Prepositional Elements in a DM/DRT-based Syntax-Semantics-Interface

Introduction

The paper focuses on the syntax and semantics of spatial prepositional elements in German with threefold functions (i) as heads of prepositional phrases, (ii) as particles in particle-verb constructions and (iii) as prefixes. The account follows the conviction of Distributed Morphology (DM) that words as well as phrases are built from their roots (cf. Halle and Marantz 1993, and related works). Since (Zeller 2001), (Stiebels 1996), (Stiebels 1998), verbal constructions with P-elements in German have been a challenge for the syntax-semantics-interface. In (Roßdeutscher 2011) a comparison of accounts within the framework of Semantic Form and word-syntactic approaches in the tradition of (Hale and Keyser 1993) has been provided building on a series of case studies on a compositional semantics of German particle verbs, starting from (Lechler and Roßdeutscher 2009). In the current version of an in depth analysis of the syntax-semantics-interface widely accepted hypotheses such as the split P-hypothesis (cf. Svenonius 2003) and subsequent work), principles in (Ramchand and Svenonius 2002) on English particle verbs and for Russian prefix-verbs in (Romanova 2007) have been accommodated for a treatment of corresponding constructions in German. A particular challenge for a syntax-semantics-interface in German are separation vs. incorporation of P-elements as well as structural alternations on the syntactic side and ambiguity vs. determinacy of the semantic contribution of the same prepositional roots on the semantic side. (Semantic coercion or metaphorical interpretation is beyond this paper.)

A semantic division: topological relations vs. directions

It has gone unnoticed to my knowledge that although prepositional roots can generally function as heads of PPs as well as a particle head (sometimes with more morphological and semantic material such as double particle constructions dr-an, hin-ein) prepositional roots that function as prefixes are subject to semantic restrictions. Figure 1 displays some examples. (I mark intonation patterns to highlight stress on particles vs. demoted intonation on prefixes). On the top of Fig.1 constructions with topological prepositions such as √ an (at.on), √ auf (on) √ in (in) and √ aus (out) show alternates in functioning as heads of prepositional phrases of verbs in (1),(2)(a) on the one hand and alternates in particle verbs as in (1)(b) and (2)(c).

It is an empirical observation that there are no prefix-verbs with topological prepositions in German, (s. ungrammatical (1),(2)(d)). Per hypothesis prefix-verbs are built from prepositional roots that semantically involve directions: Either the heads are projective prepositions such as √ über (above) as in einen Berg überfliegen (to fly over, to cross a mountain) in (3)(d); √ unter (under); as in eine Straße unterspülen; √ hinter (behind) as in hinterfütttern (to apply material behind st.) Or else the heads contribute complex change of direction. E.g. German √ um does so, as in um einen Baum fahren (to drive around, avoid a tree, driving) in (4)(a): the driver changes direction on a tangential path with the tree as its center. (4)(a) alternates with the same semantics in (4)(d) where √ um incorporates into the verb. Another example of the category of √ um is √ durch (trough) as in durch einen Wald fahren alternating with the same semantics in einen Wald durchfahren (to drive through a forest). The complex contribution of durch can be best sketched as ‘keep direction within the interior of the ground argument’ and can — just like the semantic contribution of √ um — be formally represented as a concatenation of vectors. A further instance of incorporating root is German √ wider (against) as in jemandem widersprechen (to speak against s.o.) with a counter-directional semantics. Particle constructions with √ an in (1) contributes a support relation, √ an in (2) doesn’t. The difference is at the bottom of the availability of certain alternations. They are beyond this paper; but see (Roßdeutscher n.d.).
um as in (4)(c) have a coerced interpretation where change of direction (from vertical to horizontal) survives the coercion, but doesn’t share the semantics of the preposition in (4)(a,d).

Summing up the empirical hypothesis: If a root enters the structure as a prefix, its semantics involves direction. As a consequence topological spatial roots are excluded from prefix-construction.

Topological P

<table>
<thead>
<tr>
<th>(a.) Verb + PP</th>
<th>(b.) verb + particle (i)</th>
<th>(c.) verb + particle (ii)</th>
<th>(d.) prefix-verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papier an eine Wand kleben</td>
<td>*eine Wand mit Papier ANkleben</td>
<td>* eine Wand mit Papier ANkleben</td>
<td></td>
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<tr>
<td>(1) Papier an eine Wand kleben</td>
<td>Papier an eine Wand ANkleben</td>
<td>* Farbe an eine Wand ANstreichen</td>
<td>* eine Wand mit Farbe ANstreichen</td>
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<tr>
<td>(2) Farbe an eine Wand streichen</td>
<td>* Farbe an eine Wand ANstreichen</td>
<td>* Farbe an eine Wand ANstreichen</td>
<td>* eine Wand anSTREICHen</td>
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Directional P

| (1') Papier über das Etikett kleben | * Papier über das Etikett ÜBERkleben | * das Etikett mit Papier ÜBERkleben | das Etikett mit Papier überKLEben |
| (3) über einen Berg fliegen | über einen Berg ÜBERfliegen | * einen Berg ÜBERfliegen | einen Berg überFLIEgen |
| (4) um einen Baum fahren | *um einen Baum UMfahren | ! einen Baum UMfahren | einen Baum umFAHren |

Figure 1. Semantic Division: topological P-elements vs. directional P-elements

Direction specification of roots in PPs vs. roots in prefix- and particle constructions: less vs. more specific

Again, a necessary condition for spatial roots to function as prefixes is having a directional semantics. But this doesn’t mean that the semantic contribution of prepositions, particles and prefixes are identical. Compare the verb phrase (3)(a) with the verb phrase (3)(d). (3)(b) only specifies that someone or a bird changes location into the 'above'-region of the mountain or forest. The regions of projective prepositions like German über (above) can be characterised as a set of vector footing on the top surface of the internal argument (forest or mountain) going in the same direction as vert(ical), (cf. (Kamp and Roßdeutscher 2005)). (3)(a) does not specify in which direction the above-region is entered. A bird might enter the 'above'-region of the forest from its interior, moving upwards. In (3)(d) the latter scenario is excluded: the motion of the bird or person goes orthogonal to the vectors making the 'above'-region. (This difference also makes itself felt in that über sich blicken (to look above oneself) is fine, whereas *sich überblicken (to look across oneself) is ungrammatical.) (3)(d), in turn, does not speak about whether or not the described motion is entirely within the 'above'-region (compare stundenlang die Alpen überfliegen (fly above the Alps for hours) or whether the moving target crosses the 'above'-region and leaves it behind. The former is excluded in (3)(b): über einen Berg drüberfliegen is true only if the target enters the 'above'-region and leaves it again. Naturally, these difference are less salient in (1')(a) vs. (1')(d) and (1')(b); and things are more complicated with um, because there is no √um-region of a center in a similar way as there is an 'above'-region of a forest. (Compare um sich blicken (to look around) specifies different directions, no region.)

Syntactic basics: functional heads, 'split-P'-hypothesis, case assignment

The root-based theory builds on principles following (Svenonius 2003) and others assuming a prepositional phrase to involve (at least) two functional projections. In analogy to
the verbal functional projections v (Kratzer’s V) and voice, where the presence of voice, which selects (little) v or V, licenses structural case there are two functional layers in the prepositional domain, too. (Big) P (analogous to V) selects its internal argument, i.e. the ‘ground’ argument; (little) p, an analogon to Voice (Kratzer 1996), introduces the ‘external’ argument, i.e. the ‘figure’ argument, of the selected P projection and licenses (big) P to assign prepositional case to its internal argument. The three configurations (i) verb plus selected PP, (ii) particle-verb, (iii) prefix-verbs instantiate the following configurations:

(i) (ii) (iii)

Figure 2. (i) verb + PP; (ii) particle-construction; (iii) prefix-construction

Both, verbs plus prepositional phrases and particle constructions have a p-projection, silent in the former case and overt in the latter. Overt p selects an optional PP. The p-head may also have adjoined roots √d(a)r or √h in the semantics of which is anaphorical w.r.t. the contribution of the PP selected by p+√prep. √prep may be both, a projective prepositional or a topological prepositional root. But the former is licensed only in case there is an overt PP.

The structures in (i)-(iii) correctly represent (a) the adjacency between particle and verbal root; (b) phrase status of PP; (c) government to the left in the verbal and the p-domain (d) incorporation of prepositional prefixes and non-incorporation of prepositions and particles in accordance with Head-Movement-Constraint. The structure in (iii) lacks the intervening p-projection between P and vP. The prepositional root at P head-moves to v. The structure also predicts the presence of voice in prefix-verbs. They are transitive, even with anti-intentional verbs like in Wasser umfließt ein Wehr (water runs around an obstacle). Lack of the prepositional case-licensing p-level forces the ground-argument to move out of the PP-domain to a domain where it receives structural accusative. Structural accusative, however, is available only if voice is present.

So much for the basics of the three construction types. The three constructions are still ignorant w.r.t. the semantic restrictions on the constructions and semantic specificity therein. Within the DM/DRT-based framework we present these by assuming that there are different functional P-heads of particular types, which determine the semantic contribution of the root: Place introduces topological regions, PlaceProj(ection) regions determined by projective prepositions and their internal argument; Path introduces a one-dimensional geometric element — a path — that a target moves through; Dir introduces vectors assigned in the verbal predicate. Which particular P-projection comes into play is determined by the verbal kernel. E.g. √fliegen semantically select a Path-projection, √blick a Dir-projection; others allow for a range of different sorts of heads. The P-heads may in turn select other P-projections. For example über einen Berg fliegen, (3)(a), has a syntactic representation (6), einen Berg überfliegen, (3)(d), has the syntactic representation (7). Papier an eine
Wand kleben (1)(a) has the simpler structure (8). The particle construction (1)(b) has the structure (9), compare Fig. 2.

(6) \[ \text{vP} \] 
\[ \text{pP} \] 
\[ \text{t}_{1} \] 
\[ \text{PathP} \] 
\[ \text{t}_{1} \] 
\[ \text{Path} \] 
\[ \text{∅} \] 
\[ \text{DirP} \] 
\[ \text{Dir} \] 
\[ \text{∅} \] 
\[ \text{PlaceProjP} \] 
\[ \text{ Główny} \] 
\[ \text{∅} \] 
\[ \text{PlaceProj} \] 
\[ \text{den einen Berg} \] 
\[ ]] \[ ]] \[ \text{vP} \] 
\[ \text{flieg} \] 

(7) \[ \text{vP} \] 
\[ \text{PathP} \] 
\[ \text{t}_{2} \] 
\[ \text{Path} \] 
\[ \text{∅} \] 
\[ \text{DirP} \] 
\[ \text{Dir} \] 
\[ \text{∅} \] 
\[ \text{PlaceProjP} \] 
\[ \text{ den einen Berg} \] 
\[ ] \[ ] \[ \text{vP} \] 
\[ \text{flieg} \] 

(8) \[ \text{vP} \] 
\[ \text{pP} \] 
\[ \text{Papier} \] 
\[ \text{p} \] 
\[ \text{′} \] 
\[ \text{Place} \] 
\[ \text{an} \] 
\[ \text{PlaceProj} \] 
\[ \text{den einen Wand} \] 
\[ ] 
\[ ] \[ \text{vP} \] 
\[ \text{kleb} \] 

(9) \[ \text{vP} \] 
\[ \text{pP} \] 
\[ \text{Papier} \] 
\[ \text{p} \] 
\[ \text{′} \] 
\[ \text{Place} \] 
\[ \text{an} \] 
\[ \text{PlaceProj} \] 
\[ \text{den einen Wand} \] 
\[ ] 
\[ ] \[ \text{vP} \] 
\[ \text{kleb} \] 

DRT-based semantics construction algorithm: some details
Lack of space forces me to display a few details of semantics construction, only.

Figure 3. Some details of the semantics construction of Papier an eine Wand ankleben

Please read the construction algorithm in Fig. 3 bottom up as follows: Place introduces a topological region of the ’reference’-object \( z \); \( \sqrt{\text{an}}+\text{Place} \) specifies that region as the ’an-surface of \( z \)’, i.e. \( r_{\text{an-srf}(z)} \). Combining \( \sqrt{\text{an}}+\text{Place} \) with its argument \( DP \) yields \( \text{PlaceP} \), with a semantics ”there are a wall \( z_{1} \) and its an-surface-region, \( r_{\text{an-srf}(z_{1})} \)”. The \( \sqrt{\text{an}} \) root housing the \( p \)-head contributes an \( \text{an}-\text{surface} \) of some presupposed ground-argument \( z \) on its own. \( z \) will either (as in the example) be resolved as \( z_{1} \) from the governed \( \text{PlaceP} \) or else — in case \( \text{PlaceP} \) is missing — resolved in utterance context. At the level of \( p' \) the resolution of \( z \) is done. The rest of the construction is straightforward, displaying the penultimate step. \( pP \) as a whole links the spatial specification with the ’gluing’ event. The semantics of \( \text{vP} \) determines that at least some portion of paper ends up at the \( \text{an-surface} \) of the wall.

The other constructive detail concerns the difference in specificity of interpretation in (3)(a), to the left as opposed to (3)(d), to the right. In the former the prepositional root \( \sqrt{\text{über}} \) combines with head \( \text{PlaceProj} \) (responsible for introducing the regions of projective prepositions \( r_{\text{pj}} \)). Together they introduce the ’above’-region \( r_{\uparrow} \) of the internal argument \( z \).
PlaceProj with a semantics ‘there is a mountain $z_1$ and its above-region $r \uparrow (z_1)$’ is selected by a silent Dir-head which introduces a vector $v$ and relates it to some region $r$ (which must be the region of a projective preposition). DirP will higher in the structure be selected by Path and will determine the direction of the path (s. (6),(7)). The relation of the vector $v$ to the vectors determining the ‘above’-region of the mountain $r \uparrow (z_1)$ is unspecified, excluding only that $r \uparrow (z_1)$ is entered via a downward motion, informally written as ‘−counter-directional’ to the upward vectors from $r \uparrow (z_1)$. (The ‘official’ representation isn’t easy to read). In (3)(d) the root $\sqrt{\text{über}}$ combines with the Dir-head that selects a projection introducing a region of a projective preposition beneath. The contribution of $\sqrt{\text{über}}+\text{Dir}$ is more specific. $\sqrt{\text{über}}+\text{Dir}$ require that $r_{prj}$ must be an ‘above’-region, see $r_{prj} = r \uparrow$ and contributes that the direction is orthogonal to $r \uparrow$.

$\lambda z. \langle v, z_1, r \uparrow (z_1), \text{mountain}(z_1) \rangle$

$\lambda z. \langle v \perp r_{prj}(z_1), z_1, \text{mnt.}(z_1) \rangle$

Figure 4. über einen Berg fliegen vs. einen Berg überfliegen

References


