

Locations and binding domains*

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Prepositions of relations in space are known to enable free variation of pronouns and anaphors, often attributed to discourse factors like point of view, physical contact, or expectations. This had previously raised doubts that P anaphors are predictable given the distance of the antecedent. However, these claims often assume a simplistic syntax of spatial prepositions, which compromises their evaluation of distances in the prepositional domain. This paper shows that considering richer models of spatial PPs makes it possible to draw predictive correlations between meaning components and pronominal preferences, which lead back to syntactic distance.

Keywords: *Binding theory, Complex anaphors, Logophoricity, Modern Hebrew, Spatial prepositions.*

1. Introduction

Many languages present a morphological distinction between pronouns and complex anaphors that translates into complementary use conditions, demonstrated below. Anaphors express coreference with a local c-commanding DP, while pronouns are understood as locally disjoint from c-commanding DPs (Lees and Klima 1963; Langacker 1966; Faltz 1977).

- (1) a. People₁ don't trust **them***₁/**themselves**₁.
b. People₁ don't trust their children₂ to talk to **them**_{1/*2}/**themselves***_{1/2}.

The choice between the pronoun and the anaphor in (1) seems fully predictable based on their distance from the antecedent (Chomsky 1981; Reinhart 1981; Heim 1998; Buring 2005). Yet this complementarity often breaks under prepositions of spatial relations. To illustrate, the sentences in (2) are acceptable with either a pronoun or an anaphor, both with antecedents at the same distance.

- (2) a. John₁ saw a snake next to {**him**₁/**himself**₁}. (Reinhart and Reuland 1993: 67)
b. Max₁ rolled the carpet over {**him**₁/**himself**₁}.

Such cases challenge the idea that syntactic locality is the basis on which the choice between pronoun and anaphor is made. Moreover, they require explaining how speakers know in which

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phrases to relax the strict rules that allow them to use pronouns and anaphors properly elsewhere. This is a non-trivial question since not all spatial prepositions allow the same freedom. For instance, in (3), the pronoun and the anaphor are complementary despite the spatial preposition *at*.

(3) Max pointed a finger at {***him**₁/**himself**₁}.

Alternatives to the distance-based view (most notably, Kuno 1987) have long argued that the choice between pronoun and anaphor is not the output of syntactic rules but a device that encodes nuanced semantic parameters and hierarchies between referents in the conversational context. These frameworks have stated up front that the distribution of prepositional anaphors is to an extent unpredictable, since it is impossible to control for every aspect of the conversation and the speaker's mindset. My goal in this paper is to show that pronouns and anaphors in spatial expressions keep to the traditional distance-based generalizations despite these overlaps. Moreover, I will argue that there can be structural sources for the apparent freedom in pronominal licensing, which is a regular ambiguity that allows pronouns and anaphors to occupy different parses.

One type of ambiguity involves the sensitivity of spatial relations to the deictic center they are calculated against, which in turn depends on the source of information (Kamp 1981; Sells 1987). Previous literature has shown that DPs that refer to the source of information may license anaphors across longer distances, a phenomenon known as logophoricity (due to Sells) or as exempt anaphors (Pollard and Sag 1987).¹ A common view of these cases states that perspective sources may be realized covertly in various points along the sentence, which serve as local antecedents for P anaphors (Ross 1970; Cantrall 1974; Svenonius 2006; Rooryck and Vanden Wyngaerd 2007; Charnavel and Sportiche 2016; Charnavel 2019). If this conjecture is true, a large portion of the cases of free choice between pronouns and anaphors are actually a choice between a neutral perspective and the perspective of the antecedent.

The second source of ambiguity, which is the main focus of the current paper, traces back to the prepositions themselves. It has previously been argued that certain prepositions form independent semantic and syntactic units, while others add information to existing units

¹ The term logophors is inspired by studies of West African languages that employ special pronouns to refer to the speaker in contexts of reported speech and thought (Hagège 1974; Clements 1975). The two phenomena have some shared traits but are not clearly related.

(Hoekstra 1988; Reinhart and Reuland 1993; Gehrke 2008). That is, some PPs contain more structure than others, often with no surface indication. My goal is to show that this underlying structure ties together nuances of spatial meanings with the preferences for pronouns and anaphors. Specifically, I argue that the combination of place prepositions and motion verbs requires additional layers of structure that make the PP opaque to local coreference. I will show that English and Hebrew show consistency in that only PPs with a fixed element allow pronouns to be coreferenced with nearby antecedents. In contrast, PPs that lack an overt place component require an anaphor, if they allow coreference at all. If these meanings reflect different syntactic configurations, the acceptability of pronouns and anaphors are be predictable based on conservative notions of syntactic distance.

The paper is structured as follows. Section 2 presents the relevant working assumptions and shows how far the current wisdom regarding prepositions gets in predicting the pronominal elements that follow them. Section 3 builds a syntactic typology of English PPs and demonstrates that the preference for a coreferenced pronoun shifts to anaphor as meaning component are omitted. The context where this happens will lead to the conclusion that prepositions of fixed place must form a tenseless clause to connect with motion verbs. Section 4 provides independent evidence that the semantic import of the clausal structure are evident in prepositions of fixed place and not change of place. Section 5 shows through evidence from Hebrew that using a pronoun or an anaphor may lead to semantic effects if it by forcing the listener to adopt one parse over another. Section 6 concludes the paper.

2. Coreference in prepositional phrases

2.1 Pronouns, reference, and distance

Prepositional phrases may contain pronouns and anaphors that refer to entities that are already part of the discourse (e.g., *to her*, *under herself*).² Since pronouns and anaphors have no reference in isolation, their connection to real world entities is established in each context they appear in, which is where the crucial difference between them comes into play: focusing on the third person for the moment, pronouns and anaphors narrow down the referential possibilities per instance in different directions. The chosen pronominal element should therefore restrict the referential

² I include deictic pronouns in this definition, as they target existing discourse participants or ones introduced by gestures..

space toward the entity whose reference was intended. This conceptualization is generally shared among the various approaches to anaphors. However, there are multiple ways of describing the restrictions that pronouns and anaphor place on their own reference. The traditional view in syntactic theory takes this difference to be based on distance. That is, pronouns and anaphors contrast in satisfying dependencies of different lengths: anaphors take the reference of nearby c-commanding nouns, while pronouns search for c-commanding nouns in a minimal distance.

As stated in the introduction, this is not the only mechanism that has been proposed. There are many works that see anaphor resolution as the outcome of intersecting discourse pressures, which correlate with factors such as discourse representations (Cornish 1986), accessibility in the speaker's memory (Ariel 1988), low expectations for coreference (Kemmer 1993; Ariel 2008; Haspelmath 2008), directionality (Wechsler 1997; Lederer 2013), awareness, animacy, and physical contact (Kuno 1987; Bryant 2022). The cited authors found correlations between the named factors and the choice of pronominal element, yet these do not add up to a deterministic effect. That is since measuring any combination of these factors would always neglect others that might tip the scale away from the expected form. My approach is therefore not testing the effect of discourse conditions but rather showing that the choice between anaphor and pronoun is predictable based on distance when discourse pressures are minimized.

A crucial next step is to understand what determines the level of distance between words in a sentence. I assume with many contemporary accounts that syntactic distance is measured in units known as phases, defined in (4) (Lee-Schoenfeld 2004; Canac-Marquis 2005; Johnson 2007; Quicoli 2008; Antonenko 2012; Charnavel and Sportiche 2016).

- (4) A phase is a self-contained subsection of the derivation, beginning with a
 numeration and ending with Spell-Out. (Legate 2003, p.506)

In Phase theory (Chomsky 2001, 2008; Legate 2003), the phase is a part of the syntactic tree that forms a coherent, independent output at both PF and LF. To reach this status, a phase head must have its semantic and morphosyntactic operations (selection, agreement, case, EPP) completed within the spellout domain. Each spellout contains the edge of the next phase, which allows operations between phases. With this procedure in mind, I will assume that the interpretation of complex anaphors feeds on the reference of DPs that are accessible during spellout. Pronouns show an inverse pattern and pull any reference from the discourse that is

not represented in their spellout domain.³ The idea is phrased below as a take on the classical Binding Theory.

- (5) a. Condition A: An anaphor must be bound in the accessible spellout domain.
 b. Condition B: A pronoun must be free in the accessible spellout domain.
 (Canac-Marquis 2005, Charnavel and Sportiche 2016)

If the choice between pronouns and anaphors in PPs is guided by the distance of the antecedent, the key for predicting it comes down to how sentences with prepositions break into spellout domains. In other words, the fundamental question is whether coreference becomes long-distance when it crosses a preposition.

2.2 *Are PPs local?*

To see why the relation between PPs and syntactic distance is not straightforward, consider the question of what counts as long-distance coreference in direct objects. The object position is clearly local to the subject and does not allow coreference in pronouns, as seen below in (6a). Yet pronouns have no such filter when they are embedded within a direct object (6b-c).

- (6) a. He₁ called [him*₁].
 b. He₁ called [his₁ friend].
 c. He₁ called [a friend of his₁].

This contrast suggests a rule of thumb in which embedded pronouns are in their own domain. However, for pronouns in PPs, being embedded under a preposition is a trivial fact that does not explain why coreference with the subject is blocked in some cases (below: 7a, 8a) and allowed in others (7b, 8b).

- (7) a. He₁ made dinner [for him*₁].
 b. He₁ placed a chair [next to him₁].
 (8) a. John₁ smeared the oil [on him*₁]. (adapted from Lees and Klima 1963: 34, 44)
 b. John₁ ignored the oil [on him₁].

³ Assuming that the condition on anaphors in (7a) is motivated by their mechanism of interpretation, there are multiple ways of deriving the anti-local behavior of pronouns (7b). For instance, Principle B could be the result of an independent restriction (as in Reinhart and Reuland 1993; Reuland 2001; Canac-Marquis 2005; Bruening 2021, among others), it could follow from competition with the anaphor (Safir 2004; Rooryck and Vanden Wyngaerd 2011; Dillon and Johnson 2024; Kiparsky 2002 suggests a mixed approach), or be the cause for the existence of anaphors (Author 2024). For current purposes, I will remain outside this debate and concentrate on the extent to which the binding conditions hold as descriptive generalizations on P anaphors.

From the assumption that pronouns are free in their spellout domain, we may conclude that the PPs in each pair of sentences fall into different spellouts: the PPs in the (a) sentences are in one domain with the subject, while those in (b) have a separate spellout domain. But since there is no indication for such a difference on the surface, we need independent criteria to explain how these PPs are different from each other.

Previous work has indeed noted that PPs do not form a homogeneous class, mainly based on semantic differences (Jackendoff 1973; Reinhart and Reuland 1993; Rooryck 1996; Botwinik-Rotem 2008; Merchant 2019). Some PPs seem to have more meaning than others, and if this translates to a more complex syntax, it will explain why some PPs are binding domains and others are not. Take for example the preposition *to*, seen below in various contexts. *to* is necessary for connecting these verbs with the following DPs, but seems to have no notable semantic import.

- (9) 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)

Prepositions with this behavior are known as functional prepositions, and are generally represented by the naive structure in (10) (e.g., Fillmore 1966). This definition also covers prepositions like *about*, *with*, *by*, *for*, and so on, which are predetermined for the type of participant they introduce.

- (10) *Functional PP*:
 [PP P [DP]]

PPs that are constructed this way have no subject of their own and should therefore not intervene in coreference between DPs.⁴ Accordingly, it has long been noticed that PPs that are predetermined by the context exhibit the same complementarity of pronouns and anaphors that is familiar from direct object positions (Reinhart and Reuland 1993). This is illustrated in (11-12) for core and non-core arguments, respectively.

⁴ Pylkkänen (2008) proposes a similar syntax for applicatives, which also do not present a barrier to locality (at least for English double-object construction). I assume elsewhere that functional prepositions are overt realizations of applicative heads.

- (11) a. Max₁ speaks with {*him₁/himself₁}.
 b. Max₁ relies on {*him₁/himself₁}.
- (12) a. Max₁ cooked for {*him₁/himself₁}.
 b. Max₁ stands by {*him₁/himself₁}.
 c. Max₁ talks mostly about {*him₁/himself₁}.

Spatial prepositions stand out from such PPs in the fact that they are not predetermined by their context. The following examples show that such prepositions encode a broad array of spatial relations (13), and may also form complex relations by stacking (14).

- (13) Max walked {to/toward/from/around/into} his car.
 (14) Max took something [from [under [the back of [his car]]]].

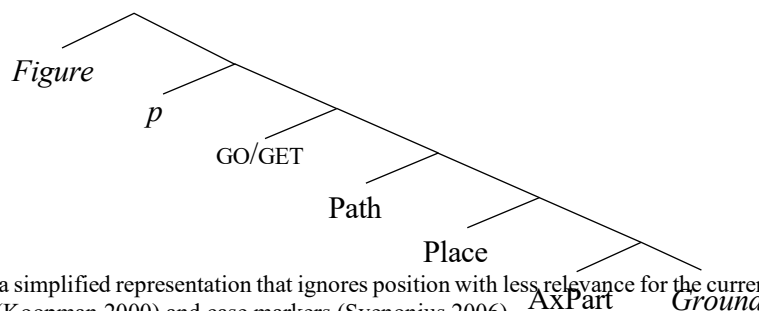
These properties suggest a more complex and nuanced structure than (10), leading to the development of the multilayered representation seen in (15).⁵

- (15) *Spatial PP*:

[_{pP} *Figure* [GO/GET [Path [Place [AxPart [DP *Ground*]]]]]]

The structure in (15) marks a shift from the canonical understanding of spatial expressions as simple modifiers connecting events and locations. Instead, the spatial PP is understood as a constituent that selects an entity and a point in space as subject and object, widely known by the respective terms *Figure* and *Ground* (Talmy 1978).⁶ The intermediate projections, adopted from the semantic literature on PPs, encode the nuances that make for the spatial relation between these entities. A brief introduction of these components is given in (16).

- (16) *The Prepositional spine*:



⁵ This is a simplified representation that ignores position with less relevance for the current purposes, such as measure phrases (Koopman 2000) and case markers (Svenonius 2006).

⁶ Sportiche (2017) proposes an opposite setting, in which the preposition selects the verb.

- a. Axial parts: a nominal projection encoding the immediate regions surrounding an entity, such as English *front* and *back* (Svenonius 2006; Rooryck and Vanden Wyngaerd 2007; Matushansky and Zwarts 2019)
- b. Place and Path: projections that represent *locations* and *trajectories* between them, respectively (Jackendoff 1973).
- c. Silent predicates GO and GET, which determine whether the PP describes motion or a result state (den Dikken 2010).
- d. Little *p*: a functional projection that introduces the Figure argument, inspired by little *v* in the verbal domain (Svenonius 2003, 2008; Ramchand and Svenonius 2004; see also Wood and Marantz 2017).

For the current purposes, the critical factor is that defining PPs as figure-ground relations equates them to tenseless clauses, which should form their own spellout domains.

Hoekstra (1988) presented independent arguments from Dutch for a small clause analysis of spatial PPs, and it has since become widely accepted (Folli & Harley 2006; Ramchand 2007; Gehrke 2008; den Dikken 2010; Mateu & Acedo-Matellán 2012, among others). Plugging in the idea of logophoric pronouns, adopted from Charnavel and Sportiche 2016, correctly predicts cases in which pronouns and anaphors are interchangeable. Figures 1 and 2 demonstrate the various options for coreference in functional and spatial PPs.

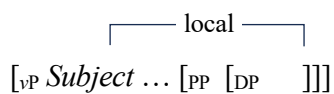


Figure 1: Coreference in functional PPs

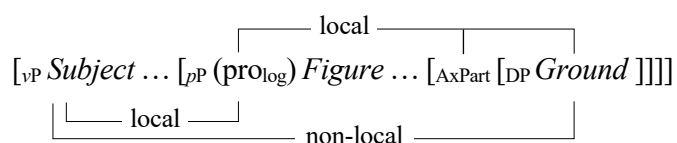


Figure 2: Coreference in spatial PPs

These structures predict that functional PPs would be indistinguishable from direct objects for binding purposes, while spatial PPs would allow a pronominal element in the Ground position to maintain long-distance coreference with the subject or local coreference with a logophoric pronoun, adjusting its form to the length of the dependency (pronoun or anaphor, respectively). When the subject and the perspective center coincide, as is common, for

example, in texts in the narrative style, the pronoun and the anaphor will get the same reference and appear to be interchangeable.

2.3 *Some open questions*

If spatial meanings emerge from the extended PP, spatial prepositions should categorically allow the freedom to choose between pronouns and anaphors. However, it has been noticed time and again that this is not actually the case, but rather there is a dimension of unpredictability in spatial pronominals (Reinhart and Reuland 1993; Kuno 1987; Hestvik 1991; Wechsler 1997; Lederer 2013; Bryant 2022). In particular, there exist prepositions that express spatial meanings and still subscribe to the basic complementarity of pronouns and anaphors that characterizes direct objects and functional PPs. A few such cases are seen in (17), all adapted from attested web examples.

- (17) a. John₁ aimed the gun at {*him₁/himself₁}.
 b. Kobe Bryant₁ likes to pass the ball to {*him₁/himself₁} off the backboard.
 c. Try to copy the folder₁ into {*it₁/itself₁}.
 d. Can Superman₁ see through {*him₁/himself₁}?

These prepositions behave as if they do not form binding domains of their own despite their spatial charge. In Section 3, I will argue that this is since they realize only part of the extended PP, and crucially, not the portion that would make them clausal. As a strategy, I will look at a complex PP that shows the full prepositional spine overtly and demonstrate that the preference for a coreferential element switches from pronoun to anaphor as meaning components drop.

Another factor to consider when asking if a spatial anaphor is local to the verb's subject is the way the PP and the verb are connected. The small clause view was proposed for PPs that describe an event's result, which are (core or non-core) arguments of the relevant verb. However, as the following examples show, the same PPs may also surface as adjuncts that describe the location of an event without taking on a more substantial role in it (Hestvik 1991, Gehrke 2008). This raises the question of whether adjunct PPs are also constructed as clauses in accordance with the prescription in (15), perhaps with a BE predicate instead of GO/GET.

(18) *Argument PP:*

Mary put [the flowers by the door].

(19) *Adjunct PP:*

Mary talked to John [? by the door].

We know from relative clauses that adjuncts can be clausal, so it is plausible that the PP in (19) has a covert subject. Alternatively, it could be that adjunct PPs are bare place prepositions without the clausal envelope, in which case their merging position would determine the spellout domain they would be part of.

We arrive at three types of structural parameters that should affect the distance of spatial pronominals from the subject, and consequently the choice between pronoun and anaphor. First, the amount of structure that is realized from the extended PP schema. Second, the type of connection between the PP and the verb. And third, the realization of a logophoric pronoun at the edge of the PP. The following section focuses on the first two factors, asking how the internal and external syntax of PPs determine the choice of pronominal element in the lack of a logophoric mediator.

3. The syntax of space

3.1 *The fixed place effect*

The goal of this section is illustrating the correspondence between pronominal preferences and the components of the extended PP model that emerges from the joint insights of Jackendoff (1975), Hoekstra (1988), Svenonius (2006), Rooryck and Vanden Wyngaerd (2007), and den Dikken (2010).

(20) *Spatial PP:*

$[_{PP} \textit{Figure} [_{GET} [_{Path} [_{Place} [_{AxPart} [_{DP} \textit{Ground}]]]]]]]]$

As a point of departure, consider the maximal PP predicted by this structure, seen in (21), which describes an outcome of change in the spatial relations of two entities, *something* and *the car*.⁷

(21) John took $[_{PP} \textit{something} [_{GET} [_{PATH} \textit{from} [_{PLACE} \textit{under} [_{AxPart} \textit{the back of} [_{Ground} \textit{the car}]]]]]]]$.

The obvious complexity of this PP should make it an independent spellout domain, which

⁷ In this particular context, the PP localizes the entity in an initial state rather than the result state. This meaning can be thought of as a negation operator introduced by *from*, which generates the meaning GET [not [under the car]].

means a pronoun in the Ground position is expected to allow coreference with the higher subject *John*. The following examples confirm that coreference is indeed available, with AxPart (22) and in its absence (23).⁸

(22) John₁ took [_{pP} something [_{GET} [_{PATH} from [_{PLACE} under [_{AxPart} [_{Ground} **his**₁] back]]]]].

(23) John₁ took [_{pP} something [_{GET} [_{PATH} from [_{PLACE} under [_{Ground} **him**₁]]]]].

A comparable context that conveys change of location without the path phrase still allows coreference, as seen in (24). This is also expected, particularly if we accept Jackendoff's (1973) claim that such PPs include a covert path projection akin to a silent 'to', and are hence structurally equivalent to (23).⁹

(24) He₁ threw [_{pP} something [_{GET} [_{PATH} [_{PLACE} under [_{Ground} **him**₁]]]]].

Going a step further and removing the path component altogether, as in (25), still makes no impact. However, the following example in (26) shows that removing the place phrase *under* cancels the option of coreference between the higher subject and the pronoun.

(25) He₁ saw [_{pP} something [_{PLACE} under [_{Ground} **him**₁]]]]].

(26) He₁ took something [_{GET} [_{PATH} from [_{Ground} **him***₁]]]]].

The contrast between (25) and (26) suggests that PP's independent status depends on a fixed place component. Judging by the ban on coreference in (26), it seems that lacking an overt place projection condenses the PP into one spellout domain with the verb. It could be claimed that this is merely an indication of a functional status of *from*, which can also describe more abstract 'source' relations with no spatial attribute (e.g., *He₁ heard the news from him**₁). Yet (27) shows that other path prepositions block coreferenced pronouns in a similar fashion. The same context then shows that place prepositions consistently allow such coreference (28).

(27) *Path prepositions:*

Kobe Bryant₁ throws the ball {to/toward/over} **him***₁.

⁸ The positions are rearranged in (22) since English does not allow pronouns as complements of AxPart.

⁹ It is not clear that a syntactic realization of Path is needed under the small clause analysis, where a chance of place is generated from the association of the PP with a result state. The model adopted here obtains this link through the GET predicate (following den Dikken 2010), and there is also a purely semantic alternative that ties the PP with a BECOME subevent in the verb's event structure (Rothstein 2004; Gehrke 2008). Moreover, a silent 'to' analysis has to explain why nouns that license path, such as *road* or *journey*, cannot generate a path reading with place prepositions in a similar fashion (namely, *a journey under the bridge* is not a journey of which destination is a point of under a bridge). I thank an anonymous reviewer for raising the last point.

(28) *Place prepositions:*

Kobe Bryant₁ throws the ball {above/ under/ next to /behind /in front of} **him**₁.

This consistency suggests that English PPs gain a clausal status when they contain an overt place projection. If path prepositions contain covert place projections, these do not have the same effect and can be rendered as absent in the syntax. This means path prepositions on their own should give way to local binding of anaphors.

To see if this prediction holds, note first that it says nothing about contexts that support a logophoric interpretation of anaphors. Both path and place prepositions should enable to surface in an antecedent-centered perspective and allow coreference through an anaphor, as indeed seen in (29).

(29) Kobe Bryant throws the ball {to/toward/over/above/under/next to/behind/ in front of} himself.

If the proposed analysis is correct, these anaphors have an underlying difference in their mode of licensing. The path anaphors have local antecedents, as illustrated in (30a), while the place anaphors are licensed in a two-step process that is mediated by a covert AxPart (30b) or a logophoric pronoun (30c).

(30) a. *Interpretation of path anaphors:*

[Subject₁ ... V ... toward Refl₁/Pro*₁]

b. *Deictic interpretation of place anaphors:*

Subject₁ ... V ... [next to ... AxPart₁ Refl₁/Pro₁]

c. *Logophoric interpretation of place anaphors:*

Subject₁ ... V ... [pro_{log1} ... next to Refl₁/Pro₁]

An immediate prediction of this suggestion is that anaphors that do not interact with perspective, such as the inanimate anaphor *itself*, should be limited in their modes of licensing. Inanimate antecedents cannot project logophoric pronouns down the line, which should make the place anaphor locally-free in its phase and hence rejected in favor of a pronoun. The following inanimate parallel of the sentence in (29) confirms this prediction, showing that path

prepositions occur with *itself* where fixed places use *it* (31a-b, respectively). I will henceforth refer to such contrasts collectively as the fixed place effect, defined in (32).

- (31) a. This laser gun₁ fires photons {over/toward} {*it₁/itself₁}.
 b. This electric circuit₁ generates a weak magnetic force {next to/under/above/in front of/behind} {it₁/*itself₁}.

(32) *The fixed place effect:*

Coreference across a preposition joining a motion verb is long-distance when the preposition contains an overt place component and local otherwise.

This effect suggests that place projections play a crucial role in establishing syntactic independence in PPs. The reason seems to follow from the particular context where this effect is observed. Conceptually, motion verbs describe situations of change in place, e.g., from point A to point B. Path prepositions are equipped to describe this relation, but place prepositions have no such capacity. They can either perform a more general localization, i.e., describe an area C that includes A and B, or refer to a stative state along this path, such as the initial state or (more commonly) the end state. That is, the place preposition needs a state to modify, and this component does not generally exist in the semantics of motion verbs, which denote events. A small clause that corresponds to the figure-ground clause answers this requirement, elevating the place preposition into a state of the form *x is in location B* (or *x is in location →A*, as seen for the complex PP *from under the car*).

I will assume with Svenonius (2003) that the figure is introduced by a functional head little *p* that corresponds to little *v* in the verbal domain. At this point, this is mainly for the sake of uniformity of subject-object relations in prepositions and verbs, but the following section will show that *p* is needed to explain contrasts with place prepositions that introduce adjuncts. Based on this architecture, the fixed place effect follows if place prepositions require the mediation of *p* to connect with motion verbs. This allows for the three possible combinations seen below.

- (33) a. V_{motion} ... [_{pP} *Figure* [_{Place} [_{DP}]]]]
 b. V_{motion} ... [_{Path} [_{pP} *Figure* [_{Place} [_{DP}]]]]
 c. V_{motion} ... [_{Path} [_{DP}]]

The verb selects either *p* (33a) or Path (33b-c), Path selects *p* (33b) or goes straight to the DP complement (33c), and *p* selects Place invariably (33a-b). The clausal constituent can convey the end state or the initial state of motion, or a steady state in the case of perception verbs like in the case of (25), which I list below as a fourth option (I assume for now that it has the same structure as (33a), but some differences will come up in Section 3.6).

(33) d. $V_{\text{perception}} \dots [{}_{pP} \textit{Figure} [{}_{\text{Place}} [{}_{\text{DP}}]]]]$

The observation that the phasal status of the PP goes together with the place projection suggests that *p* and Place form a constituent within the extended PP, which I assume to take scope under the path projection, as shown in (34). This means that the figure argument in path-over-place structures is generated below the path and rises to the surface position at the edge of the whole PP.

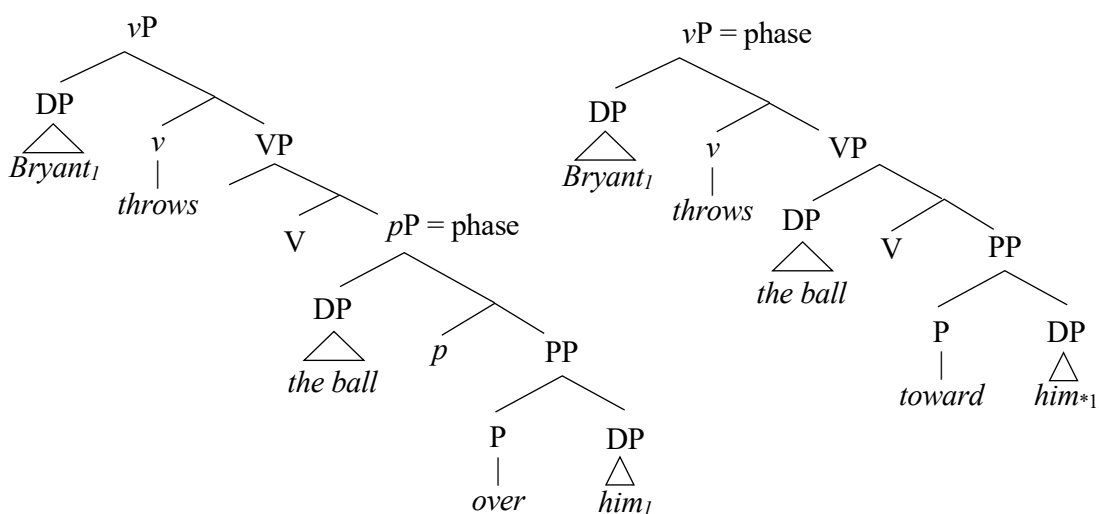
(34) *Spatial PP*:

$[{}_{\text{Path}} [{}_{\text{GET}} [{}_{pP} \textit{Figure}_1 [{}_{\text{Place}} [{}_{\text{AxPart}} [{}_{\text{Ground}}]]]]]]$

(35) something₁ [${}_{\text{PathP}}$ from [${}_{\text{PlaceP=SC}}$ t₁ under the back of the car]

Crucially, the acceptability of what seems to be a local anaphor at the object position of path prepositions that do not contain a place projection suggests that the semantic richness of paths is contained in a more compact syntax (cf. Pantcheva (2011) and Zwarts (2017) for a possible decomposition of path concepts). We arrive at two structural prototypes for place and path prepositions, illustrated respectively in (36a-b).

(36) a. Bryant₁ throws the ball over him₁. b. Bryant₁ throws the ball toward him*₁.



I will discuss the independent semantic outcomes of this difference in some detail in Section 5. The crucial observation for the current purposes is that the proposed distinction between place and non-place PPs derives the distribution of pronouns and anaphors for English prepositions, as well as that of the prepositions themselves. Place prepositions that generate a state constituent are licensed by predicates that can have states as their arguments: verbs of perception (37a), desire (37b), and resultative constructions (37c). Path prepositions are unacceptable in these contexts and are instead limited to predicates that support change between locations, as in (38).

- (37) a. Mary₁ saw Jill₂ {next to/*toward} her_{1/*2}.
 b. Mary₁ wanted Jill₂ {next to/*toward} her_{1/*2}.
 c. Mary₁ sang Jill₂ {next to/*toward} her_{1/*2}.
- (38) Mary₁ kicked Jill₂ toward her_{*1/*2}.

It turns out that motion verbs are uniquely positioned to take both types of prepositions since they can accommodate both a change of location and a result state (Section 4 will make clear that the two are not the same).

I have passed over the more simple option for fixed place prepositions, which is localizing the event in a higher resolution, providing the area in which the entire action takes place. The standard analysis for such prepositions is an adjunct above V (e.g., Gehrke 2008). They will not require a state argument, which raises the question of whether adjunct PPs are clauses. In other words, is the clausal structure a property of place prepositions, or does it only arise to mediate result readings? If the former option is correct, *p* is not strictly needed. It would be for place prepositions to be themselves figure-ground relations, which would make them a different semantic type than path prepositions. The upcoming subsection focuses on place prepositions as adjuncts and show that their binding domain is not independent but rather varies according to their position, suggesting a division of labor between *p* and Place.

3.2 *Other places*

The previous subsection showed that place prepositions behave like clauses while path prepositions are part of the VP for the purpose of anaphor resolution. The comparison has required focusing on contexts that license both of these prototypes, mainly verbs of motion. Yet fixed place prepositions have a much broader distribution, since any eventuality or

physical entity exists in some location. This subset of fixed places that describe general locations, the non-selected PPs, have so far been neglected. The phrases below illustrate these PPs with an event (39a) and an entity (39b).

(39) *Non-selected PPs:*

- a. dancing **in the streets**.
- b. a house **in the sky**.

Non-selected PPs overwhelmingly consist of place prepositions and have traditionally been analyzed as adjuncts on the phrases they modify.¹⁰ There are also alternative analyses like Sportiche (2017), who treats adjunct PPs as relative clauses whose subject is the VP. As with argument PPs, the information I am after is what these options dictate for the PPs in terms of locality. If adjuncts introduce a place DP to an existing predication, they should in principle fall in the same spellout domain and require anaphors, similarly to path arguments. But if these adjuncts are themselves clauses, as in Hoekstra's or Sportiche's models, the adjunct should be spelled out independently and license coreferenced pronouns. This upcoming section shows that the binding facts go in the direction of a non-clausal syntax for PP adjuncts.

As before, I look into the distribution of coreferenced pronouns, this time in adjunct PPs. If coreference is available, it would support the clausal analysis for place prepositions across the board. A methodological question that rises when gathering this information is how do we know that we are accessing pronouns in the adjunct reading if these PPs are headed by the same prepositions as small clause arguments. Much of the previous literature (e.g., Hestvik 1991, Reinhart and Reuland 1993) classified PPs as adjuncts based on optionality, seen below in (40), but these PPs are not exclusively adjuncts.

- (40) a. Max₁ saw a ghost (next to him₁/himself₁). (Reinhart and Reuland 1993: 59a)
 b. John₁ found a dollar bill (in front of him₁). (Hestvik 1991: 14a)

As seen below, *see* and *find* are perception verbs and have a capacity to take clausal complements, including small clauses. The PPs in (40) above could likewise be clausal

¹⁰ It is possible to find non selected Path PPs, as in speech and perception verbs, as in *shout toward John* or *hear John through the door*. The binding facts in these contexts suggest that the paths remain part of the verb's binding domain. The following scenario is physically possible (sound can be reflected or directed back toward its source), hence the ungrammaticality of the coreferenced pronoun seems like a Principle B violation.

(i) Mary₁ shouted toward {her*₁/herself₁}.

complements of these verbs, in which case coreferenced pronouns are expected and will not add to what we have already learned from P arguments.

- (41) a. Max {saw/found} John.
 b. Max {saw/found} that John was crying.
 c. Max {saw/found} John crying.

To probe the adjunct reading, I rely on a test adapted from Gehrke (2008), which evaluates the PP's position based on the scope of localization. The idea is that everything in the PP's c-command domain should be modified by the PP's location, while events and entities beyond this range can (though do not have to) be located somewhere else. According to this classification, the PPs joining perception verbs have two readings, demonstrated below.

- (42) Max saw a ghost next to the window.
 a. VP adjunct: Max and the ghost are next to the window.
 b. DP adjunct: The ghost is next to the window.
- (43) John found a snake behind the fence.
 a. VP adjunct: John and snake are behind a fence (relative to an observer).
 b. DP adjunct: The snake is across the fence from John.

In both (42) and (43), a high PP that modifies the entire VP defines the location of both the subject and the object, while the low reading localizes only the object, leaving the subject free to be somewhere else. The small clause reading here is indistinguishable from a DP adjunct reading in terms of scope. If adjuncts PPs are clausal on a par with place prepositions elsewhere, we should expect coreferenced pronouns to be available in all readings, since a clausal adjunct will be spelled out independently in any position it lands. On the other hand, if adjuncts have the simple syntax of path arguments, PPs that are adjuncts on V should ban coreference in pronouns, whereas PPs adjacent to a DP should allow pronouns to corefer with a higher subject.

To make sure we are only considering pronouns in adjunct readings, we now focus on verbs that have no component of perception nor result. For instance, the verbs *kneel* and *clean* cannot take an object of perception and require particular contexts to be understood as resultative. The sentences in (44-45) illustrate that the most accessible reading for these verbs is an adjunct.

- (44) John knelt in front of the door.
 a. VP adjunct: John is in front of the door.

b.*Small clause: John got in front of the door as a result of kneeling.

(45) John cleaned a window behind the door.

a. VP adjunct: John and the window are behind the door.

b. DP adjunct: The window across the door from John.

c.*Small clause: The window got behind the door as a result of cleaning.

The following sentences show that a coreferenced pronoun can leave inside the PP in (45), but not in (44). That is, the PP's binding domain is not invariably independent, but rather seems to match its semantic scope.

(46) John₁ knelt in front of him*₁.

(47) John₁ cleaned a window behind him₁.

It could be claimed that the ban on subject coreference for the pronoun in (46) is one of semantic coherence. After all, it is impossible for a person to kneel before himself. Yet the following attested example shows that this meaning can in fact be conveyed using an anaphor.

(48) It feels like he could kneel in front of himself, pat his own head, it's gonna be alright, we'll work this out. <https://archiveofourown.org/works/16967817/chapters/141603154>

This type of coreference illustrates a phenomenon known as the proxy reading, discovered by Jackendoff (1992), where an anaphor refers to a representation of its antecedent. Still, it makes the same point, since this type of coreference is also blocked for the simple pronoun. In (49) below the pronoun is understood as referring to a statue of someone other than Ringo.

(49) At the wax museum, Ringo₁ knelt in front of him*₁.

It appears that the binding domain of adjunct PPs corresponds to the minimal spellout of the phrase they modify (VP or DP). This principle seems to extend beyond the category of spatial relations, as the following temporal and functional PPs follow the same pattern.

(50) Temporal PPs:

a. The film₁ was played before it*₁. (VP adjunct)

b. The speech₁ repeated [the one before it₁]. (DP adjunct)

(51) Functional PPs:

a. She₁ came with her*₁. (VP adjunct)

b. She₁ suggested [a meeting with her₁]. (DP adjunct)

This completes a mapping of the binding domains of spatial prepositions in English. Table 1 lists the judgements for coreferenced pronouns across prepositions of different types.

Meaning	Structure	Pronoun coreference (DP ₁ +DP ₃)		
Functional P	[_{vP} DP ₁ ... DP ₂ [_{PP} P DP ₃]]	*		
Spatial P	Path	[_{vP} DP ₁ ... DP ₂ [_{Path} P DP ₃]]	*	
	Place	Small clause	[_{vP} DP ₁ ... [_{PP} P DP ₂ [_{Place} P DP ₃]]]	✓
		VP adjunct	[_{vP} DP ₁ ... DP ₂][_{Place} P DP ₃]	*
		DP adjunct	[_{vP} DP ₁ ... [_{DP} [_{Place} P DP ₃]]]]	✓

Table 1: Structural typology of English PPs

3.3 Unifying previous accounts

I have so far tied the binding facts to the meaning composition of the PP, arguing that the combination of place prepositions and verbs of perception or motion generates a clausal structure that makes coreference long-distance. An immediate advantage of this analysis is that it unifies some of the solutions that were previously raised for the question of spatial PPs from a syntactic standpoint. For instance, the first locality-based account to anaphors, developed in by Lees and Klima (1963), inferred from cases like (52-53) below that a bi-clausal history of sentences involving PPs makes pronouns available.

- (52) a. The men₁ cast a smokescreen around themselves₁. (Lees and Klima 1963:12-13)
 b. The men₁ found a smokescreen around them₁.
- (53) a. John₁ smeared the oil on himself₁. (34, 44)
 b. John₁ ignored the oil on him₁.

This account made no predictions for spatial anaphors at the time, since it had no way of telling which PPs give rise to bi-clausal structures, apart from the cues provided by anaphors. The current analysis predicts correctly that the clausal PPs would be those that contain a fixed place component. In the sentences above, the (a) cases vary from (b) ones in having the factor of motion, which allows a path interpretation of the prepositions only in the former cases (52a, 53a). The fixed place effect predicts that the stative sentences (52b and 53b) will rely on a bi-clausal structure to support their state argument, which matches the distribution of pronouns and anaphors in these examples.

From another perspective, Hestvik (1991) argued that anaphors are acceptable in PPs that are selected arguments, since this allows an extension of the binding domain from the theta domain of the PP to the next theta domain (i.e., the verb). The fixed place effect explains the same intuition from the opposite direction: since fixed places are not selected by motion verbs, they require the mediation of little *p*, which turns them into opaque binding domains.

Wechler (1997) argued that, in the context of spatial PPs, the semantics of anaphors requires directionality. With this notion, he explained contrasts like that seen in (54), where the path preposition *onto* occurs with an anaphor while the place preposition *beside* licenses a coreferenced pronoun. Here too, the fixed place effect demonstrates the reverse reasoning: instead of encoding path semantics in the anaphor, my proposal derives the creation of a separate binding domain from the fixed place component. This predicts the same contrast without assigning anaphors a special meaning that applies only to spatial contexts.

- (54) a. Corporal Crump_i pinned the medal onto {*him_i/himself_i}. (Wechsler 1997: 39)
 b. Corporal Crump_i pinned the medal beside {him_i/*himself_i}.

These examples show that the fixed place effect acts as a meta-principle for three separate indicators: selection, clausal status, and directionality. The following table shows that each of these properties varies between path and place PPs in the direction that predicts anaphors in the former case and pronouns in the latter.

	Argument of V (Hestvik 1991)	Small clause Hoekstra (1988)	Directional (Wechsler 1997)
Place		✓	
Non-place	✓		✓

Table 2: The distinction between place and non-place PPs underlies properties suggested as predictors for the preference of anaphors over pronouns (in the case of PPs that are selected arguments and directional) or vice versa (in the case of clausal PPs).

3.4 Evidence from result meanings

If paths on their own lack a clausal component, their semantics should lack a result state. The logic goes back to Hoekstra (1988), who argued that verbs may acquire a resultative meaning by combining with a small clause instead of a DP complement. His examples are illustrated in (55).

- (55) a. He washed [_{PP} the soup out of his eyes]. (Hoekstra 1988: 35a, 37b)
 b. They screamed [_{AP} the baby awake].

The literature on spatial PPs traditionally associates result meanings with both place and path prepositions, particularly the path preposition *to* (Jackendoff 1973, 1987, Piñón 1993, Smith 1997).¹¹ The accepted wisdom holds that English sentences like *John went to the store* convey the information that John got to the store. However, there is accumulating evidence that the arrival part of the meaning is not entailed by *to*, but in fact can be rolled back quite easily.

Rappaport Hovav (2008) demonstrated that entailments of arrival in *to* phrases vary according to the verb's event structure, and more specifically, to the property of homomorphism between sub-events as defined by Krifka (1999). This notion describes a correspondence between actions that cause motion and the path taken. Homomorphic motion verbs (e.g., *walk*, *push*) denote events in which every time interval of the action maps onto a part of the path taken by the moving entity. Rappaport Hovav showed with examples like (56) that non-homomorphic verbs, like *throw*, *send*, or *launch*, may exist in contexts that cancel the arrival at the path's final stop.

(56) *No result entailment in Paths (Rappaport Hovav 2008 p.29):*

- a. I threw the ball to Mary (but aimed badly and she didn't catch it).
- b. We launched the rocket to the moon (but it blew up before it got there).

This suggests that *to* has no result component, but rather its results meaning arises as an inference under event homomorphism. The following example shows that a similar continuation is contradictory when the context features a fixed place preposition such as *next to*.

(57) I threw the ball next to Mary (#but aimed badly and it didn't get there).

Bruening (2018) showed further that depictive predicates joining path constructions can access the path, but not the result state. To see what this means, consider an adjective like *wet* as a secondary predicate over the motion verb *walk*, as seen in (58).

(58) *Modification of result state in Path and Place Ps (adapted from Bruening 2018: 13):*

- a. Albert walked to the flat wet but got there dry.
- b. Albert walked in the flat wet # but got there dry.

These sentences show that a path phrase like *to the flat* does not entail wetness at the

¹¹ I assume here with previous literature that English has a path preposition *to* that is distinguished from the functional *to*. Upcoming examples from Hebrew use the preposition *el* 'to' which is unambiguously a path preposition. The judgements with respect to result meanings are the same as for Hebrew *le* 'to' which is both spatial and functional.

stage of arrival (58a), whereas the matched place phrase *in the flat* (understood here as an end state) does have this entailment in (58b). That is, with *in* as the head preposition, trying to cancel the wetness attribute for the time of arrival is contradictory.

Evidence in the same direction arrive from experimental work by Martin et al. (2021), who showed that arrival inferences are generally cancellable for English *to*, German *zu* and French *à*. More specifically, the authors showed that the level of certainty that participants reported for arrival entailments in *to*-phrases varies between deictic and non-deictic verbs (e.g., *go* vs. *walk*), and drops in contexts that introduce a possible interference, as in (59).

(59) *No result entailment with to* (Martin et al. 2021: 12):

Nina is a heavy smoker. At three o'clock in the morning she {walked/went} to the convenience store on the next street (but on the way she ran into good friends at the bus stop).

Q: How safely can you conclude that Nina reached the convenience store?

Martin and colleagues found lower certainty ratings for Nina's arrival with verbs like *walk* vs. *went*. For both types of verbs, the scores dropped significantly when the doubt expression in brackets appeared. These results suggest that the entailment of arrival that is traditionally linked with *to*-phrases is not encoded in the semantics of the preposition in the same way that it is for place phrases.

Finally, the following minimal pairs in English and Hebrew demonstrate a systematic contrast in result entailments between matched path and place constructions, seen below in (60-64). In all these examples, the path preposition *to* allows adding statements that reject a scenario of arrival with no contradiction, which is impossible with the place prepositions *in*, *next to*, and *over*.

(60) *Result entailment in Paths and derive goals*:

- a. She kicked the ball **to** his face (but he dodged it).
- b. She kicked the ball **in** his face (#but he dodged it).

- (61) a. I threw the book **to** Mary (but aimed badly and it didn't get there).
- b. I threw the book **next to** Mary (#but aimed badly and it didn't get there).

- (62) a. North Korea launched a rocket **to** Okinawa, which blew up before it got there.
- b. North Korea launched a rocket **over** Okinawa, #which blew up before it got there.

- (63) a. zarakti et ha-sefer **el**-ha-xacer ha-axorit aval hu lo hegi'a le-šam.
 threw.1SG ACC DET-book to-DET-yard DET-backbut it NEG arrive to-there
 'I threw the book to the backyard but it didn't get there.'
- b. zarakti et ha-sefer **ba**-xacer ha-axorit # aval hu lo hegi'a le-šam.
 threw.1SG ACC DET-book in.DET-yard DET-back but it NEG arrive to-there
 'I threw the book in the back yard # but it didn't get there.'
- (64) a. ha-šoteryara **el**-ha-matara ve-hexiti'.
 DET-cop shot to-DET-target and-missed
 'The cop shot toward the target and missed.'
- b. ha-šoter yara **ba**-matara # ve-hexiti'.
 DET-cop shot in.DET-target and-missed
 'The cop shot the target #and missed.'

These contrasts show for both English and Hebrew that the semantic and the syntactic consequences of the small clause analysis converge in prepositions of fixed place. I conclude that PPs that lack an overt place projection in these languages also lack the clausal envelope in their syntax and semantics.

3.5 *The subject of P*

We have now seen that confining the small clause analysis of spatial PPs to fixed places in contexts of motion and perception predicts both the binding effects and the distribution of result entailments. From the current perspective, the crucial factor is that the distinction between clausal and non-clausal PPs predicts the choice of pronominal element independently of the additional properties of the discourse tier. Still, to propose an actual structure for these PPs we need to ask what type of clauses they form, and particularly, what stands as their subject.

Hoekstra's (1988) original motivations for small clauses included subject-like behavior by some post-verbal DPs, which boils down to lack of the thematic association expected of a direct object. To illustrate, the emphasized DPs below take object positions and accusative case (overtly in the case of the pronoun) and yet are not themselves recipients of the actions conveyed by the verbs.

- (65) a. I want **him** off my ship. (≠ I want him.)
 b. Mary considers **John** wrong. (≠ Mary considers John.)

The non-thematic status of these positions is revealed further in their capacity to host expletive pronouns, demonstrated in (66).

- (66) a. I want **there** to be peace on earth.
 b. Mary considers **it** obvious that John is wrong. (Rothstein 2016: 18)

The conflict is resolved if we see these DPs as embedded subjects that undergo raising (Postal 1974; Lasnik and Saito 1991; Runner 2006; Mateu and Acedo-Matellán 2012; Bryant 2022), or simply occur inside a small clause that absorbs the direct object position (as Hoekstra sees it). Following this line of analysis, we may represent clausal place PPs by one of the structures in (67).

- (67) a. Bryant₁ {throws/sees} [_{PP} him*₁ next to him₁].
 b. Bryant₁ {throws/sees} him*₁ [_{PP} t*₁ next to him₁].

However, at first glance, these contexts appear not to exhibit the same lack of entailment between the verb and the PP's subject. That is, *Bryant sees the ball next to him* also means that Bryant sees the ball, and the same goes for *throw*. In the case of *see*, there is some indication that this meaning arises due to lack of tense in the small clause, which anchors it to the matrix time frame. If the event of noticing John's leaving overlaps with his actual exit, the most accessible meaning is one in which we are witnessing John while leaving, hence we see John. Switching from the small clause to a full CP complement cancels this entailment (compare 68a and 68b).

- (68) a. I saw John leaving. (≠ I saw John.)
 b. I saw that John left. (≠ I saw John.)

This suggests that the meaning that John was seen in (68a) does not reflect a thematic relation but rather arrives from a reasoning based on event structure properties. Crucially, this explanation does not hold for similar entailments in motion verbs. When the PP contributes a result, as in the familiar sentence in (69), it is consecutive to rather than overlapping with the action of throwing. In these conditions. Consequently, we cannot trace the inference that Bryant throws the ball to a temporal synch between eventualities.

- (69) Bryant throws the ball over him (≠Bryant throws the ball).

It could be argued the causal link between the matrix and the PP makes *throws the ball*

over someone entail *throws the ball*. However, no such entailment arises when result PPs target verbs with no motion, as seen in the following classical resultative.

(70) She drank him under the table. (Hoekstra 1988: 56b)

In this example, someone being under the table is understood as the result of the drinking event, which clearly does not entail *she drank him*. This brings back the option that *throw* is potentially ditransitive and thematically associated with two arguments: a DP and a PP. The following sentences show accordingly that it is possible to use expletives with perception verbs (71), but not verbs of motion (72).

(71) We saw it rain.

(72) *Bryant throws it so that the ball goes over him.

It therefore seems that, in motion contexts, the entity localized by the preposition is thematically linked in two positions, which fits an object control analysis better than raising. A more thorough investigation of the internal makeup of place clauses is clearly needed but falls outside the current scope. For now, I will propose based on the observed contrasts that place clauses divide between raising and control according to their context (perception or motion, respectively). With these options, we arrive at five possible configurations for spatial PPs.

(73) *Spatial structures:*

- | | |
|--|-----------------|
| a. Bryant ₁ sees the ball ₂ [t ₂ over him ₁]. | Raising |
| b. Bryant ₁ throws the ball ₂ [PRO ₂ over him ₁]. | Control |
| c. Bryant ₁ [throws [the ball ₂] [toward him* ₁]]. | Direct argument |
| d. Bryant ₁ [holds the ball ₂ [over him* ₁]]. | VP adjunct |
| e. Bryant ₁ kicks [the ball ₂ [next to him ₁]]. | DP adjunct |

Note that the listed configurations are quite similar on the surface. Assigning them different underlying structures serve to explain some of their semantic nuances on the one hand (entailment of arrival, scope of localization), and the acceptability of coreference in pronouns on the other. The following section shows that structures of the form (73b) and (73c) may be superficially identical, in cases where one preposition can realize either a fixed place or a path projection. Such minimal pairs demonstrate the capacity of pronouns and anaphors to trigger meaning differences without appealing to discourse properties, by overriding the syntax of the local environment.

4. Non-complementarity as ambiguity: Evidence from Hebrew

4.1 Recap

The previous section concluded in an inventory of possible structures for spatial prepositions to integrate in, demonstrated below along with the preferred form of coreference. For the sake of completeness, I added past proposals for mediated coreference in (74f,g).

(74) *Spatial structures (elaborated from 73, binding domains noted in bold brackets):*

- | | |
|--|-------------------------|
| a. Bryant ₁ sees the ball ₂ [PP t ₂ over him ₁]. | Raising |
| b. Bryant ₁ throws the ball ₂ [PP PRO ₂ over him ₁]. | Control |
| c. Bryant ₁ [VP throws [the ball ₂] [toward himself ₁]]. | Direct argument |
| d. Bryant ₁ [VP holds the ball ₂ [over himself ₁]]. | VP adjunct |
| e. Bryant ₁ kicks [DP he ball ₂ [next to him ₁]]. | DP adjunct |
| f. Bryant ₁ sees the ball ₂ [PP next to AxPart ₁ himself ₁]]. | AxPart intervention |
| g. Bryant ₁ sees the ball ₂ [PP pro _{log1} next to himself ₁]]. | Logophoric intervention |

I would like to propose based on these structures that various cases of overlapping positions of pronouns and anaphors in these contexts co-exist in different parses that seem identical on the surface. This has been claimed before with respect to the optional realization of Axial Parts (Svenonius 2006; Rooryck and Vanden Wyngaerd 2007) and logophoric pronouns (Charnavel and Sportiche 2016; Charnavel 2019). According to these views, the choice between the pronoun and the anaphor reflects the absence or presence of these elements (respectively), which in turn determines whether the perspective in the sentence is neutral or anchored to the antecedent. Put more concretely, when dealing with a sentence such as (75) below (P stands for a spatial preposition), using a pronoun or an anaphor determines whether it would be parsed as (a) or (b).

(75) Bryant₁ sees the ball P {him₁/himself₁}.

- a. Bryant₁ sees the ball₂ [t₂ P him₁].
- b. Bryant₁ sees the ball₂ [pro_{log} t₂ P himself₁].

Since the elements that control the perspective are covert, the sentence remains ambiguous between the neutral and the anchored perspective until the pronominal element shows up. The goal of the current section is to first show that a similar duality exists in sentences like (76).

(76) Bryant₁ throws the ball P {him₁/himself₁}.

- a. Bryant₁ throws the ball₂ [PRO₂ P_{Place} him₁].
 b. Bryant₁ throws the ball₂ P_{Path} himself₁.

Treating P as an abstract category that consists of both place and path means that the sentence has the two possible parses seen in (76a) and (76b). Now if there are actual prepositions that shift between path and place meanings, the sentence will be ambiguous until the pronominal element appears. The chosen form would not affect the perspective in the sentence but rather resolve the derivation toward the place or the path configuration. To show that this effect exists, I turn again to anaphors in Hebrew, mainly in order to avoid the parse in (17).

(77) Bryant₁ throws the ball₂ [pro_{log1} PRO₂ P_{Place} himself₁].

Being phonetically identical to (76b), the accessibility of this option to speakers will obscure the existence of a path option. The Hebrew anaphor *acm-x* makes it possible to bypass this factor since it does not interact with perspective centers, similarly to English *itself*.

4.2 Dual prepositions

The Hebrew equivalent of (76), given below in (78), demonstrates three possible patterns of coreference: only anaphors (78a), only pronouns (78b), or both acceptable (78c). The judgements are summarized in Table 3.

(78) Hebrew:

- a. braj_{ent1} zorek et ha-kadur **el-** { *av/ acm-o₁ } / **leever** { -*o/ acm-o₁ }.
 B. throws ACC DET-ball to- him himself toward him REFL-3SG.M
 ‘Bryant throws the ball to/toward *him/himself.’
- b. braj_{ent1} zorek et ha-kadur { **lejad/ mul** } { -o/ *acm-o₁ }.
 B. throws ACC DET-ball next.to against him him-REFL-3SG.M
 ‘Bryant throws the ball to/toward *him/himself.’
- c. braj_{ent1} zorek et ha-kadur { **sviv/ me’al-/ mitaxat** } - { o₁~av₁ / le-acm-o₁ }.¹²
 B. throws ACC DET-ball around over under him to-REFL-3SG.M
 ‘Bryant throws the ball around/above/under him/himself.’

¹² -o and -av are allomorphs of the pronominal suffix in prepositions.

	Meaning	Anaphor	Pronoun
a. <i>el</i> ‘to’	Path	✓	*
b. <i>le-kivun, le’ever</i> ‘toward’	Path	✓	*
c. <i>me’al</i> ‘above, over’	Place	✓	✓
d. <i>mitaxat (le-)</i> ‘under’	Place	✓	✓
e. <i>(mi)sviv</i> ‘around’	Place	✓	✓
f. <i>lifne</i> ‘in front of’	Place	*	✓
g. <i>me’axore</i> ‘behind’	Place	*	✓
h. <i>leyad</i> ‘next to’	Place	*	✓
i. <i>mul</i> ‘in front of’	Place	*	✓

Table 3: Licensing of coreferential pronouns and anaphors in Hebrew spatial prepositions. The shaded area marks prepositions that allow coreference with both pronominal options

The reported judgments show the fixed place effect, in the sense that prepositions that convey a path require an anaphor for coreference while place prepositions require a pronoun (in the lack of a logophoric option). However, the subset of place prepositions in the shaded area – *sviv* ‘around’, *me’al* ‘above’, and *mitaxat* ‘under’ – allow both pronominal forms. These prepositions will comply with the logic of the rest of table if they can also convey paths.

Keep in mind that I am not referring here to the capacity of place prepositions to convey an end state, which led the investigation in Section 3.1. The end state meaning has a fixed place component and should form its own domain. What I argue here is that these prepositions may also realize the path projection in the prepositional spine. That is, there are contexts in which these prepositions sketch paths from one side of an object to the other instead of referring to a general area above, under, or around the object. Graphic illustrations are given in Figure 2.

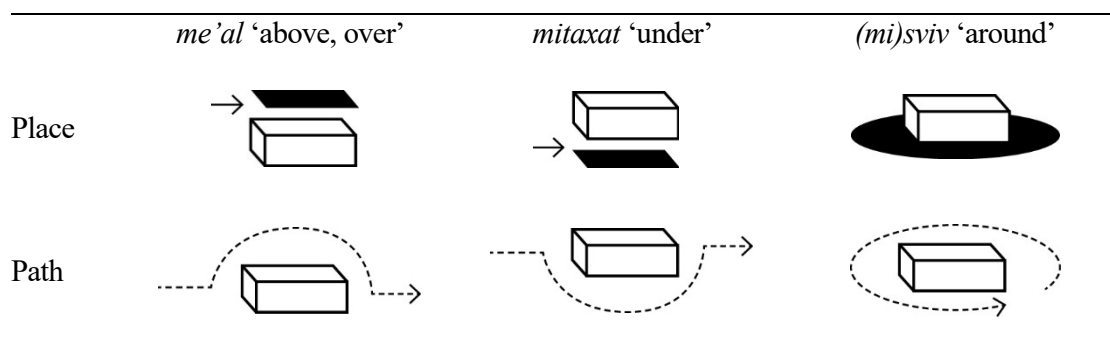


Figure 2: Place and path readings of Hebrew prepositions: *me’al* ‘above’, *mitaxat* ‘under’, *(mi)sviv* ‘around’

I argue that these readings exist since *me'al*, *mitaxat*, and *sviv* may realize either the place or the path projection. The following sentences demonstrate with *sviv* ‘around’ that contexts that limit the preposition to just one of these spatial descriptions narrow down the possibilities to one pronominal element. Specifically, a stative context that invites a fixed place reading has to express coreference with the subject via a pronoun (79a), while a motion context that forces the path reading of the preposition requires a complex anaphor (79b).

(79) a. *sviv* ‘around’ – Place reading:

le-kadur ha-arec₁ yeš kim'at xamešet alafim lavjanim
 to-ball.of DET-earth exist almost five thousands satellites
 {**sviv-0₁**/ *sviv acm-0₁}.
 around-3SG.M around REFL-3SG.M

b. *sviv* ‘around’ – Path reading:

[kadur ha-arec]₁ mistovev {*sviv-0₁/ **sviv acm-0₁**}.
 ball.of DET-earth turns around-3SG.M around REFL-3SG.M
 ‘The earth spins around *it/itself.’
 ‘The earth has nearly 5,000 satellites around it/*itself.’

A more structured way of controlling the meaning of a preposition is by combining it with unambiguous place or path PPs. To see why, consider the possible ways of interpreting two consecutive PPs. In general, a sequence of two PPs like that in (80) may be understood as either additive (both PPs describe the location simultaneously) or recursive (the second PP modifies the complement of the first one as reduced relatives).

(80) [PP on the beach] [PP behind the hotel]

- a. Additive reading: the described location is both on the beach and behind a hotel.
- b. Recursive reading: the beach is behind the hotel.

The availability of these readings depends on the types of PPs involved. The following examples show access to both readings is granted when the PPs describe two places, as in (81a). For two paths, only the additive meaning exists, (81b). Crucially for the current purposes, a path-place sequence like (81c) favors the recursive reading.

- (81) a. I sat **in** <Place> the park **in front** <Place> of the bus station. [✓Additive ✓Recursive]
- b. I walked **through** <Path> the park **to** <Path> the bus station. [✓Additive * Recursive]

- c. I walked **to** <Path> the bus station **in front of** <Place> the park. [??Additive ✓Recursive]

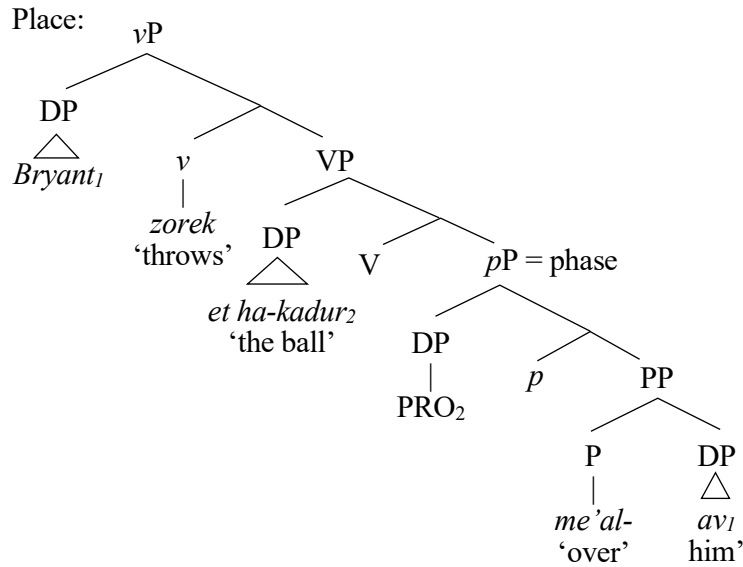
That is, without supporting context, the reading in which the bus station is in front of the park is more accessible in (81c) than one in which the entire walk takes place in front of the park, though both options are geographically possible. Since the additive reading is accessible in PPs that are both place or both path (as it is in 81a,b), we can use it to resolve an ambiguous PP in either direction and observe the effect on the choice of pronominal element.

To illustrate, the sentences below repeat (78) twice, each time with an additional PP that is unambiguous. The first iteration in (82a) adds the fixed place phrase *ba-avir* ‘in the air’ while (82b) includes the path phrase *la-cad ha-šeni* ‘to the other side’. The judgements show a preference for a pronoun with ‘in the air’ and for an anaphor with ‘to the other side’.

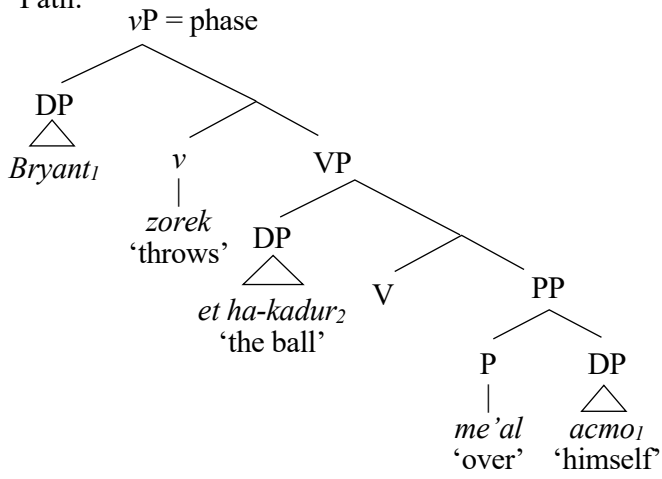
- (82) a. brajent₁ zorek et ha-kadur ba-avir { **me'al-av₁**/ ??me'al acm-0₁ }.
 B. throws ACC DET-ball in.DET-air above-3SG.M above REFL-3SG.M
 ‘Bryant throws the ball in the air above him/??himself.’ (Place reading)
- b. brajent₁ zorek et ha-kadur { ??me'al-av₁/ **me'al acm-0₁** }
 B. throws ACC DET-ball above-3SG.M above REFL-3SG.M
 la-cad ha-šeni šel ha-migraš.
 to.DET-side DET-second of DET-court
 ‘Bryant throws the ball above ??him/himself to the other side of the court.’
 (Path reading)

Again, this result follows if place meanings require a clausal structure to connect with motion verbs, while path meanings integrate with no additional structure. Now if we omit the recently added PPs and go back at the sentence in (78), we see that the choice between the pronoun and the anaphor determines whether the thrown ball goes in the air above the player or from one side to the other over his head. The different parses are illustrated respectively in (83) and (84).

- (83) brajent₁ zorek et ha-kadur **me'al**{-av₁/ le-acm-0₁}.
 B. throws ACC DET-ball over him to-REFL-3SG.M
 ‘Bryant throws the ball over him/himself.’



(84) Path:



Thus, switching from one option to the other generates a nuanced difference in meaning that seems to be triggered by the choice of pronominal element, and yet does not have to be encoded by the pronominals themselves. Instead, the semantic effect follows from a structure that determines the pronominal element based on the distance of the antecedent.

4.3 Explaining contact effects

The previous subsection suggested that Hebrew speakers do not make a choice between the pronoun and the anaphors – those are predetermined by distance – but rather between two possible parses. Speakers may either identify the preposition as a path and spell it out as an argument of the verb, or identify the same preposition as a place, in which case it can connect as either an adjunct or a small clause.

I argue that this step of choosing a structure out of multiple options is a source of at least some of the more obscure semantic effects linked with anaphors. I will demonstrate this point through the notion of physical contact, which is known since Kuno (1987) as one of the hallmarks of anaphors in spatial PPs, primarily in English.

The contact effect is demonstrated by the minimal pairs in (85) and (86). For both pairs, the spatial pronouns localize the objects *blanket* and *book* in a general area relative to the subject *John*. The anaphors go with a special case of that relation, in which the subject and object are touching.

- (85) a. John₁ put the blanket under him₁. (Kuno 1987: 9.17,20)
 b. John₁ put the blanket under himself₁.
- (86) a. John₁ hid the book behind him₁.
 b. John₁ hid the book behind himself₁.

Kuno understands this effect as one of the hierarchies that anaphors are sensitive to in the context of a spatial PPs. I argue that there is an additional way of getting the same effect: the anaphor resolves the sentence toward the parse that obeys locality and generates a meaning of physical content as an inference. For these examples, contact effects can follow from a path-place ambiguity of *under* in (85), and from a deictic interpretation of the PP in (86), which activates AxPart.

To see how this works for (85), we should first eliminate the logophoric reading of the anaphor by switching to the Hebrew translation, seen below in (87). We have learned from the previous subsection that the Hebrew anaphor is only acceptable when the preposition is read as a path. This seems to be true for this example as well.

- (87) a. hu₁ sam et ha-smixa mitaxat-av₁.
 he putACC the-blanket under -3SG
 ‘He put the blanket under him.’ (Place meaning)
- b. hu₁ sam et ha-smixa mitaxat le-acm-o₁.
 he putACC the-blanket under to-REFL-3SG
 ‘He put the blanket under himself.’ (Path meaning)

‘put the blanket under him’ fits any context in which the blanket is placed lower than the person (87a), but speakers that accepted ‘put the blanket under himself’ thought of a context

in which the blanket is pushed under the person from one side to the other (87b). The two readings are pictured in Figure 3.

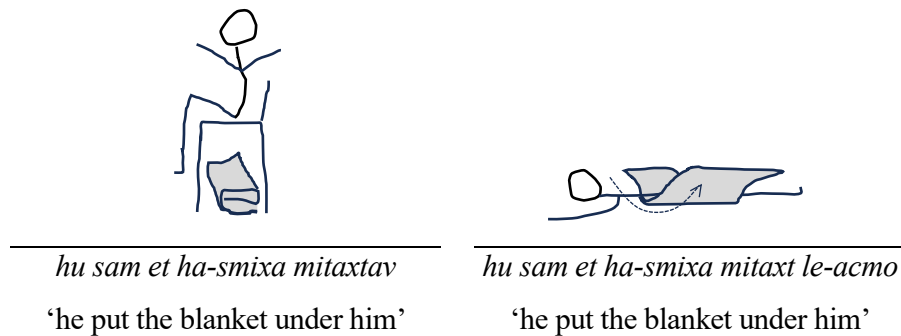


Figure 3: scenarios that fit the place and path reading of *mitaxat* ,under‘
(left and right panel, respectively)

We can now see why (87b) requires physical content, unlike the more general localization in (87a). Moving a blanket in a path under someone is impossible without contact, unless the whole scene is happening in an environment with no gravity, in which case it would be less clear what ‘under’ means. A context in which the blanket touches the person is therefore much more accessible in (87b), whereas in (87a) can easily be imagined in a contact-less situation.

Going back to (86), here the only logical reading of the preposition is a place reading, but there are two possible perspectives. As noted by Rooryck and Vanden Wyngaerd (2007), an observer can be seeing the book being placed behind John (from the observer’s perspective), or John’s perspective can be adopted, in which case the book would be John’s back. The latter reading locates the book in John’s back region, which we may represent, following Rooryck and Vanden Wyngaerd, as an AxPart projection coreferenced with John. An anaphor would then be triggered by the locality of AxPart to the lower DP. If the observer’s perspective is adopted instead, ‘behind John’ does not say anything about the region of John that book is facing, which means no AxPart should be realized, and a pronoun can appear down the line. In this scenario, the choice between the pronoun and the anaphor effectively resolves the sentence toward the parse in (88a) or the one in (88b), respectively.¹³

¹³ In Rooryck and Vanden Wyngaerd’s (2007) account, (88a) would have AxPart anchor to the speaker and name the area that is considered behind John from the speaker’s perspective. For this particular context it seemed more straightforward to omit AxPart altogether, since the region past John bears no inherent relation to the speaker. Moreover, having a speaker AxPart predicts that a first-second anaphor would be acceptable in this context, which is not the case.

(i) John hid the book behind {me/*myself}.

- (88) a. John₁ hid the book₂ [PP PRO₂ behind him₁].
 b. John₁ hid the book₂ [PP PRO₂ [AxPart₁ behind himself₁].

Crucially, to hide something behind one's back, the person would normally have to hold the item, which raises the inference that physical contact is involved. A world in which John can move objects mentally would not necessarily raise the same inference.

I conclude that the meaning of physical contact in these examples does not have to be encoded in the anaphors but could also be inferred from the parse that contains them. Each parse has a particular semantic import which in turn interacts with the relevant discourse conditions, which means various additional effects could correspond with the choice of pronominal element.

5. Conclusion

This paper has shown that pronominal licensing across spatial prepositions does not counter locality-based systems of coreference. The well-known variation in this domain, which was so far assumed to be under the control of discourse properties, was shown to reveal predictable patterns that respect the general principles of the Binding Theory. I specifically showed that verbs of motion require prepositions of fixed place to realize as clauses, which in turn form independent binding domain that restrict anaphors and enable coreferenced pronouns. I argued that place prepositions require the mediation of *p* to integrate in these contexts, while path prepositions can merge directly and therefore remain part of the existing spellout domain.

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