Unifying English PPs

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Introduction. Most syntactic categories adhere to a clear cut between lexical (V, N, A) and functional (D, T, C) and show consistency in syntactic structure and semantic type. The category P shows variation in all these axes and has long been treated as a cover term. Even with a focus on the grammar of English, the literature has so far come up with separate analyses for prepositions in indirect objects, applicatives, spatial and temporal PPs, which raises the question of whether a theory of grammar should include P as a primitive category. This paper defends a unified analysis for the four main classes of English PPs, which can potentially be extended to other languages that contain these classes.

Background. English Ps divide into a number of common subclasses with different semantic and syntactic properties. The class of indirect objects employs Ps that seem to make little to no semantic contribution of their own, but rather provide a syntactic realization for an argument of the verb. To illustrate, in the following examples, the meaning of the English preposition *to* varies with the selecting predicate.

(1) (a) *donate money to hospitals* (change of possession)
(b) *bit to death* (result)
(c) *speak to your parents* (goal)
(d) *naked to the waist* (distance)

Other prepositions, demonstrated in (2), are less vague in their contribution and express fixed meanings that correspond to various thematic roles. On the more lexical end, we find expressions of spatial relations (3) and temporal relations (4), which encode a larger selection of meanings and accommodate modifiers.

(2) (a) *parties at home* (location)
(b) *stories by children* (agent)
(c) *stories about children* (theme)
(d) *stories for children* (beneficiary)

(3) *two meters* {*in front of/behind*} *the car* (spatial)

(4) *two hours* {*before/after*} *class* (temporal)

Previous analyses of P syntax and semantics have so far concentrated on some subset of the domain. To illustrate the extent of the division, works like Bresnan and Moshi (1990), Bowers (1993) looked at indirect object PPs as part of a broader object hierarchy, without considering other PPs; Pylkkänen (2008) speaks of "argument introducers", which covers the Ps in (1-2) and does not clearly extend to (3-4); Hoekstra (1988) described spatial Ps as resultative constructions that contain a Small Clause; Zwarts (1997, 2005) analyzed temporal Ps as vectors to account for the licensing of degree modifiers; for spatial prepositions, the same phenomenon was explained through designated positions in the prepositional spine (Koopman 2000; Svenonius 2006), and this is obviously a partial list. Between these and other influential analyses, PPs have received a variety of meanings and structures, as if the category P was a super-set of essentially different classes.

Current focus: Do Ps form a coherent category? The fact that previous analyses have so far refrained from capturing more than one class of Ps raises the question of whether a unified analysis is at all possible. Moreover, it has been unclear whether there are sufficient semantic and syntactic behaviors that are shared across Ps to justify their shared label. This paper responds **yes** on both matters and proposes a modular account where Ps shared a joint P element while their variable properties arrive from additional, independently suggested heads: a Degree argument adopted from the literature on scalar adjectives (Kennedy and McNally 2005) and a little *p* head suggested in the spatial literature for thematic considerations (Svenonius 2003, Ramchand and Svenonius 2004).

I. The properties of English PPs do not converge with their traditional classes. I show that there is empirical motivation for an analysis that crosses the lines between functional, spatial or temporal PPs. First, despite their differences, all the Ps above are argument introducers, in the sense that they denote a relation between some predicate and a DP. Second, contrary to previous claims that modifiers are characteristics of Ps with rich syntax and semantics, it can be shown that all classes have the capacity to take modifiers, including the more functional Ps:

(5) (a) *God spoke directly to him.*
(b) *a book vaguely about U2.*

Spatial and temporal PPs remain unique for accommodating *degree* modifiers. Yet, (6) shows that this does not cover all prepositions in these classes, as the spatial P *next to* seems incompatible with degrees.

(6) *You parked (right/*two meters) next to the tree.*

Compatibility with degrees is therefore a property of some Ps, not necessarily of a particular class. A similar discrepancy is observed in the syntactic cues that various PPs provide, such as the distribution of pronouns and anaphors. The background for such diagnostics is that PPs that are light enough to be part of the verb for the purposes of anaphor resolution should require a reflexive anaphor for coreference with the subject, but a PP that contains its own subject (i.e., a Small Clause) should be opaque for this purpose (Legate 2003, Lee-Schoenfeld 2005). In this respect, the data below show that PPs of all classes block coreferential readings of pronouns, on a par with direct objects.

(7) (a) *She$_1$ sees her$_{*1}$.* (Direct Object)
(b) *She$_1$ speaks to her$_{*1}$.* (Goal)
(c) *She$_1$ cooked for her$_{*1}$.* (Beneficiary)
(d) *She$_1$ drank coffee next to her$_{*1}$.* (Spatial)
(e) *The film$_1$ was played after it$_{*1}$.* (Temporal)

This comes as a surprise for spatial Ps like *next to*, which is often analyzed as a SC (Talmy 1978; Hoekstra 1988; Mateu and Acedo-Matellán 2012). The same preposition can nonetheless deliver coreferential readings of pronouns when it is selected by resultative verbs or verbs of perception:

(8) (a) *She$_1$ spilled coffee next to her$_1$.* (b) *She$_1$ saw coffee next to her$_1$.*

Assuming that pronoun coreference indicates a SC structure of the PP (alternative analyses exist and will be discussed), these examples suggest that SC is not deterministic per class or even per preposition. Instead, it seems that Ps realize different amounts of structure, and this too is seen across different P classes, as demonstrated below for a functional preposition (9) and a temporal one (10).

(9) (a) *She$_1$ came with her$_{*1}$.*
(b) *She$_1$ suggested [a meeting with her$_1$].*

(10) (a) *The class$_1$ started before it$_{*1}$.*
(b) *The class$_1$ repeated [the one before it$_1$].*

II. A modular account of English PPs. The shared patterns of semantic import and binding effects are explained by a minimal definition of Ps as relations between events to entities, given in (11).

(11) $[\![P]\!]_{\langle e \langle \varepsilon,t\rangle\rangle} = \lambda x \lambda \varepsilon.R(\varepsilon,x)$

This entry allows variation between Ps through the content conveyed by R. The Ps that surface with indirect objects convey an abstract Goal relation that leaves room for nuances stemming from the semantics of the selecting predicate. In contrast, Ps like *about* or *for* define more specific relations (Theme, Beneficiary), which have a rather consistent meaning across predicates. All are parsed as part of the binding domain of the predicate, giving rise to the robust ban on pronoun coreference seen in (7).

In a similar fashion, spatio-temporal Ps introduce arguments understood as points in time and space. What gives them privileged status is that many of them have a scalar meaning that allows them to take degree modifiers. I propose that such Ps contain a degree variable in their semantics, which means they start out with the type in (12) and combine with a degree argument to generate (11).

(12) $[\![P']\!]_{\langle d\langle e \langle \varepsilon,t\rangle\rangle\rangle} = \lambda d \lambda x \lambda \varepsilon.R(\varepsilon,x)(d)$

Crucially, such Ps need a degree phrase to be interpreted, which means in the lack of such a phrase they will have to acquire some default value and be understood as '(some contextually appropriate degree) after the car/class'. The difference between Ps of type in (11) and those that start out as (12) cuts through traditional classes and explains how *behind* takes degree modifiers while *next to* does not. This property is independent from the question of whether the PP is a SC, which I link with the functional head little *p*. I give *p* the meaning (13), inspired by the semantics of little *v*/Voice (Kratzer 1996). *p* introduces a subject into the R relation and makes the PP a two-way predication (14) and an independent binding domain where pronouns are allowed to corefer with the matrix subject.

(13) $[\![p]\!]_{\langle e \langle \varepsilon,t\rangle} = \lambda x \lambda \varepsilon.\text{Subject}(\varepsilon,x)$

(14) $[\![p\text{+P}]\!]_{\langle e \langle e \langle \varepsilon,t\rangle} = \lambda x \lambda y \lambda \varepsilon\ [R(\varepsilon,x) \wedge \text{Subject}(\varepsilon,y)]$

Selected references. Bowers 1993 "The Syntax of Predication" *LI.* **Bresnan & Moshi 1990** "Object Asymmetries in Comparative Bantu Syntax" *LI*. **Hoekstra 1988** "Small Clause Results" *Lingua* **Kennedy & McNally 2005** "Scale Structure, Degree Modification, and the Semantics of Gradable Predicates" *Language*. **Koopman 2000** "Prepositions, Postpositions, Circumpositions, and Particles" **Kratzer 1996** "Severing the External Argument from Its Verb" **Pylkkänen 2008** "Introducing arguments" *LI* . **Ramchand & Svenonius 2004** Ps and external argument demotion. **Svenonius 2003** Limits on P: filling in holes vs. falling in holes. Nordlyd. **Zwarts 1997** "Vectors as Relative Positions: A Compositional Semantics of Modified PPs" *Journal of Semantics*; **2005** "Prepositional Aspect and the Algebra of Paths" *Linguistics & Philosophy*