

Adjunct Roles and External Predication

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0. Introduction

This paper addresses one of the linking problems involving prepositional phrases (PPs) especially those involving beneficiary *for*, and argues that such PPs are best analyzed as adjunct PPs. In this paper I propose that external predication is more appropriate for these PPs than Wechsler's (1995) argument-annexing approach. The argument and analysis put forth in this paper assume a constraint-based grammatical framework called Head-Driven Phrase Structure Grammar and related semantic theories. The argument of this paper crucially hinges on a semantic analysis of PPs as proposed by Gawron (1986) who provides a three-way distinction among PPs: argument PPs, co-predicators and adjuncts. On the basis of Gawron's analysis of PPs and other basic principles of semantics, I will propose that verbal categories should be assigned the attribute INDEX and that (some subdomain of) the CONTENT value of the verbal signs should be set-valued instead of matrix-valued. Section 1 reviews the main points of Gawron's analysis and identify an adverbial PPs as distinct from either co-predicational PPs or argument PPs. Section 2 reviews an HPSG approach as suggested in Wechsler's treatment of PPs and its problems. Section 3 examines problems related to modification structures and predication, adopting Parsons' approach. Section 4 provide an HPSG approach to external predication and modification structures.

1. Three Semantic Types of PPs

This section is virtually a review of Gawron's paper. Gawron (1986) identifies three different semantic types of PPs. Let us consider the examples¹⁾ in (1). What explains the acceptability difference between (1b) and (2b)?

- (1)a. John hit the stick against the fence.
b. *John hit the stick.

- (2)a. Jon broke the vase against the hammer.
b. John broke the hammer.

If the verb *hit* can be classified semantically as impingement verb, as was suggested in Gawron, we can make the following observations. First, we may need an agent initiating the hitting event. In addition, an impingement situation needs two more individuals. One is the thing in a forceful movement; the other is an entity which gets involved in a violent contact with the moving object. This can explain why (1b) is unacceptable. (1b) is unacceptable if the entity denoted by [the stick] takes on an 'instrumental' role. In this case the moving object denoted by [the stick] lacks the counterpart to move against. So we can say that the entities denoted by NPs (the object of *against*) in (1a) fills the roles needed for the arguments of the

1. Examples in (1) are collected from various parts of Gawron's paper. It should also be noted that we are looking at some specific meaning of *hit* in (1a) and (1b) where the object NPs take on experiencer roles.

verb *hit*. So the PP in this case is called an 'argument PP'.

We can also accept that the preposition *against* is a two-place predicate denoting forceful contact or impingement between two entities. So (1a) is the typical example where the verb and the preposition denote almost the same range of meaning, the denotation of the former being subsumed by that of the latter.

However the verb *break* has a different property. If *break* were the same type as *hit*, there should be no meaning difference between (2a) and (2b), just as the examples (1a) and (1b) make no significant change in thematic roles. In (2), however, the entity denoted by the object NP ('the vase') is 'affected' and this makes *break* different from *hit* whose object does not behave as an 'affected' entity in its interpretation. The verb *break* can be parsimonious in taking syntactic arguments as in (3):

(3) The vase broke

So the semantics of *break* does not need multiple objects for it to be complete. However it is also true that the sentences in (2) depict a situation where two objects are in forceful clash against each other. The sense of impingement is attributable, in fact, to the preposition *against*². If we give translations of (1a) and (2b), they can reveal crucial differences in the semantics of the two verbs, as shown in (4). I follow Gawron's convention since it can show the difference between the semantics of the two verbs. It should be noted that *hit* is a three-place as argued before and *against* a two-place predicate; *break* is assumed to be basically a two-place predicate:

(4)a. Jack hit the stick against the fence.

{<\$LOC0, hit, \$A, \$B, \$C> <Jack, \$A>
<the-stick, \$C> <the-fence, \$B>
<\$LOC1, IMPINGEMENT \$C, \$B>}

b. Jack broke the hammer against the vase.

{<\$LOC2, break, \$A, \$B><Jack, \$A>
<the-vase, \$C> <the-hammer, \$B>
<\$LOC3, IMPINGEMENT \$B, \$C>}

What we can see here is that the object NP of the PP in (4a) is interpreted as the argument of the predicate *hit* while its counterpart ([vase]) in (4b) is not an argument of *break*. Instead the predicates *break* share the argument [[*the-hammer*]] with *against* which in turn takes an

2. There is noticeable sense of 'movement' involved in (2) and also in (a).

- (a) He cut his foot against the rock.
- (b) He cut his foot.
- (c) The vase broke (against the wall).

As we can see in (b), the sense of 'movement' is not inherent to the meaning of *cut* (or *break*). Rather it is a contribution of the meaning of *against* as a *impingement* predicate. So we can say that 'break' and 'cut' does not contain 'movement' in their meaning components.'

additional argument [[the vase]]. So the preposition in (4b) has an argument which connects its predicate to another predicate by argument-coindexing and so this type of prepositions can be called a co-predicator in a sense.

We can identify another type of PP: adjunct PP. Consider (5):

(5) John walked under the bridge.

According to Gawron, the PP in (5) has two readings. One is a goal reading; the other is a location reading. On the former, the preposition describes a relation between [John] and [the bridge] and the meaning of the verb limit the mode of movement. So the PP in this sense is viewed a co-predicating PP. On the latter, the proposition can be seen as a relation between [John's walking] and [the bridge]. So the PP on this reading contains an adjunct PP.

There are cases, however, where the distinction between argument PPs and adjunct PPs is not clear. One such case is the one that involves beneficiary *for*. Consider (6):

(6)a. John made a sweater for Mary.

b. John made Mary a sweater.

In (6a) *for Mary* can be interpreted as a beneficiary recipient just as *Mary* in (6b) is. So we can think of *for Mary* as an argument PP. However, the examples in (7) shows that 'for NP' is not always an argument³.

(7)a. John made a sweater for Miles for Mary.

b. John made a sweater for Mary for Miles.

If *for Mary* were an semantic argument, the repeated appearance would violate the basic principle of compositionality, because the PP of this type can be repeated many times in examples like (7) and because no verb is assumed to have arbitrary number of multiple arguments. Furthermore (7a) and (7b) does not have the same meaning. In (7a) John's making a sweater for Miles was to the interest of Mary while in (7b) John's behavior for Mary was to the advantage of Miles.

If these PP are not arguments, what are they? One viable alternative is to analyze it as an adjunct. An example like (8) provide another piece of evidence that 'for NP' is sometimes an adjunct.

(8) Could you buy this for me?

If a street vendor utters (8), the intended recipient cannot be the seller himself.

I propose in this paper that there should be a distinction made between two related thematic roles: (intended) recipient and beneficiary. Recipients usually fills argument roles while beneficiaries can fill either argument roles or adjunct roles. Recipients are usually the end point of transfer of objects moving between two individuals. So this notion involves an individual participating in an action or event along with other individuals. In other words, the notion depicts a relation between event-internal objects. So a recipient can be seen as a

3. I think (6a) is ambiguous between 'intended recipient' reading and 'beneficiary' reading whereas (6b) has only 'intended recipient' reading.

constituent or a formative of an event. This explains why phrases denoting recipients cannot reiterate but appear only once in a sentence.

In the case of beneficiaries, on the other hand, the notion depicts a relation between an event and an individual external to that event, as illustrated in (9)

- (9) a. We fought for our country.
 b. I cooked for Mary
 c. I cooked for Mary for her mother.
 d. They worked for peace.
 e. They worked for peace for the whole world.

In (9b) [[my cooking]] is to the interest of [[Mary]] and in (9c) '[[my cooking for Mary]] is to the interest of [[her mother]]. Therefore, the relation *for* in (9) is between events and event-external individuals. This much difference seems to justify different analyses for recipient and beneficiary readings.

2. Linking Problems

Any linguistic theory which deals with thematic roles should capture in a general way certain relations holding between argument positions of a predicate and the roles that the argument positions bear. Head-driven Phrase Structure Grammar (HPSG) crucially employs the notion of linking, and linking these two domains has been an area of much debate among the HPSG practitioners. In this section, I will review some of the main points proposed in Wechsler (1995), focusing particularly on PPs.

Wechsler attempts to capture the generalization that some prepositions are semantically selected by the meanings of verbs as in *yearn for*, *long for*, *wish for*, etc. This can be done by placing restrictions on linking rules so that some roles can be shared by two NP positions. For instance, *seek* would have a kind of argument structure in (9):

- (9) *seek*
 [SUBCAT <NP_[1], PP[*for*]_[2]>]
 [ROLES<[SEEKER[1]], [SOUGHT [*k*]]^[+r]>]

So the verb *seek* itself is a two-place relation which needs SEEKER and SOUGHT roles. On the other hand, the desiderative preposition *for* is assumed to have a lexical entry as shown in (10):

- (10) *for*
 [CAT [HEAD prep]]
 | [SUBCAT <NP[1]>] |
 | CONTENT [REL desire] |
 | [ROLE <[DESIRER[*i*], [DESIRED [*j*]]>]]

In (9) and (10), [*j*] and [*k*] should be token-identical when the above structures are combined in the same configuration. This is done by a special linking principle in Wechsler⁴ which says that if a restricted thematic role filling a verbal argument subsumes its counterpart of a

4. See Wechsler (1995) pp 70-72.

prepositional argument, the two roles must be linked. This seems to be the correct way to deal with these lexical dependencies.

However, in his analysis of other PPs, Wechsler propose that the recipient PP[for] should be seen semantically as an adjunct but syntactically as an complement. For instance, the main verb of (11a) should have a lexical specification shown in (11b).

(11)a. John carved a statue for Mary.

b. *carve*

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CAT  [ HEAD    verb                ]
      [ SUBCAT  <... NP[int. rec][2], ...> ]
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CTT  [ REL     carve                ]
      [ ROLES  <[AGT], [THM]>      ]
      [ ADJ-ROLES <REC[2][+r]> ]
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This analysis implicates that the object position of the PP is interpreted not as a first-class argument of the main verb but as a second-class argument. This move may be unavoidable, but the representation in question is misleading. It gives us an impression that the added argument is an adjunct or adverbial phrase. Furthermore, in his analysis Wechsler ignores one important fact about (11a). He does not provide an analysis for beneficiary reading of the PP in question.

As we argued above, PPs can be classified into three different categories and beneficiary PPs[for] in (6) are seen as adverbials. In this paper, using the HPSG framework, I will attempt to incorporate into my analysis the basic idea that adverbial PPs are adjunctive PPs in Gawron's term and so they are functors for the external argument which VPs provide. Consider (12).

(12)a. John ran quickly.

b. John ran for the orphans

In the realm of HPSG, there has not been a satisfactory treatment of these constructions, as far as my knowledge is concerned. So I will look into the some of the distinguishing characteristics of adverbial modifiers in the next section.

3. Modification vs Predication

In this section, I will examine what type of semantic object could be posited for adverbial PPs considering that it determines the AVM of the adjunct PPs. Before doing this, I will attempt to repair some asymmetries found between two types of modified structures shown in the traditional translations of the phrases as in (13). (I ignore quantifiers here since they are not relevant to my discussion.)

(13) a. a quick walk ---> quick'(x) & walk'(x)

b. walks quickly ---> quickly'(walk')

c. runs for John ---> for-John'(run')

Is there any a priori reason that the adjective-noun sequence should differ from the verb-adverbial string in translation? In this paper, I will propose that the translations for (13a), (13b) and (13c) can receive a unified treatment and so new translations will be posited for (13b) and (13c). In arriving at a symmetrical translation, I will suggest that (13b) and (13c) should be translated as in (14a) and (14b) respectively.

- (14)a. walks quickly ---> quick'(e) & walk'(e)
 b. runs for John ----> for-John'(e) & run'(e)

The above translation resembles Parsons' analysis, but my motivation for (14) is different from Parsons'. My main argument for this comes from some conceptual difference between head-complement structures and head-modifier structures. Modification is different from predication and this distinction should be maintained cross-categorically. Basically in a model-theoretic semantics, predication is captured by functional application in a predicate logic as shown in (15)

- (15)a. John walks ---> walk'(j)
 b. John loves Mary ---> love'(j, m)

On the other hand, modification is usually captured by set intersection, as shown in (16)⁵. The translation in (16a) is equivalent to the set expression in (16b).

- (16) a. tall boys ---> tall'(x) & boys'(x) b. { x | tall'(x) } ∩ { x | boys'(x) }

Our reasoning can be schematically illustrated in diagrams as in (17)

- (17) a. predication



- b. modification



The intuition I am trying to convey here is that functional application is a 'semantic' process involved in building a saturated expressions crucially using at least one unsaturated building block. This captures the common belief that the functors are semantic categories that needs other expressions as arguments. On the other hand, modification can be seen an operation between sets of objects, saturated or not, through which a narrower reference is made by the equal contribution from each part of the meaning components. This process does not involve

5. I am aware of some difficulties employing the set-intersection approach. For instance, many adjectives like *former*, *alleged*, *small*, etc. pose well-known problems and they are beyond the scope of this paper.

saturation, but a kind of delimitation over semantic objects.

From what has been discussed above, we can claim that the phrases involving adverbial modification should be translated as in (14) not as in (13b) or (13c). This implies that verbs cannot be seen as denoting an event, but a set of events, as Parsons (1990) proposes. This means that verbs can have an external argument (or INDEX in HPSG terms) if common nouns do in the semantics assumed in HPSG.

4. A HPSG Treatment

Capturing the intuition presented above using the HPSG framework is not an easy task since the current version of HPSG theory does not look at the modification structures the way I do. If the HPSG tool is going to incorporate Parson's idea and mine, then a verb's CONTENT value should contain an INDEX and have a set as its value, just as a nominal counterpart does in its inner domain. Given this amendment, structures involved in modification can be represented in a schematic way as shown in (18).

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(18) modifier: [ CAT [ HEAD [ MOD [ CTT INDEX  $\bar{i}$  ] ] ] ]
                |      [      [      [ RESTRC <  $\bar{j}$  > ] ] ] |
                |      [INDEX  $\bar{i}$  ] |
                [CTT [RESTRC <  $\bar{k}$  >  $\cup$  <  $\bar{j}$  > ] ] ]

modified: [ INDEX  $\bar{i}$  ]
          [ RESTRC <  $\bar{k}$  > ]
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As we have suggested before, we should provide an external argument for an event depicted by a verb. So verbal categories will have as its CONTENT value not only RELN (relation) and AGR (arguments) but INDEX just as nominal signs do.

Furthermore, we should take into account the fact that (7a) and (7b) have different interpretations as repeated in (19):

- (19) a. John made a sweater for Miles for Mary. (=7a)
 b. John made a sweater for Mary for Miles. (=7b)

Simply allowing set values in the semantic content of verbal categories is not enough. Otherwise we cannot distinguish between the two different readings in our translation. Sentences in (20) also indicates that the distinction we are trying to make is not a case of an isolated incidence.

- (20) a. John did it clumsily for Mary
 b. John did it for Mary clumsily.

In (23a) the preferred reading is John's clumsy behavior was to Mary's interest; in (20b) John's clumsy behavior was probably due to lack of tactics⁶. These examples motivate us to

6. (20a) and (20b) can sometimes be used interchangeably. This possibility does not totally undermine my proposal for an ordered set since we can work out a translation that can ignore ordering relations.

put an additional constraint on the semantic content of the modification structure. That is, the order of adverbials is significant in semantics and this calls for a change in the structure of RESTRC (restriction) since ordinary sets cannot capture ordering relations. One way of capturing the ordering relation is to employ as the value of RESTRC an ordered set rather than an ordinary set.

Given these revisions, *for* as a beneficiary adjunct preposition will have the structure shown in (21)⁷.

(21) AVM of *for* as an beneficiary adjunct preposition (SUBCAT is ignored)

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[ CAT [ HEAD [ P ] ] ]
|     |     | MOD [V: CTT [ INDEX 5 ] ] ] ] ]
|     |     | [ RESTRC 6 ] ] ] ]
|     |     | PRD - ] ] ]
|
|     | INDEX 5 ] ] ]
| CTT | [ REL for ] ] ]
|     | RESTR < | BENFCTR 5 | > U 6 ] ] ]
|     | [ BENFCIRY 4 ] ] ] ]

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Finally, the relevant part of the AVM for *run for Mary* would look like the one in (22). In this case, as we suggested before, we need to introduce an event-type object as contrasted with an individual-type object. I will employ the attribute name E-INSTNC to cover these event-type objects and this attribute will be a component of a verb-type relation which itself becomes a component of a restriction on event contents.

(22) AVM for *run for Mary*

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[ CAT [ HEAD [ V ] ] ]
|     | [ SUBCAT <NP1> ] ] ]
|
|     | INDEX 5 ] ] ]
|     | [ REL run ] [ REL for ] ] ] ]
| CTT | RESTR < | ARG 1 | | BENFCTR 5 | > ] ] ]
|     | [ E-INSTNC 5 ], [ BENFCIRY Mary ] ] ] ]

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5. Conclusions

In this paper I have attempted to give a unified analysis of modification structures, i.e., adjectival and adverbial modifications and, I argue, that this is motivated by the theoretical need of external predication on events, especially in connection with adverbial PPs. However

7. In addition, as Pollard and Sag (1994) put forth, we need a kind of ID schema and semantics principle as defined in Pollard and Sag (1994: 56) in order to make up for the Head Feature Principle.

my proposal is of a provisional nature and need further investigation in that a complete account of event indexing would probably need to take more factors in account, i.e., identity of events, the similarities and dissimilarities of nominal and verbal INSTANCE. However, many authors, like Peterson (1979, 1982), Parsons (1990), Lasersohn (1995) and others have assumed its existence or felt a need for a kind of event indexing, especially in connection with event reference. This paper's discussion was limited to beneficiary adjuncts, but the same reasoning can be applicable to manner adverbials as well.

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