. He stayed at home [because [of the strike]].
b. He fell [out [of the window]].
c. Few people [outside [of the immediate family]] know.
d. Sam disappeared [down [into the darkness]].
e. Tom pushed John [up [against the ropes]].
f. The ice is [over [under the bridge]].

Even there are cases that we might think the prepositions just take an NP only. The prepositions such as *from* and *after* in (18) all combine with PPs (Quirk et al. 1985):

- (18) a. He picked up the gun [from [behind the counter]].
b. We didn't meet [until [after the show]].
c. Food has been scarce [since [before the war]].
d. The weather has been fine [except [in the north]].

The data illustrate that the prepositional phrases acts as the prepositional complements of prepositions like *from*, *until*, *since* and *except*. The information that such prepositions are transitive prepositions selecting one complement, PP can be represented in the feature structure as in (19):

- (19) $\left[\begin{array}{l} \text{HEAD preposition} \\ \text{COMPS } \langle \text{PP} \rangle \end{array} \right]$

One piece of confirmation that such a preposition subcategorizes a PP comes from the ungrammaticality of (20)b (Radford 1997):

²One could claim that the preposition selecting another PP here might be a specifier or optional adverbial element. But we could observe that, for example, the omission of *out* in (17)b makes the sentence unacceptable. Even though we can drop out prepositions like *down*, *up* and *over*, we would have completely different meanings.

- (20) a. He is [so [out of touch]] in some ways.
b. *He is [so out [in some way] of touch].

The contrast in (20) follows naturally with the assumption that the complement PP *of touch* is positioned before the adjunct PP *in some ways*.

Also, another support comes from the fact that the PP complement and its head preposition behave just like a canonical preposition. For example, phrases of this form can occur as the directional complement of verbs like *put* and *place*.

- (21) John put the garbage [out of the window].

Further, they can also license subject-verb inversion, supporting their status (Jackendoff 1973):

- (22) a. [Out of the night] appeared the nine black riders.
b. [Up into the clouds] shot a riderless broomstick.

We couldn't assume that they are specifiers since it is these prepositions that the main predicates require and their presence is obligatory:

- (23) a. *He is of touch in some ways.
b. *John put the garbage [of the window].

Since a certain preposition can subcategorize a prepositional phrase itself, we could predict the generation of iterating PPs (Jackendoff 1973):

- (24) a. She jumped [out [from [under the bushes]]].
b. The man is said to be [from [out [of the darkness]]].
c. [Down [from [above the altar]]] groaned a mysterious voice.
d. [Back [out [from [inside [of the hole]]]]] squirmed Groucho.

Under the present system, nothing blocks us from generating sentences like (24): The prepositions *out* and *from* both select a PP complement. But prepositions like *into* only select an NP complement. This rules out examples like (25).

- (25) *The baby crawled [down [**into** [above [the alter]]]].

2.3 Ditransitive Prepositions

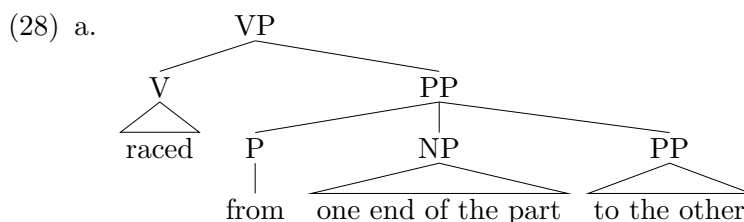
In the same spirit, we also assume that there exist ditransitive prepositions such as *from*, *down*, and *into* (Jackendoff 1973). Examples in (26) illustrate this point:

- (26) a. The mice raced [from [one end of the part] [to the other]].
 b. An old man lumbered [down [the street] [toward the frightened child]].
 c. A drunken pianist staggered [into [the smoky room] [from out of the cold]].

We assume that these prepositions require NP and PP complements as lexically represented in (27):

- (27) $\left[\begin{array}{l} \text{HEAD preposition} \\ \text{COMPS } \langle \text{NP, PP} \rangle \end{array} \right]$

This lexical information would generate the structure (28) for cases like (26)a:



Evidence that such prepositions select NP and PP complements and generate the structures above lies in several phenomena (cf. Jackendoff 1973). For example, these whole bracketed phrases behave as a single unit as shown in the contrast in (29).

- (29) a. [From one end of the park to the other] raced the mice.
 b. *[From one end of the park] raced the mice [to the other].

We can notice that the NP and PP sequence alone cannot function as a constituent (serving as subject):

- (30) a. *[The street toward the frightened garbage collector] was littered with broken bassoon reeds.
 b. *[The smoky room from out of the cold] had too many movie stars.
 c. *[One end of the park to the other] was a mess.

What the examples in (30) implies is that the preposition, NP, and PP sequence forms a strong unit so that the NP and PP cannot appear without the preposition.

Cleft constructions also show that the head preposition forms a constituent together with its NP and PP complements (Jackendoff 1973):

- (31) a. It was [from one end of the part to the other] that the mice raced.
b. It was [into the smoky room from out of the cold] that a drunken pianist staggered.

2.4 Multiclasses

The observations we have seen so far also imply that just like verbs, one preposition also can have different subcategorization information:

- (32) a. Tom jumped out of the bushes.
b. Tom ran out the door.
c. Tom jumped out.
- (33) a. They snapped the antenna off of the car.
b. They snapped the antenna off the car.
c. They snapped the antenna off.
- (34) a. Tom moved from under the bushes.
b. Tom jumped from the bushes.
c. *Tom jumped from.
- (35) a. Tom thought of Mary.
b. *Tom thought of.

Such data tell us the flexibility of the types of complement that prepositions take. That is, in terms of complements, we could classify prepositions into several classes, for example, as in (36).

- (36) a. out, in, up, down, etc: selecting NP, PP or nothing
b. from, until, except: NP or PP
c. away, back, ahead, apart: PP or nothing:

Such lexical information could be easily represented within the feature structure system of HPSG as given in (37):

- (37)
- a. $\left[\begin{array}{l} \langle \text{out} \rangle \\ \text{HEAD preposition} \\ \text{COMPS } \langle (\text{NP}|\text{PP}) \rangle \end{array} \right]$
 - b. $\left[\begin{array}{l} \langle \text{from} \rangle \\ \text{HEAD preposition} \\ \text{COMPS } \langle \text{NP}|\text{PP} \rangle \end{array} \right]$
 - c. $\left[\begin{array}{l} \langle \text{of} \rangle \\ \text{HEAD preposition} \\ \text{COMPS } \langle \text{PP} \rangle \end{array} \right]$

As indicated, the preposition *out* can appear either with an NP or PP complement or even with nothing; *from* should appear either with an NP or PP complement; *of* obligatory selects a PP complement.

Once we allow a system where prepositions can have multiple subcategorization information, we could provide a clean account of structural ambiguity for examples like (38) (Jackendoff 1973):

- (38) a. Tom raced [away [from Mary]].
 b. Tom raced [away] [in a battered car]].

As in (39)a and (39)b, *away* in (38)a is a head preposition selecting a PP, whereas *away* in (38)b is an intransitive preposition selected by the head verb *race*.

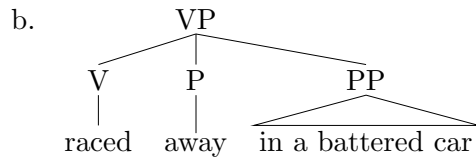
- (39) $\left[\begin{array}{l} \langle \text{away} \rangle \\ \text{HEAD preposition} \\ \text{COMPS } \langle (\text{PP}) \rangle \end{array} \right]$

This lexical information will generate the following structure:

- (40) a.
-
- ```

graph TD
 VP --> V[V]
 VP --> PP1[PP]
 V --> raced[raced]
 PP1 --> PP2[PP]
 PP1 --> PP3[PP]
 PP2 --> away[away]
 PP3 --> fromMary[from Mary]

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As the two different structures indicate, if we accept the lexical information that *away* in (40)a selects a PP whereas *away* in (40)b allows no complement, we could account for the contrast in the preposed examples in (41) (Jackendoff 1973):

- (41) a. [Away from Mary] raced Tom.  
 b. \*?[Away in a battered car] raced Tom.

The different constituent structures generated from the different lexical information for *away* in (40)a and (40)b predict the following contrast too:

- (42) a. ?\* Tom raced [away [quickly] [from Mary]].  
 b. Tom raced [away] [quickly] [in a battered car].

The word *away* in (42)a selects a PP complement, and thus no adverbial element can intervene between the two. But in (42)b, *away* is simply an adverbial, intransitive preposition selected by *race*. Thus, an adverb can be positioned between the preposition and the PP *in a battered car*.

One could question why we resort to the individual properties of the lexicon. There seems to be abundant evidence showing that prepositions have an rich expository of idiosyncrasies. For example, as noted earlier, no sentential element can serve as the complement of a preposition.

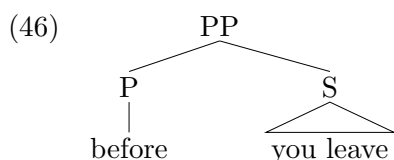
- (43) a. \*Tom is thinking about [that his students are eager to learn English].  
 b. \*We are counting on [for Tom to make an announcement.]  
 c. \*Fred is talking about [to stay in Seoul].

However, there are cases where prepositions select a sentence. For example, indirect questions head by the word *whether* can functional as prepositional complements (Baker 1989).

- (44) a. The outcome depends on [how many candidates participate in the election].  
 b. Fred is thinking about [whether he should stay in Seoul].

This lexical treatment goes well with Emonds’s analysis of *after*, *before*, *since*, and so forth.

- (45) a. before/after you leave...  
 b. since they were tired...



This seems in consistent with an analysis that tries to make predictions based on the assumption that English phrase structure doesn’t allow Ss inside PPs.

In addition to the classification of prepositions depending on the types of their complements, we can classify prepositions with respect to their semantic functions: argument-marking prepositions and predicative prepositions (cf. Sag and Wasow 1999):

- (47) a. John gave a book to Bill.  
 b. John is in the room.

The preposition *to* in (47)a just indicates what role its object NP (*Bill*) plays in the situation denoted by the verb *gave*. Meanwhile *in* in (47)b function much like a verb, introducing new predicates and having its own argument structure. This distinction means that the prepositons in (47) would have the following lexical information:

- (48)
- a.  $\left[ \begin{array}{l} \langle \text{to} \rangle \\ \text{HEAD preposition} \\ \text{SUBJ} \langle \rangle \\ \text{COMPS} \langle \text{NP} \rangle \end{array} \right]$
- b.  $\left[ \begin{array}{l} \langle \text{in} \rangle \\ \text{HEAD preposition} \\ \text{SUBJ} \langle \text{NP} \rangle \\ \text{COMPS} \langle \text{NP} \rangle \end{array} \right]$

One welcome consequence of such diversity concerns binding facts:

- (49) a. The house<sub>i</sub> had a fence around it<sub>i</sub>/\*itself<sub>i</sub>.  
 b. To make a noose, you wind the rope around itself<sub>i</sub>/\*it<sub>i</sub>.  
 c. Susan<sub>i</sub> wrapped the blanket around her<sub>i</sub>/herself<sub>i</sub>.

Once we accept the view that the preposition *around* can either be an argument-marking and/or predicative preposition, the present system could easily account for the variability of binding possibilities observed in (49). It seems that *around* in (49)a functions as a separate predicate, *around* in (49)b it just marks one of the arguments of the verb *wind*, and *around* in (49)c can ambiguously be either an independent predicate or an argument-marking, as represented in (50):

- (50) 
$$\left[ \begin{array}{l} \textit{argument-marking} \\ \langle \textit{around} \rangle \\ \text{a. HEAD preposition} \\ \text{SUBJ} \langle \rangle \\ \text{COMPS} \langle \text{NP} \rangle \end{array} \right]$$
- $$\left[ \begin{array}{l} \textit{predicative} \\ \langle \textit{around} \rangle \\ \text{b. HEAD preposition} \\ \text{SUBJ} \langle \text{NP} \rangle \\ \text{COMPS} \langle \text{NP} \rangle \end{array} \right]$$

What we need then is to assume that the PP headed by an argument-marking preposition will have the identical syntactic-semantic information to its object NP, and to posit a general theory of binding in terms of argument-structure roughly stating that an anaphor must be bound by a preceding argument in the ARG-STR (argument-structure). The argument structure of the main verbs in (49) will look like the following:

- (51) 
$$\left[ \begin{array}{l} \textit{verb} \\ \langle \textit{had} \rangle \\ \text{a. ARG-ST} \langle \text{NP}, \text{NP} \rangle \end{array} \right]$$

- b. 
$$\left[ \begin{array}{l} \textit{verb} \\ \langle \textit{wind} \rangle \\ \text{ARG-ST} \langle \text{NP, NP, PP}[\text{ANAPHOR +}] \rangle \end{array} \right]$$
- c. 
$$\left[ \begin{array}{l} \textit{verb} \\ \langle \textit{wrapped} \rangle \\ \text{ARG-ST} \langle \text{NP, NP, (PP}[\text{ANAPHOR +}]) \rangle \end{array} \right]$$

Thus, *itself* in (49), the object of a predicative preposition, is not an argument of *had*. This explains why it cannot occur here. Since the verb *wind* selects the PP complement *around itself* in (49)b, the preceding binder *rope* can binds this anaphor. But the pronoun cannot occur here since it is bound within the same argument structure (binding domain). In *wrap*, when the PP complement is one of its argument, the prepositional object can be anaphoric. But when it isn't an argument, the prepositional object can be a pronoun.

### 3 Movement Paradox

We have seen preposition lexemes are specified with stricter subcategorization information than we can image. We could find cases where lexemes impose more specific constraints on the type of their arguments. For instance, one of the usages of the verb *assure* requires an NP object not to be locally realized (Ginzberg and Sag 2000):

- (52) a. This candidate, they assured me    to be reliable.  
 b. \*They assured me this candidate to be reliable.

One simple way for capturing this contrast is to assume that the direct object of *assure* is specified as being of type *noncanonical-synsem* (syntax-semantics), *gap*:

- (53) 
$$\left[ \begin{array}{l} \text{HEAD verb} \\ \text{COMPS} \langle \text{NP, NP}[\textit{gap-synsem}], \text{VP} \rangle \end{array} \right]$$

This treatment provides a possible means to deal with so-called movement paradox examples. A general rule of topicalization in English is a strong category match between the gap and the filler as shown in (54) (Bresnan 2000):

- (54) a. You can rely on Chris.  
 b. Chris, you can rely on \_\_\_ .
- (55) a. We talked about that problem for days.  
 b. That problem, we talked about \_\_\_ for days.

However, observe the following cases:

- (56) a. \*You can rely on [that Chris will come].  
 b. [That Chris will come], you can rely on \_\_\_ .
- (57) a. \*We talked about [that he was sick] for days.  
 b. [That he was sick], we talked about \_\_\_ for days.
- (58) a. \*He didn't think of [that he might be wrong].  
 b. [That he might be wrong], he didn't think of \_\_\_ .

Note that there is a mismatch in category type between a seemingly moved phrase, the initial *that* complement in (b) examples and the position it is supposed to be moved from as in (a) examples. As indicated in (59), the prepositions *on*, *about* and *of* all require an NP complement, which is why all (a) examples from (56) are ungrammatical.

- (59) a. You can rely on [the fact that Chris will come].  
 b. We talked about [the fact that the was sick for days].

That is, the ‘that-S’ clause cannot appear in the position from which it is supposed to be moved, because it is of the wrong type of syntactic category for that position. But when we move this ‘that-S’ to the topicalized position, they are acceptable. Such data are problematic for the derivational assumptions that the surface configurations of phrase structure categories are derived by transformational operations (movements) from basic syntactic representations of the same type.

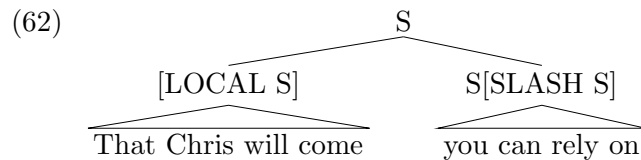
Within a constraint-based framework where the correspondence between structure and function is not perfect, such mismatches could be expressed by positing a new type of noncanonical-sign with the constraint in (60) assumed in Ginzberg and Sag 2000.

$$(60) \quad sgap \Rightarrow \left[ \begin{array}{l} \text{LOCAL NP} \\ \text{SLASH } \{S\} \end{array} \right]$$

The preposition selects for an argument that is [LOC NP]. All overt NPs are [LOC NP] whereas overt CPs and Ss are not. But by allowing this *sgap* as a subtype of *gap-ss*, an S filler can be associated with a gap that is the object of the P. Thus, the preposition *on* can be realized as follows:<sup>3</sup>

$$(61) \left[ \left\langle \text{on} \right\rangle \right. \\ \left. \left[ \text{ARG-ST} \left\langle \text{NP} \left[ \begin{array}{l} \textit{sgap} \\ \text{LOCAL NP} \\ \text{SLASH } \{S\} \end{array} \right] \right\rangle \right] \right]$$

This lexical information will project the following structure, allow the mismatch between the sentential topic and the gapped NP:



## 4 Idiosyncrasies in Extraction

It is common to extract the NP object of a preposition as in (63):

- (63) a. Who are you looking at \_\_\_ ?  
 b. Which shelf did they put the book on \_\_\_ ?  
 c. What did they write this letter with \_\_\_ ?  
 d. Who was this poem written for \_\_\_ ?

However, extraction of the PP complement is not possible when the PP serves as an adjunct:

- (64) a. \*What class did you fall asleep during?  
 b. \*What did you leave the book now?  
 c. \*What did they leave notwithstanding?  
 d. \*What time did John arrive at?

A similar fact can be observed in the contrast in (65) (Radford 1997):

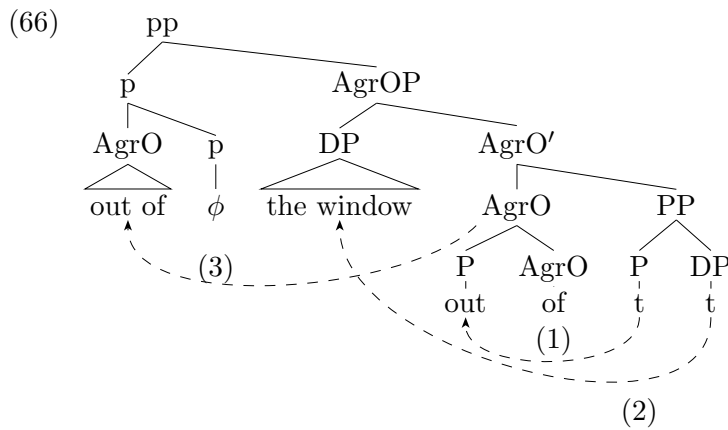
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<sup>3</sup>For the theory of long distance dependency we adopt here, see Ginzberg and Sag 2001.

- (65) a. Which bushes did she jump [out [of [\_\_ ]]]?  
 b. Out of which bushes did she jump [\_\_ ]?  
 c. \*Of which bushes did she jump [out [\_\_ ]]?  
 d. From which bushes did she jump [out [\_\_ ]]?

What we can observe here is that though it is fine to move the inner NP complement as in (65)a or the whole PP as in(65)b, the PP complement of *out* cannot be extracted as in (65)c. But this is not possible in (65)d.

One transformational analysis within the framework of Minimalist Program such as that of Radford (1997: 452) posits rather a complicated structure for capturing these data. Within his system, the phrase like *out of the window* is generated by the structure (66):



The intransitive preposition *out* is first merged with the DP *the window*, forming *out the window*. This in turn merges with an AgrO containing the dummy transitive preposition *of* and then *out* adjoins to the AgrO constituent, as indicated by the arrow (1). The DP *window* is also raised to the Spec of AgrOP as marked by the arrow (2). Finally, as the arrow (3) indicates, the compound *out of* adjoins to the dummy transitive preposition *of* in AgrO.<sup>4</sup>

Going back to the data in (65), such an analysis explains the contrast, relying on the constituenthood: In (65)a, the DP *which window* has been preposed whereas in (65)b, *out of which window* has been preposed. But

<sup>4</sup>This process also involves such that the objective case of the DP *the window* is checked via the spec-head relation and AgrOP merges with a light preposition  $\phi$  to which the compound preposition *out of* adjoins. See Radford 1997: 453.

(65)c is ungrammatical since *of which window* isn't a constituent according to the structure in (66).

Such an analysis relying on the constituent, however, raises several questions. For example, it appears that the elements following the preposition *out* acts as a constituent as in (67)a. Further even if the preposition *out* alone can serve as an independent element, there is no case where the two consecutive elements act as one unit.

- (67) a. He is out there.  
 b. He is out.  
 c. \*He is out of.

Further such an analysis would meet changes too to account for examples like (66)d. We need to set up why (66)c and (66)d are different.

Rather than claiming that *of which bushes* form no unitary constituent as in Radford (1997), we assume that this is simply due to the lexical property of the preposition *out*. What I mean by this is that the preposition *out* selects a PP complement which cannot be gapped. Adopting the system of HPSG, we can represent this lexical restriction as in (68):<sup>5</sup>

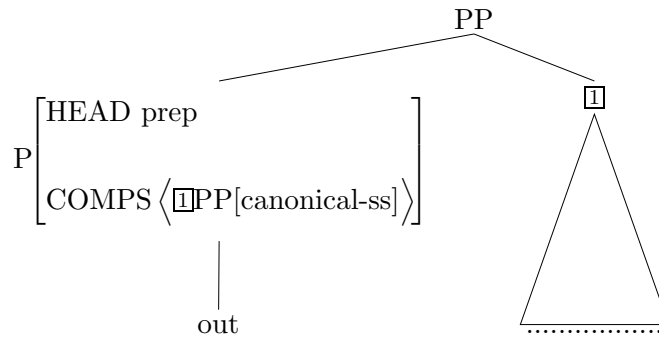
$$(68) \left[ \begin{array}{l} \langle \text{out} \rangle \\ \text{HEAD preposition} \\ \text{COMPS } \langle \text{PP}[\text{canonical-sign}] \rangle \end{array} \right]$$

An explanation requires for what does the notion of *canonical-sign* mean here. Following Swiss linguist Ferdinand de Saussure, we could conceive of language as a system of 'signs'. Then words as well as phrases would be equally viewed as associations of sound and meaning. Following this view, we could classify 'signs' into those phonologically realized and those are not. The former signs are what we call *canonical* signs, and the latter signs, traditionally called traces, are *noncanonical* signs. Within the system of constraint-based grammar, we could reformulate all of our grammar as a set of constraints on signs. Interpreting this in the current context, we could assume that the lexical sign *out* has its own constraint that its complement PP cannot be a noncanonical sign.

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<sup>5</sup>In HPSG, *canonical-sign* is meant to be *canonical-synsem*. We use this term for the expository purpose.

(69) a.



## 5 Conclusion

We have seen that there are at least three types of prepositions in terms of their subcategorization information. We have also seen that the lexicon, a rich repository of idiosyncratic information not predicted from syntactic operations, is best in capturing these lexical properties.

The idiosyncratic restrictions relating to the possible range of complements that a preposition select are directly analogous to those in the case of verbs. The paper claim that such lexical restrictions can be best treated in terms of properties of individual lexical items rather than by phrase structure rules. This system can provide a straightforward analysis of related phenomena.

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