

Abstract

The aim of this paper is to provide an adequate analysis in LFG of the prepositional passive, e.g. *That problem has been dealt with*, *My pen has been written with*. This construction has been examined in LFG before by Bresnan (1982), Lødrup (1991), and Alsina (2009), but empirical and theoretical problems, some well-documented, some new, mean that such proposals cannot be maintained. Instead, I offer an account couched in recent work on the mapping between grammatical functions and arguments (Asudeh et al., 2014; Findlay, 2014a) that treats the defining characteristic of the prepositional passive not as purely syntactic, but rather as being located at the interface between syntax and semantics.

1 Introduction

The *prepositional passive* (also *pseudopassive*) is much like the regular passive, except that the subject in the prepositional passive corresponds not to the object of the *verb* in the active, but to the object of a *preposition*:

- (1) a. Scott relies [on Logan].
- b. Logan is relied on (by Scott).

This construction is typologically highly restricted—it is attested in only about half a dozen languages, mostly in the Germanic family (Truswell, 2008).¹ Nevertheless, in the languages in which it occurs, including English, it is a common and perfectly standard part of the grammar. Section 2 surveys the data around the prepositional passive in more detail, and asks what a theory which deals with this phenomenon must account for. In Section 3, I argue that previous LFG accounts of the prepositional passive have been inadequate, and show how improvements can be made by making use of recent work in argument linking. In the final part of this section, I also address the question of argumenthood, and offer some thoughts on how this notion interacts with Pustejovsky's (1995) qualia structure. Section 4 concludes.

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¹Specifically: Norwegian, Swedish, English, Vata (Koopman, 1984), Gbadi (*ibid.*), some North American varieties of French, especially those spoken on Prince Edward Island (King & Roberge, 1990), and potentially Papiamentu (Abels, 2003).

2 Explananda

2.1 Type I vs. Type II

For verbs like *rely* (*on*), the existence of the prepositional passive is perhaps not so surprising. After all, the preposition is idiosyncratically selected and semantically inert, and the whole verb+preposition complex has a semantically unified, transitive meaning. Since transitivity is undoubtedly related to passivisation, it makes sense that such a relation should participate in the passive alternation, and since the preposition is part of the expression of this relation, it makes sense that it should remain with the verb and be left stranded.

However, the preposition involved need not be (uniquely) specified by the verb. First of all, we have prepositional passives with semantically contentful argument PPs:

- (2) a. Scott spoke to/about Jean.
- b. Jean was spoken to/about.

Given that the only alternation here is between the prepositions, and given that this changes the meaning, it seems clear that the prepositions themselves bear some meaning.²

What is more, there are prepositional passives whose subjects appear to originate in adjunct PPs:

- (3) When I'm on the bus I don't like being sat next to. [Locative]
(<https://twitter.com/spencernickson/status/654923013285126144>)
- (4) Charles Dickens' quill pen has been written with by me. [Instrumental]
(<http://www.bustle.com/articles/117731-10-amazing-margaret-atwood-quotes-from-the-2015-texas-book-festival-from-the-future-library-project>)
- (5) To come back, and not get turned around for. . . . [Benefactive]
(Will.i.am on an episode of *The Voice*, 7 Feb. 2014)

Here there can be no doubt that the prepositions are both meaningful and not selected by the verb, at least not in the traditional sense of subcategorisation. What these examples show is that it is not only idiomatically combining pairs of verbs and prepositions that allow for passivisation in this way.

Huddleston & Pullum (2002, 1433–1434) describe the cases where the preposition is idiosyncratically selected as Type I prepositional passives, and the cases where the preposition is contentful as Type II. In our analysis, we would ideally like an explanation which carries over to both, since it seems that they are two sides of the same coin, rather than totally separate phenomena.

²Whether they merely align their object with a certain thematic role or actually carry truth-conditional content themselves is not important; the point is that they are not semantically inert in the same way as *on* is in *rely on*.

2.2 Relation to the regular passive

The prepositional passive “has all the features of a canonical passive construction, except for one” (Alsina, 2009, 45), *viz.* that the subject corresponds to a prepositional, not verbal, object in the active. It is not, in other words, particularly exceptional (and for this reason I prefer the term ‘prepositional passive’ to ‘pseudopassive’, with its implications of inauthenticity).

Morphologically, the prepositional passive is identical to the regular passive; the verb in the prepositional passive has the same form as any other passive, namely the perfect participle of the verb. We also observe the same range of auxiliary verb possibilities: prepositional passives occur with *be* as well as *get*, just like the regular passive in English.

Furthermore, the prepositional passive is very productive, being used with verb-preposition combinations that have surely not been lexicalised, including recent neologisms:

- (6) a. We can’t bring you everything that is being blogged about.
(COCA³)
- b. Sean was tweeted at by Molly Mesnick.
(<http://hollywoodlife.com/2013/03/12/catherine-giudici-sean-lowes-secret-engagement/>)
- c. This will definitely be facebooked on!
(<http://thenaturalnutritionist.com.au/coconut-oil-the-scoop/>)

This productivity argues that the prepositional passive should not be treated as a lexically idiosyncratic phenomenon, but as a general property of English grammar.

2.3 Adjacency

There is one property, however, which by its nature the prepositional passive cannot share with the regular passive. It is commonly observed that the verb and preposition must be adjacent in the prepositional passive, even though this restriction does not hold in the active:

- (7) a. We rely increasingly on David.
- b. *David is relied increasingly on.

Certainly, taken in isolation, the contrast in (7) seems clear enough. However, others have pointed out that this simplistic formulation is inadequate (e.g. Tseng, 2006). A wide variety of intervening adverbs and PP specifiers are in fact attested:

- (8) a. I’ve stood there [on the London Underground], heavily pregnant (and obviously so), and been looked **straight** through.
(<https://londondigitalmum.wordpress.com/category/commuting-2/>)

³The Corpus of Contemporary American English (Davies, 2008–).

- b. Yerba mate is consumed in nearly 100% of Argentine households. It is considered a staple food, and is relied **especially** on by poor Argentines when food is scarce.
(https://www.tni.org/files/download/47_bowles_2013_0.pdf)
- c. Gas turbines have rapid transient response capabilities and, thus, will be relied **increasingly** on in markets with large intermittent sources.
(Lieuwen et al., 2013, 1311)

Indeed, example (8c) involves precisely the adverb-verb pairing ruled ungrammatical in (7b)! It seems that context is crucially important in determining the acceptability of such sentences, which means that purely invented examples are difficult to come up with.

Adverbs can apparently intervene between the verb and preposition, then. But what about direct objects? These are generally very bad:

- (9) a. We put some books on the table.
- b. * The table was put some books on (by them).

Of course, however, there are exceptions. Firstly, direct objects are perfectly acceptable when they form part of an idiom or a light verb construction:

- (10) a. You have been taken advantage of.
- b. Russia was declared war on (by Germany).
- c. I've been made a fool of!

But in fact, given an appropriate context, direct objects are acceptable more widely. Bolinger (1975, 65) goes so far as to claim that “the only real restrictions are clarity and intent”, which are clearly not syntactic constraints (see also Ziv & Sheintuch, 1981, from which the following examples are drawn):

- (11) a. That city has been fought many a battle over.
- b. He has been burned, stuck pins in, beheaded—all in effigy, of course.
- c. To be whispered such dirty innuendos about was enough to break any girl's heart.
- d. I don't like to be told lies about.

Once again, it seems that context is crucial, and that there cannot be a narrow syntactic rule in operation here. Following Tseng (2006), then, I assume that there is nothing in principle, and certainly nothing in the syntax, ruling out the presence of direct objects or other intervening material in the prepositional passive.

2.4 Semantic-pragmatic constraints

While there might not be uniquely syntactic constraints on the prepositional passive, there is a large amount of literature delimiting the class of predicates which can participate in the prepositional passive via non-syntactic restrictions. This work usually focusses on properties borne or ascribed to the subject.

2.4.1 Affectedness

The first of these is *affectedness*, based on the claim by Bolinger (1977, 67) that “the subject in a passive construction is conceived to be a true patient, i.e. to be genuinely affected by the action of the verb”. This applies as much to the regular passive as to the prepositional passive, and is appealed to in order to explain such contrasts as the following:

- (12) a. * I was approached by the train.
b. I was approached by the stranger. (Bolinger, 1977, 68)

Bolinger’s argument is that in (12a), the subject is not an affected patient, but merely some kind of ‘terminus’, and therefore the passive is ruled out. In (12b), by contrast, the subject is affected by the actions of the stranger, being interacted with in some way: perhaps s/he is a panhandler, perhaps s/he is propositioning me, etc.

Such a contrast can be observed in the prepositional passive as well:

- (13) a. * Seoul was slept in by the businessman last night.
b. This bed was surely slept in by a huge guy last night. (Kim, 2009)

The argument runs parallel here: Seoul is not affected by being slept in by a single individual, but a bed is—it becomes dirty, unmade, etc.

Now, it is clear that this notion of affectedness is not very formally explicit. It interacts with aspects of world knowledge, for one thing: it is significant that the man sleeping in the bed is *huge*, for example, since this, we know, will affect the bed more. And what exactly counts as ‘affecting’ something is far from clear. Bolinger intends the definition to cover “all sorts of physical, psychological and metaphorical effects” (Riddle & Sheintuch, 1983, 538), to the point where the term has been accused of being stretched so broadly as to be essentially meaningless (see the exchange in Householder, 1978 and Bolinger, 1978 for more on this).

Despite these accusations, however, there are cases which suggest that the definition is in fact not broad enough:

- (14) a. And my brother simply cannot be disagreed with.
b. Such a dress can’t be sat down in.
c. There the mistakes were, in their houses, pervading their lives, having to be sat with at every meal and slept with every night.
(Riddle & Sheintuch, 1983, 538)

It is far from obvious how my brother is affected by being unable to be disagreed with, and in (14b–c), it would seem more natural to claim that the subject is, if anything, the thing *doing* the affecting, not the thing being affected. The dress is preventing the wearer from sitting down, and the mistakes are causing discomfort in people while they sit at table and sleep in their beds. So, while we might wish to retain some notion of affectedness as being important in licensing passives, it clearly cannot be the whole story.

2.4.2 Role Prominence

Riddle & Sheintuch (1983) claim that the discriminating factor in (14) is not affect-*edness* but *role prominence*. In their formulation, “all and only NPs whose referent the speaker views as being role prominent in the situation described by the passive clause occur as subjects of passive verbs” (p. 546). Role prominence is explained by Schachter (1977, 282) as belonging to the NP whose referent the speaker views as “being at the center of events”.

In some sense this explains the existence of (14) accurately: it does seem that the subjects are “at the center of events”, and that they are what the speaker is choosing to focus on from a discourse perspective. (14c) is ‘about’ the mistakes, for example, rather than the people suffering from having made them.

However, role prominence is perhaps even more vague a concept than affect-*edness*. Riddle & Sheintuch (1983, 559) themselves note that “it is not possible to offer an algorithm for determining what causes some entity or concept to be viewed as role prominent”, but regard this as no weakening of their account, claiming that role prominence is first and foremost a psychological notion, and one that we clearly have the ability to access, which means it is therefore, derivatively, accessible to the grammar. This may be so, but it does mean that their theory cannot, as it stands, make predictions about acceptability/grammaticality, and thus can only ever be offered as a *post hoc* explanation of the data, which considerably reduces its appeal.

2.4.3 Characterisation

One final property which has been discussed in the literature is that of *characterisation*. The role of characterisation is illustrated in the following examples:

- (15) a. * Seoul was walked around by his father.
b. Seoul can be walked around in a day.
- (16) a. * This statue was stood beside by John.
b. No statue should be stood beside in this park. (Kim, 2009)

In the (b) sentences, the VP gives what is a general or characteristic property of the subject—in other words, it characterises it. In the (a) sentences, no such relation holds, and they are therefore illicit.

The relationship between characterisation and role prominence is an interesting one. Notice that the crucial examples for both involve modality and/or negation. Do we need both conditions? On the face of it, characterisation seems to offer an acceptable account of the problematic sentences in (14) which motivated the appeal to role prominence, whereas role prominence alone cannot account for the ungrammaticality of e.g. (15a).

If it does prove possible to do away with role prominence, we would have a simple disjunction of necessary conditions on the passive: the subject must either

be affected by or characterised by the predicate. This would also suggest that characterisation is a property of the regular passive as much as the prepositional passive, although it is only in terms of the latter that it has usually been discussed. This offers an explanation for one class of passives which ought not to be permitted if affectedness were the only constraint on passive subjects, namely those where the active voice object is not a patient:

- (17) Many people fear spiders. \sim Spiders are feared by many people.

We cannot straightforwardly say that spiders are affected by being feared by many people, but it does seem to characterise them.

2.5 Summary

In summary, the prepositional passive is like the regular passive in most ways: morphologically, syntactically, and in terms of semantic-pragmatic constraints. Any analysis of the prepositional passive ought to be an extension to the analysis of the regular passive, therefore, and not a replacement for it.

3 Analysis

The essential property of the prepositional passive (especially where the preposition is contentful, i.e. Type II) is that the clause's subject in the syntax corresponds to the stranded preposition's internal argument in the semantics. What a formal analysis has to do, therefore, is provide a mechanism for passing the subject's referent to the prepositional meaning in the semantics. This is a question of the mapping from f- to s-structure. Previous LFG analyses have treated the prepositional passive as a purely syntactic phenomenon, and thereby miss this most basic formulation of the problem. I turn now to two such analyses, and the problems they face.

3.1 Previous LFG analyses

3.1.1 Reanalysis

The 'canonical' theory of the prepositional passive in LFG remains the reanalysis account of Bresnan (1982). This involves a lexical rule of V-P incorporation, given in (18), which morphologically incorporates the verb and preposition, and merges their valency frames. (19) gives an example for *rely*:

- (18) **V-P Incorporation:**
 Operation on lexical form: $(P\ OBJ) \mapsto (OBJ)$
 Morphological change: $V \mapsto [V\ P]_V$
- (19) 'rely $\langle SUBJ, ON\ OBJ \rangle$ ' $V \mapsto$ 'rely on $\langle SUBJ, OBJ \rangle$ ' $[V\ P]_V$

Reanalysis accounts have been popular outside of LFG as well (e.g. van Riemsdijk, 1978; Hornstein & Weinberg, 1981), and provide an obvious way of accounting for the behaviour of prepositional verbs in the passive: as we noted above, *rely on* acts in many ways as a unit, and so it makes sense to unify it at some level of representation. Once this is done, it behaves just like any other transitive verb, and thus undergoes passive perfectly normally. Unfortunately, such accounts are not without their problems. Postal (1986) and Baltin & Postal (1996) have argued at length that the issues facing such an approach are insurmountable, and that, despite its appeal, the reanalysis account is ultimately untenable. Space precludes a full discussion of the issues here, but I will briefly illustrate two erroneous predictions made by the rule in (18).

Firstly, it predicts that the object of a preposition in a V+P sequence should (at least optionally) behave like the direct object of a normal transitive verb. However, this does not appear to be the case. Consider data from heavy NP shift, for example:

- (20) a. I discussed ____₁ with Lorenzo [the problems he was having with deliveries]₁.
 b. *I argued with ____₂ about such problems [the drivers' union leader]₂.
 (Baltin & Postal, 1996, 129)

The same lack of parallelism is observed in subdeletion (Bresnan, 1973):

- (21) a. Jane saw more of these people than Sally saw ____ of those people.
 b. *Jane spoke to more of these people than Sally spoke to ____ of those people.
 (after Baltin & Postal, 1996, 131)

In neither case do the prepositional objects behave in the same way as the direct objects, contrary to the predictions of the reanalysis account.

The second prediction of the reanalysis account is that the V+P complex ought to behave like a single morphological word; but the preposition displays a high degree of syntactic mobility not expected if it is morphologically incorporated:

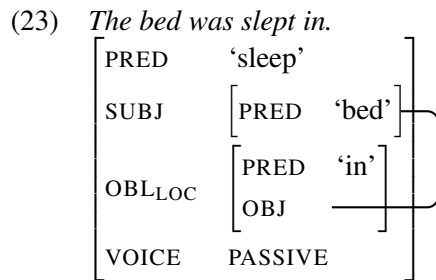
- (22) a. The bridge was flown (both) over and under.
 b. Communism was talked, argued, and fought about.
 c. The bridge was flown over and then, but only then, under.
 d. Fascism was fought for by Goebbels and (then) against by De Gaulle.
 e. Fascism was fought for by Goebbels and then, but I assure you, only then, against by De Gaulle.

(Postal, 1986, 223, fn. 14)

Similarly, incorporation requires absolute adjacency between the verb and preposition, which, as we have seen, is not the correct characterisation of the data. For these reasons, any reanalysis-based explanation of the prepositional passive is simply unable to account adequately for the data, and so must be abandoned.

3.1.2 Structure sharing

The only alternative theory on the prepositional passive within LFG that I am aware of is the structure-sharing account of Lødrup (1991) and Alsina (2009). Although they differ in formal details, they both work on the principle that the prepositional passive should be analysed as a structure-sharing relation between the subject and the object of the oblique:



This of course does not follow from anything about the passive, and thus requires further formal machinery: for Lødrup, the prepositional passive also involves the addition of a control equation ($\uparrow \text{SUBJ} = (\uparrow \text{OBL}_\theta \text{ OBJ})$), while for Alsina, other aspects of his more elaborated theory of structure sharing (Alsina, 2008) force the appropriate structure.

The structure sharing proposal in some ways captures the claim that the clause’s subject corresponds to the preposition’s argument, which is, after all, canonically its object. However, I do not believe it is right to ignore the role of the mapping between syntax and semantics here, instead framing this as a purely syntactic phenomenon.

Firstly, the structure-sharing account makes the wrong predictions with respect to case-marking. In the proposed structure-shared relation, we would expect case identity between the two positions, since the f-structures which are shared must be (token) identical. However, this is not what we observe:

- (24) I rely on him.
 NOM ACC
- (25) a. He is relied on.
 NOM
- b. *Him is relied on.
 ACC

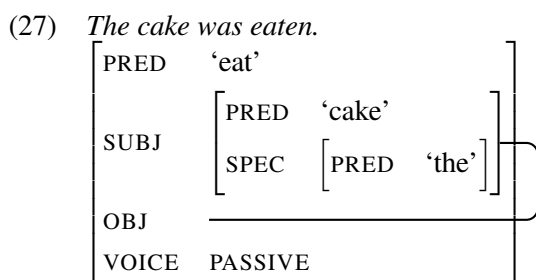
The subject position requires nominative case, while the prepositional object requires accusative; whatever case is assigned to the subject of the prepositional passive will lead to a clash, therefore, and it turns out that it is the nominative case of the subject that is actually attested, providing no reason to suppose there is any structure sharing here.

We could escape this unwanted case clash by making use of the restriction operator (Kaplan & Wedekind, 1993), and rewriting the control equation used by Lødrup as below:

$$(26) \quad (\uparrow \text{SUBJ})/\text{CASE} = (\uparrow \text{OBL}_{\theta} \text{OBJ})/\text{CASE}$$

This solves the problem for Lødrup, although we may note disapprovingly that it adds another layer of stipulation, but there remain formal problems for Alsina. Since the Theory of Structure-Sharing of Alsina (2008) does away with the need for control equations, there is nowhere to add the restriction operator, and the structure sharing must therefore, I presume, be total.

Secondly, on a more (meta-)theoretical level, we might object that such an approach makes the prepositional passive very different from the regular passive. In fact, it starts to look quite transformational: the subject is ‘really’ the object of the preposition, but has been displaced into the subject position. Given such an approach, we might wonder, for example, why the regular passive does not look like (27):



This is perhaps a little unfair, as Alsina would no doubt respond that *bed* in (23) bears no thematic relation to the predicate *sleep*, while *cake* does bear such a relation to *eat* in (27), thus accounting for the difference. I do not wish to overstate the charge on this count, therefore. But what I do want to emphasise is that such a disparity in analyses between the regular passive and the prepositional passive is not desirable. We noted above that the prepositional passive is identical to the passive in most respects, and so it seems to me that we should strive for a parallel analysis if at all possible.

3.2 Proposal

In this section I give my own proposal for the best way to represent the prepositional passive in LFG. I begin in the next section by outlining the underlying machinery I assume, before turning to the account of Type I and Type II prepositional passives in turn.

3.2.1 Machinery

For the mapping between arguments and grammatical functions (GFs), we use the model of Asudeh et al. (2014) (see also Asudeh & Giorgolo, 2012, Findlay, 2014a).

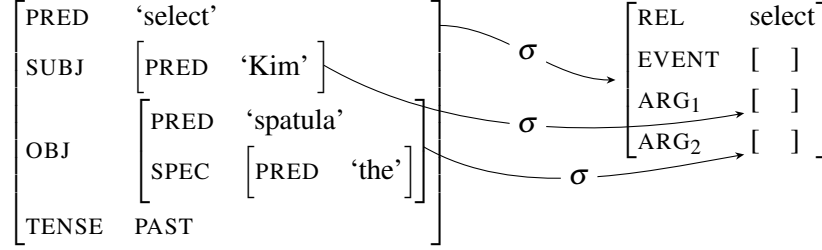


Figure 1: Mapping from f-structure to a connected semantic structure for *Kim selected the spatula*.

In this theory, such mapping is handled via various functional descriptions, primarily through defining equations like (28), ultimately to be provided by some version of Lexical Mapping Theory (LMT: Bresnan & Kanerva, 1989; Kibort, 2007; Findlay, 2014a).

$$(28) \quad (\uparrow \text{OBJ})_\sigma = (\uparrow_\sigma \text{ARG}_2)$$

These define the possible links, via the sigma projection function, between the values of GF features in the f-structure and argument positions in a connected s-structure. The latter represent resources to be used in the Glue Semantics (Dalrymple, 1999). Such a mapping is illustrated for the active voice sentence *Kim selected the spatula* in Figure 1.

For the passive, we use the model of Kibort (2001), whereby the highest argument of a predicate, ARG_1 , is marked as semantically restricted.⁴ In the present model this means it must appear as an OBL_θ if it is realised syntactically.

The regular passive can thus be described via the following template:⁵

$$(29) \quad \text{PASSIVE} :=$$

$$(\uparrow \text{VOICE}) = \text{PASSIVE}$$

$$@\text{ADDMAP}(\text{PLUSR}, \text{ARG}_1)$$

$$(\lambda P \exists x. [P(x)] : [(\uparrow_\sigma \text{ARG}_1) \multimap \uparrow_\sigma] \multimap \uparrow_\sigma)$$

The first line provides the relevant f-structural information regarding the VOICE feature. The ADDMAP template is responsible for restricting the first argument in the manner just described. Its definition is given below:

$$(30) \quad \text{ADDMAP}(\text{D}, \text{A}) :=$$

$$\{(\uparrow \text{D})_\sigma = (\uparrow_\sigma \text{A}) \mid (\uparrow_\sigma \text{A})_{\sigma^{-1}} = \emptyset\}$$

⁴In LMT terms, it is marked as $[+r]$.

⁵A template is just a bundle of functional information given a name. They are ‘called’ or ‘invoked’ in a lexical entry or annotated c-structure rule by prefixing the name with the @ symbol. On the potential theoretical import of templates in forming generalisations, see Dalrymple et al. (2004). This version of the passive template is based on that in Asudeh & Giorgolo (2012).

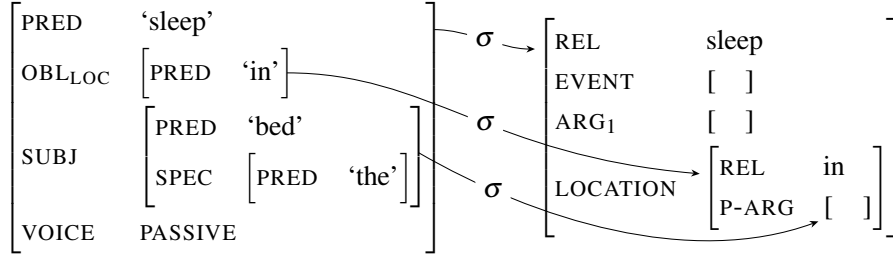


Figure 2: Mapping from f-structure to s-structure for *The bed was slept in.*

This template is used generally for adding mapping constraints, and says that either the feature disjunction D maps to the argument position A , or nothing maps to A ; in other words, an argument must be mapped to by one of a specified pair of grammatical functions unless it is syntactically unrealised.⁶ For more on this approach to mapping theory, see Asudeh et al. (2014) and Findlay (2014a).

Finally, the meaning constructor in the third line of (29) existentially closes the first argument of the passive predicate. It is optional because in the long passive it will not be needed: there the resource corresponding to ARG_1 will be provided by the *by*-phrase. The resource sensitivity of Glue Semantics will ensure that the meaning constructor in (29) is used if and only if it is required.

3.2.2 Expanding the passive template

In keeping with the claim that the prepositional passive is by and large identical to the regular passive, we would like the former to be an augmentation of the latter, rather than a replacement for it. In that case, what information must we add to the regular passive template in (29)? Firstly, we must include the fundamental information that the subject of the clause at f-structure is the argument of the stranded preposition at s-structure. That is, we want to arrive at the structure given in Figure 2, where P-ARG is the name of a feature at s-structure standing for the internal argument of the preposition.

If we assume for the moment that only OBLiques can be involved (I turn to the apparent adjuncts shortly), then we need an equation like the following, which maps the subject to the preposition’s internal argument:

$$(31) \quad (\uparrow \text{SUBJ})_\sigma = ((\uparrow \text{OBL})_\sigma \text{ P-ARG})$$

However, we also need to limit the OBL in question to the *nearest* PP to the verb, to account for contrasts like (32):

- (32) a. Victor has been spoken to about this.
b. * Victor has been spoken about this to.

⁶The LMT features are reconceptualised as disjunctions of grammatical functions, so that e.g. $\text{PLUSR} \equiv \{\text{OBJ}_\theta | \text{OBL}_\theta\}$.

In order to achieve this, we use the following, more detailed, description:

$$(33) \quad \begin{aligned} (\uparrow \text{OBL}_\theta) &= \% \text{STRDD-PREP} \\ \neg(\uparrow \text{OBL}_\theta) &<_f^{\text{VP}} \% \text{STRDD-PREP} \\ (\uparrow \text{SUBJ})_\sigma &= (\% \text{STRDD-PREP}_\sigma \text{ P-ARG}) \end{aligned}$$

OBL_θ represents a disjunction over all OBL functions, i.e. (34):

$$(34) \quad \text{OBL}_\theta \equiv \{ \text{OBL}_{\text{GOAL}} | \text{OBL}_{\text{LOC}} | \dots | \text{OBL}_{\text{TO}} | \text{OBL}_{\text{ON}} | \dots \}$$

The first line of (33) therefore picks some oblique and, using a local variable (Crouch et al., 2012), names it $\% \text{STRDD-PREP}$. The second line then requires of this oblique that no other oblique f -precedes it within the VP.⁷ In the last line, we then include the mapping information from (31), now relativised to the correct oblique.

Including all of this, the passive template is thus augmented as follows:

$$(35) \quad \begin{aligned} \text{PASSIVE} &:= \\ &(\uparrow \text{VOICE}) = \text{PASSIVE} \\ &\text{@ADD MAP}(\text{PLUSR}, \text{ARG}_1) \\ &\left(\begin{array}{l} (\uparrow \text{OBL}_\theta) = \% \text{STRDD-PREP} \\ \neg(\uparrow \text{OBL}_\theta) <_f^{\text{VP}} \% \text{STRDD-PREP} \\ (\uparrow \text{SUBJ})_\sigma = (\% \text{STRDD-PREP}_\sigma \text{ P-ARG}) \end{array} \right) \\ &(\lambda P \exists x. [P(x)] : [(\uparrow_\sigma \text{ ARG}_1) \multimap \uparrow_\sigma] \multimap \uparrow_\sigma) \end{aligned}$$

The prepositional passive information is optional, because in the regular passive it will not be used. In the prepositional passive, however, it will have to be selected, or else there will be no appropriate analysis of the sentence: the preposition has no object to map to its internal argument, and so there will be a resource deficit in the semantics if the subject mapping equation is not selected.

⁷F-precedence is essentially the f-structure reflex of c-structure precedence (i.e. linear precedence): it is the image of c-precedence under the ϕ function from c-structure to f-structure (Kaplan & Zaenen, 1989). Relativised f-precedence (Zaenen & Kaplan, 1995, 236) further restricts this relation so that the corresponding c-structure nodes (reached via the inverse of the ϕ function, ϕ^{-1}) must all be dominated by the same, specified category:

- (i) For two f-structure elements f_1 and f_2 , and a category X ,
 f_1 *f-precedes* f_2 relative to X ($f_1 <_f^X f_2$) iff for all $n_1 \in \phi^{-1}(f_1)$ and for all $n_2 \in \phi^{-1}(f_2)$,
 n_1 c-precedes n_2 and n_1 and n_2 are co-dominated by X .

This more restrictive definition of f-precedence is needed here because fronted OBLs, which f-precede the stranded preposition in the general sense, where c-structure co-domination is not required, do not result in ungrammaticality:

- (ii) About this, Victor has been spoken to.

Now, as we saw in Section 2, there are a number of other potential semantic and pragmatic constraints on the passive in general. Whatever the ultimate consensus on their exact nature, they can easily be accommodated in the present approach, simply by adding the requisite meaning constructor(s) or functional constraints to the passive template:

$$\begin{aligned}
(36) \quad \text{PASSIVE} := & \\
& (\uparrow \text{VOICE}) = \text{PASSIVE} \\
& @\text{ADDMAP}(\text{PLUSR}, \text{ARG}_1) \\
& \left(\begin{array}{l} (\uparrow \text{OBL}_\theta) = \% \text{STRDD-PREP} \\ \neg(\uparrow \text{OBL}_\theta) <_f^{\text{VP}} \% \text{STRDD-PREP} \\ (\uparrow \text{SUBJ})_\sigma = (\% \text{STRDD-PREP}_\sigma \text{ P-ARG}) \end{array} \right) \\
& \lambda P \lambda x \lambda e. P(e, x) \wedge [\text{affected}(e, x) \vee \text{characterised}(e, x)] : \\
& \quad [(\uparrow \text{SUBJ})_\sigma \multimap (\uparrow_\sigma \text{EVENT}) \multimap \uparrow_\sigma] \multimap \\
& \quad (\uparrow \text{SUBJ})_\sigma \multimap (\uparrow_\sigma \text{EVENT}) \multimap \uparrow_\sigma \\
& (\lambda P \exists x. [P(x)] : [(\uparrow_\sigma \text{ARG}_1) \multimap \uparrow_\sigma] \multimap \uparrow_\sigma)
\end{aligned}$$

Of course, the meaning constructor in (36) is intended as a placeholder only. For one thing, as it stands, it suggests that sentences like **Seoul was walked around by my father*, where the relevant constraints do not apply, is unacceptable because it is *false*, not because of any linguistic ill-formedness. This is surely not right. What we really need is a constraining equation which requires certain properties but does not provide them itself. Exactly what features, at which level of representation, are to be constrained, however, remains an open question.⁸

Let us turn now to how each of the two types of prepositional passive can be analysed under this approach.

3.2.3 Type I

Type I prepositional passives are the less problematic of the two, since the esoteric information can all be encoded locally, in a single lexical entry.

$$\begin{aligned}
(37) \quad \text{rely} \quad \vee \quad & (\uparrow \text{PRED}) = \text{'rely'} \\
& (\uparrow_\sigma \text{ARG}_2) = ((\uparrow \text{OBL}_{\text{ON}})_\sigma \text{ P-ARG}) \\
& \lambda y \lambda x. \text{rely_on}(x, y) : \\
& \quad (\uparrow_\sigma \text{ARG}_2) \multimap (\uparrow_\sigma \text{ARG}_1) \multimap (\uparrow_\sigma \text{EVENT}) \multimap \uparrow_\sigma
\end{aligned}$$

⁸If affectedness really is patient-hood, then this may be one piece of evidence that pleads for the presence of thematic role information in the grammar, *contra* the motivations of Kibort (2007) and Findlay (2014a), who argue that a grammar that makes no reference to thematic roles is preferable on theoretical grounds.

In the default case, the preposition's object will map to the P-ARG, while if the passive template is selected, it will be the clause's subject. Either way, that argument is identified as the second argument of the verb *rely* and passed to its semantics appropriately, where the verb now behaves exactly like any other transitive verb.

3.2.4 Type II

At present, the equations in (33) refer to the nearest oblique. If the PPs which participate in Type II prepositional passives are obliques, then no more need be said: the analysis will hold of them directly. But as we have seen, it looks as though NPs can be promoted to subject out of adjuncts, and so if we want to say that these are really obliques, contrary to appearances, we have some more work to do.

Given that the passive is an *argument* alternation, it would be surprising to find that it allowed non-arguments to participate, but only when they were PPs. There are no regular passives from adjuncts, for example:

- (38) They smiled last night. ~ *Last night was smiled (by them).

Adam Przepiórkowski (p.c.) argues that this shows little, however, since there are equally no passives from obliques (of the form **In the bed was slept*, for example), and thus we are begging the question by assuming a distinction between obliques and adjuncts in the first place. Indeed, Przepiórkowski sees the lack of contrast between arguments and adjuncts in the prepositional passive as further evidence that there is no distinction between these two categories in general (on which see Przepiórkowski, 2016). A full discussion of such a proposal would take us too far afield here, but I do note approvingly that the distinctions that seem relevant for the prepositional passive are semantic-pragmatic rather than syntactic, and gradient rather than categorical, which would seem entirely in keeping with an approach where the distinction between dependent-types is collapsed in the syntax.

In his discussion of this problem, Alsina (2009, 55) advocates that we “assume that certain verbs can augment their argument structures with a locative or instrumental argument”. This is very reminiscent of the suggestion by Needham & Toivonen (2011) that certain classes of PP can be added as ‘derived’ arguments to a verb's argument structure, rather than being true adjuncts. It would be nice, then, if the class of apparent adjunct PPs which participate in the prepositional passive were a subset (proper or otherwise) of Needham & Toivonen's list of derived arguments. But this is not the case: instrumentals and benefactive *for*-phrases are productive sources of prepositional passives, and listed as derived arguments by Needham & Toivonen, but displaced themes and directionals, also on the authors' list, are not. And locatives, which account for large numbers of prepositional passives, are not mentioned in the list of derived argument types.

It is certainly not true, then, that being a derived argument is a sufficient condition for prepositional passive subjecthood. But this is perhaps not surprising: as we saw in Section 2, there are other constraints on the passive which still obtain. In fact, these constraints seem to be the ultimate arbiters of whether or not a given PP

can participate in the prepositional passive. Recall the case of *This bed has been slept in*. It is not true that all locative PPs are automatically permitted here:

- (39) a. This bed has been slept in.
b. * This bed has been slept under.

Rather, whether or not a particular type of PP will enter into the prepositional passive is heavily dependent on contextual factors. For example, passives with *slept under* are perfectly acceptable given an appropriate context:

- (40) This heavy sheet is designed to be slept under.

What is happening here, then, is not purely linguistic. To return to the examples in (39), one suggestion for the source of the contrast is the Affectedness Condition: beds are affected by being slept in but not by being slept under. But this is inextricably linked to our knowledge of the world—of how beds work and what happens to them when people sleep in them. This kind of real-world knowledge that has linguistic effects is precisely the sort of information discussed by Pustejovsky (1995) in relation to *qualia structure*, where information is stored in lexical entries which relates to the canonical relations associated with particular expressions.

For example, the qualia structure for *book* will include the information that the prototypical relations it enters into are those of *reading* or *writing*. This, so Pustejovsky argues, allows us to correctly interpret sentences like *Tim began the book* as meaning *Tim began reading the book* (or *writing*, if we know he is an author), since the relations in the qualia structure of *book* are available during composition (what he refers to as co-composition).

If this approach is extended throughout the lexicon, then verbs and nouns will specify which kinds of relations are particularly associated with them, and it could well be that those are precisely the relations which are more argument-like when they are used, and therefore which will be realised as OBLs rather than ADJs. For example, it is clearly part of our understanding of sleeping that, for humans, it now normally happens *in* things, and usually in beds, at that. Similarly, it is part of our knowledge of beds that they are usually slept *in*—and of sheets that they are slept *under*. Whether this knowledge is properly *linguistic* knowledge is not so clear, however, and it may be preferable to integrate it in some way that avoids encoding it in the lexicon.⁹

Of course, we can imagine scenarios where other relations are appropriate: take a situation in which we are all sleeping in a dormitory, but the beds are all full, and so some of us are sleeping under the beds. Then, if a newcomer were looking for somewhere to bed down, it would seem perfectly sensible to say (41):

⁹There are large question marks over the desirability of bringing such real-world knowledge into our lexical representations in the manner advocated by Pustejovsky. A reviewer points out that Pustejovsky's qualia structure is not computationally implementable, for example, which is a major concern in a well-formalised theory like LFG.

(41) That bed is being slept under already.

But the point is that this requires a more marked context to come off successfully. Without details of the context, it does indeed seem odd, in a way that *That bed is being slept in already* does not. Really, relations that are available to the prepositional passive are simply those which are contextually relevant; it's just that some such relations are taken as the default, available even in the null context, which allows them to be used without a richer contextual background.¹⁰ Notions like affectedness or prominence, and, perhaps, the distinction between arguments and adjuncts, may in fact be epiphenomena, the result of Gricean-style inference interacting with knowledge about the kinds of relationships with the world which the referents of words enter into.

4 Conclusion

Let us recap the main points raised in this paper. Firstly, the prepositional passive is only minimally different from the regular passive, and subject to the same semantic and pragmatic constraints. We should, therefore, strive for a parallel analysis as far as possible. Existing LFG analyses are either empirically inadequate or obscure this similarity.

A minimally sufficient analysis can be incorporated into existing theories of the passive by simply adding the crucial information that sets the prepositional passive apart, namely the mapping from f- to s-structure. Any additional constraints, unique to the prepositional passive or otherwise, can be added and elaborated on as and when needed, owing to the modular nature of the approach, but of course ideally would be reducible to more basic principles. I suggested, finally, what such a reduction might involve: namely, making use of qualia structure or some other mechanism to reduce many of the constraints to questions of relevance, although of course a good formalisation of this notion, as with so many higher-level cognitive processes, remains elusive.

¹⁰Berthold Crysmann (p.c.) has kindly brought to my attention another example of real-world knowledge having an impact on syntactic acceptability. In German, when a PP argument is separated from its noun predicator, the acceptability of the sentence is affected by whether the embedding verb and the noun form a contextually unmarked meaning or not (Grewendorf, 1989):

- (i) Über Syntax hat Hans ein Buch ausgeliehen.
about syntax has Hans a book borrowed
'Hans has borrowed a book about syntax.'
- (ii) * Über Syntax hat Hans ein Buch geklaut.
about syntax has Hans a book stolen
'Hans has stolen a book about syntax.'

(De Kuthy, 1998)

Borrowing a book is more usual, and thus less contextually marked, than stealing one, and so (i) is grammatical while (ii) is not. Such a contrast equally pleads for the integration of real-world knowledge into the grammar, either via qualia structure or some other mechanism.

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