

## PUTTING PATH IN PLACE\*

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### Abstract

The paper discusses circumstances under which locative prepositional phrases (PPs) can act as a constituting part of a directed motion event. It will be shown that there is a division of labour among different elements in a sentence to express the Path of a directed motion event and this labour can be distributed in various ways not only among different languages, as discussed in Talmy (1985) and subsequent work, but also among different constructions that are not always associated with particular types of verbs or particular types of Ps.

### 1 Introduction

It is commonly assumed that the distinction between locative (stative) and directional (dynamic) meanings in the spatial domain manifests itself both in the semantics and the syntax of P(P)s. Locative PPs denote sets of Places (locations) in semantics, whereas directional PPs denote sets of Paths made up of Places (Jackendoff 1983), (Zwarts and Winter 2000), (Kracht 2002), (Zwarts 2005). Syntactically, locative PPs are associated with Place structure, directional PPs with Path structure which embeds Place structure (Koopman 1997), (van Riemsdijk and Huybregts 2001), (Helmantel 2002), (den Dikken 2003), (Svenonius 2004).

Locative, but not directional PPs can be complements of stative verbs like *be*, *stay*, *remain* (1).

- (1) a. The box was in / on / under / behind the table.  
b. \*The box was to / into / onto / from / out of / through the table.

Directional PPs, then, express some kind of trajectory along which an entity moves or is moved rather than a location that describes a state of an entity. To my knowledge, there are no general diagnostics in the literature to test whether a P(P) is directional as opposed to locative. This could be due to a widespread (often tacit) assumption according to which Ps of the type in (1-a) can more or less freely constitute part of a directed motion event (Koopman 1997), (van Riemsdijk and Huybregts 2001), (den Dikken 2003). Under such a view, then, the particular Ps should be (lexically) ambiguous between a directional and a locative reading and thus be able to license both Place and Path structure.

I will argue instead that English, Dutch, and German have no spatial Ps that are lexically ambiguous between a locative and a directional reading. Rather, Ps like *in* and *on* are locative only and the meaning of directionality that can arise with these Ps is always due to elements or operations independent of the lexical meaning of these prepositions. In particular, the directional component can be provided by certain verbs or by other means such as case and syntactic movement. An advantage of this approach is that it avoids postulating ambiguity in the lexicon

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but shows instead that there is a systematic way in which directional readings are derived with locative P<sub>s</sub>.

The paper is organised as follows. Section 2 addresses a typology proposed by Talmy (2000), according to which languages fall into different types with respect to the encoding of motion, manner and path. An overview of the main data under discussion is provided in section 3. Basic theoretical assumptions are outlined in section 4. Section 5 deals with ways in which directional readings arise with locative prepositions due to reasons that are external to the PP, i.e. that are associated with the event structure provided by the VP that the PP combines with. Circumstances under which a directional reading is derived PP-internally will be the topic of section 6. Finally, section 7 concludes.

## 2 Verb-framed and satellite-framed languages

The question as to which surface elements express the Path leads Talmy (2000) to the typological distinction between satellite-framed and verb-framed languages. Satellites are not of a particular syntactic category, but stand in a particular grammatical relation to the verb.<sup>1</sup> Satellite-framed languages are characterised as having a large collection of verbs of motion, which additionally convey Manner or other Co-Event meanings, but that do not encode Path. At the same time, these languages have a large collection of satellites. This type, which is represented by Indo-European (except Romance), Chinese, Finno-Ugric, Ojibwa, Warlpiri, typically conflates Motion and Co-Event on the verb root (2).

- (2) *Satellite-framed languages, e.g. English*
- a. The bottle floated into the cave.
  - b. The bottle floated out of the cave.

Verb-framed languages, on the other hand, typically express Path (but not Manner) on the verb and have a large collection of verbs of inherent motion such as *entrar* ‘enter’ or *salir* ‘exit’ in (3). These languages typically conflate Motion and Path on the verb, but a Co-Event such as Cause or Manner is expressed separately, e.g. by a subordinate clause, or not expressed at all. Languages and language families that belong to this type include Romance, Semitic, Polynesian, Nez Perce, Caddo, Japanese, Korean (3).<sup>2</sup>

- (3) *Verb-framed languages, e.g. Spanish*
- a. La botella entró a la cueva (flotando).  
the bottle MOVED-in to the cave (floating)  
The bottle floated into the cave.
  - b. La botella salió de la cueva (flotando).  
the bottle MOVED-out of the cave (floating)  
The bottle floated out of the cave.

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<sup>1</sup>Satellites are characterised as ‘immediate constituents of a verb root other than inflections, auxiliaries, or nominal arguments’ and are assumed to be related to the verb root as periphery (or modifiers) to a head (sister to the verb). A verb root together with its satellite, then, forms a constituent in its own right, the ‘verb complex’. If possible, I will try to avoid this term or at least use it in a descriptive way. For a critical assessment of the term satellite, see for instance Stringer (2002).

<sup>2</sup>A third type, which conflates Motion and Figure, i.e. the located object, on the verb root, is only represented by a few languages such as Atsugewi and Navaho. Since this type has not prompted discussion in the subsequent literature, I will not address it further.

There are indications that Talmy's typology needs to be refined. For example, Folli (to appear) provides two types of data that can be interpreted as arguments against a straightforward classification of Italian as a verb-framed language. First, Italian has a set of motion verbs that specify Manner (*correre* 'run', *rimbalzare* 'bounce', *saltare* 'jump', among others), but that can combine with locative PPs to refer to a directed motion event (4).

- (4) La palla è rimbalzata sotto il tavolo.  
 The ball is bounced under the table  
 'The ball bounced (to a point) under the table.'

All three components (Motion, Path, Manner) are expressed by the composition of one verb and one PP, and apparently it is this composition or the overall syntactic structure that brings about a Path reading. Cases like these are not accounted for under Talmy's typology, because this is neither the verb-framing strategy (without the PP there is no Path but only Motion and Manner expressed by the verb) nor the satellite-framing strategy (without the verb there is no Path but only a location because the PP is locative only).

Second, Folli (to appear) shows that Italian has complex PPs that are made up of a locative P and the P *a* 'at, to'. Such complex PPs systematically express Path even with manner of motion verbs that usually cannot bring about a directed motion reading such as *galleggiare* 'to float' (5).

- (5) a. La barca galleggiò dentro alla grotta.  
 the boat floated inside to.the cave  
 'The boat floated into the cave.'
- b. La barca galleggiò dentro la grotta.  
 the boat floated inside the cave  
 'The boat floated in the cave.' (locative reading only)

The strategy of employing complex PPs, made up of a locative P and *to*, to express Path is typical for satellite-framed languages like English, which is exemplified by the translation in (5-a).

Data like these suggest that the difference between so-called verb-framing and satellite-framing should be sought not just in the inventory of verbs but also in the inventory of adpositions available in particular languages. It seems to be the case that languages that have been classified as verb-framed typically lack Path adpositions like English *to* that can freely combine with locative prepositions like *in* and *on* to derive more complex paths or other operations to derive Paths from Places expressed by locative prepositions. This is true for French, for example, which does not have complex PPs of the Italian type in (5):

- (6) \*La fille dansait à dans la chambre / dans à la chambre.  
 the girls danced to in the room / in to the room

The following sections show that the 'satellite-framed' language English is not that different from a 'verb-framed' language like Italian. Both languages can employ complex PPs containing a locative P and a cognate of *to* to provide a Path when the verb itself does not contain a Path component.<sup>3</sup> Furthermore, I will argue contra Talmy that there are genuinely Germanic verbs<sup>4</sup> that simultaneously encode Path and Motion and thus behave like verbs in languages he

<sup>3</sup>Folli (to appear) does not draw this parallel, though, but argues that Italian *a* is a locative preposition.

<sup>4</sup>Talmy (1985), (Talmy 2000) discusses cases where also English behaves like verb-framed languages, e.g. *he entered the room*. He assumes that English shows verb-framed behaviour with such verbs because they have Latinate roots. Hence, in his system, genuinely Germanic verbs should behave like verbs in satellite-framed languages.

characterises as verb-framed. Locative PPs can obtain a directional reading only due to some component of directionality associated with these verbs, and again the reading involved is a goal one. In addition, I will discuss other strategies to bring about a directional reading with locative PPs in Dutch and German, which are overall hard to integrate into Talmy's two-way (even three-way) distinction.

### 3 Locative PPs in West Germanic

#### 3.1 English and Dutch *in* and *on*

Experimental work and corpus studies by Thomas (2003) and Nikitina (to appear) show that the English preposition *in* cannot be understood directionally in all contexts. The sentence in (7), for example, is ambiguous between a locative reading, where Sharon did one jump (or more jumps, e.g. up and down) in one location, namely inside the lake, and a directional reading, where Sharon jumped on a path which lead to a place inside the lake.

- (7) Sharon jumped in the lake.
- a. *paraphrase of the locative reading:*  
Sharon jumped while being in the lake (i.e. the jumping took place in the lake).
  - b. *paraphrase of the directional reading:*  
Sharon jumped and (as a result) he ended up in the lake.

The same kind of ambiguity is found with the English preposition *on* (8) (see Thomas (2003) for discussion).

- (8) Anna kicked the ball on the table.
- a. *paraphrase of the locative reading:*  
Anna kicked the ball while being on the table (i.e. the kicking took place on the table).
  - b. *paraphrase of the directional reading:*  
Anna kicked the ball and (as a result) the ball ended up on the table.

The ambiguity of sentences with *in* and *on* between a locative and a directional reading is not observed with all instances of these PPs, though. In particular, only certain verbs such as *kick*, non-iterative *jump*, *throw*, *put*, *fall*, among others, henceforth *kick*-verbs, can trigger a directional reading (7), (8). With other motion verbs like *dance*, *crawl*, *walk*, *swim*, among others, henceforth *swim*-verbs, these prepositions only get a locative reading (9).

- (9) Shakuntala swam in the lake.
- a. *paraphrase of the locative reading:*  
Shakuntala swam while being in the lake (i.e. the swimming took place in the lake).
  - b. *\*directional reading*
- (10) John danced on the stage.
- a. *paraphrase of the locative reading:*  
John danced while being on the stage (i.e. the dancing took place on the stage).
  - b. *\*directional reading*

(9) can only have the locative reading where Shakuntala swam around in the lake, but not a directional reading where she, for example, swims from a river into the lake. (10) is a parallel

example with *on*.

If we look at another closely-related language, Dutch, a similar picture arises (11), (12).

- (11) a. Rick sprong in het meer. (locative / directional)  
Rick jumped in the lake  
'Rick jumped in the lake.'  
b. Willemijn zwom in het meer. (locative / \*directional)  
Willemijn swam in the lake  
'Willemijn swam in the lake.'
- (12) a. Gert Jan schopte de bal op de tafel. (locative / directional)  
Gert Jan kicked the ball on the table  
'Gert Jan kicked the ball on the table.'  
b. Brigit dansde op het podium. (locative / \*directional)  
Brigit danced on the stage  
'Brigit danced on the stage.'

With *kick*-verbs, Dutch prepositional phrases with *in* 'in' and *op* 'on' can refer to the final location of an event (under the directional reading) or to a location where an event takes place (under the locative reading). With *swim*-verbs, on the other hand, prepositional *in*- and *op*-phrases can only locate the entire event and thus be understood locatively.<sup>5</sup>

There are particular conditions, under which English and Dutch *swim*-verbs can combine with *in* and *on* so that both act as constituting parts of a directed motion event. English has complex prepositions *into* and *onto*, where the locative prepositions *in* and *on* combine with the directional preposition *to*. Any motion verb can combine with such a complex PP, which refers to a path that ends up at the location specified by the particular *in*- or *on*-phrase (13).

- (13) *English complex PPs*  
a. Shakuntala swam into the lake.  
b. John danced onto the stage.

Dutch uses *in* and *op* in postposition (14).<sup>6</sup>

- (14) *Dutch postpositions*  
a. Willemijn zwom het meer in.  
Willemijn swam the lake in  
'Willemijn swam into the lake.'  
b. Brigit dansde het podium op.  
Brigit danced the stage on  
'Brigit danced onto the stage.'

Hence, the addition of a directional element *to* in English and a change in the syntactic structure in Dutch bring about a directional reading with *in* and *on*. The English complex PPs and the Dutch postpositional phrases cannot be understood locatively but always have a directional

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<sup>5</sup>Tungseth (2006) reports similar finding for Norwegian. A similar difference between two types of motion verbs can also be detected in Russian with the locative prepositions *meždu* 'between' and *pered* 'in front of', as well as in Hungarian, where a directional particle can be omitted with *kick*-verbs but not with *swim*-verbs (Veronika Hegedűs, p.c.). These languages are discussed in more detail in Gehrke (in progress).

<sup>6</sup>Neither English nor German can use *in* and *on* as postpositions and not all Dutch locative PPs can appear in postposition (see Gehrke (2006) for discussion).

reading. However, I will argue that the lexical semantics of the particular Ps themselves (*in*, *on/op*) still remains the same and that these Ps are locative only.

### 3.2 A fourth strategy to get directional readings with locative Ps: German

So far, we have seen that there are three ways to obtain a directional reading with locative prepositions. First, with one set of motion verbs, the *kick*-verbs, locative PPs can specify the final location of a directed motion event. Second, English combines the directional P *to* with a locative P into a complex PP denoting a Path ending up at a Place. Third, Dutch uses (some) locative Ps in postposition to create the same reading. A fourth strategy to bring about a directional reading with locative Ps is found in Indo-European languages that have morphological case such as Latin, Greek, German, and most Slavic languages.

In German, locative and directional readings of PPs headed by *in* ‘in’ or *auf* ‘on’ are systematically distinguished by case on the DP inside the PP. If the DP bears dative case, the whole PP can only refer to a location (15).

(15) *German in and on with DATIVE DPs: locative only*

- a. Diana schwamm im See.  
Diana swam in-the.DAT lake  
‘Diana swam in the lake.’
- b. Silke sprang im See.  
Silke jumped in-the.DAT lake  
‘Silke jumped in the lake.’
- c. Sören tanzte auf der Bühne.  
Sören danced on the.DAT stage  
‘Sören danced on the stage.’
- d. Maren kickte den Ball auf dem Tisch.  
Maren kicked the ball on the.DAT table  
‘Maren kicked the ball on the table.’

If the DP inside the PP bears accusative case, the PP has a directional reading (16). The directional meanings involved are goal readings with the location denoted by the *in/on*-phrase being the ending-point or the final location of some movement along a path.

(16) *German in and on with ACCUSATIVE DPs: directional only*

- a. Diana schwamm in den See.  
Diana swam in the.ACC lake  
‘Diana swam into the lake.’
- b. Silke sprang in den See.  
Silke jumped in the.ACC lake  
‘Silke jumped into the lake.’
- c. Sören tanzte auf die Bühne.  
Sören danced on the.ACC stage  
‘Sören danced onto the stage.’
- d. Maren kickte den Ball auf den Tisch.  
Maren kicked the ball on the.ACC table  
‘Maren kicked the ball onto the table.’

This strategy of distinguishing between a locative and a directional reading is entirely indepen-

dent of the verb class in use so in this respect German is different from both Dutch and English. It is similar though in the sense that a directional reading of the particular P<sub>s</sub> in question has to be marked additionally, in this case by accusative case on the DP inside the PP. This fact will be taken as additional argument in favour of the claim that the particular P<sub>s</sub> are not lexically ambiguous but locative only, and any directional reading is derived compositionally.

### 3.3 Data summary

The following table summarises the empirical findings for the languages under discussion.

	locative	directional
English <i>in, on</i> + <i>swim</i>	✓	*
English <i>in, on</i> + <i>kick</i>	✓	✓
English <i>in, on</i> + <i>to</i> (= <i>into, onto</i> ) + <i>swim, kick</i>	*	✓
Dutch <i>in, on</i> in <b>preposition</b> + <i>swim</i>	✓	*
Dutch <i>in, on</i> in <b>preposition</b> + <i>kick</i>	✓	✓
Dutch <i>in, on</i> in <b>postposition</b> + <i>swim, kick</i>	*	✓
German <i>in, on</i> + <i>swim, kick</i> + <b>DATIVE</b>	✓	*
German <i>in, on</i> + <i>swim, kick</i> + <b>ACCUSATIVE</b>	*	✓

Table 1: Locative P<sub>s</sub> in West Germanic

In English and Dutch, the availability of a directional reading for locative prepositions depends on the verb class. With *kick*-verbs the English and Dutch prepositions *in/in* and *on/op* can get a directional (goal) reading, whereas with *swim*-verbs they can only be interpreted locatively and any directional reading needs extra marking. Dutch uses *in* and *op* in postposition to obtain a directional reading, which is therefore derived by syntactic movement as will be argued for in the analysis. English *in* and *on* combine with the directional preposition *to* into the complex PPs *into, onto* to express a directional meaning. I therefore conclude that the prepositions under discussion are not (lexically) ambiguous between a locative and a directional reading.<sup>7</sup>

In German, the distinction between directional and locative readings of PPs involving *in* and *on* is associated with accusative and dative case on the DP inside the PP, respectively, irrespective of the verb class. In other languages that employ case marking inside PPs to differentiate between a locative and a directional reading, the case that is used for the directional reading is always accusative, whereas the case in use for the locative reading varies (dative in German, prepositional or instrumental in Czech and Russian, ablative in Latin etc.). Accusative case, in turn, is generally analysed as a structural case in all other domains, most prominently on the internal argument of a transitive verb. I will take this as a point of departure for arguing that accusative case is a structural case also within the PP and that the directional meaning is therefore structurally derived and not provided by the P itself. This means that we can analyse the particular P<sub>s</sub> as locative only also in these case-marking languages.

Given that the prepositions under discussion can be locative in all contexts and with all kinds of verbs (unless a goal reading is derived structurally), whereas there are restrictions on the availability of directional readings, I view it as preferable to analyse such P<sub>s</sub> as locative and to pin down the conditions that have to be met for a directional reading to arise. Such an analysis stands in sharp contrast to most accounts, which usually treat the particular P<sub>s</sub> as ambiguous

<sup>7</sup>See Gehrke (in progress) for reasons to assume that, in general, Dutch, English and German only have prepositions that are either locative or directional but due to lack of space these reasons cannot be discussed here.

between a locative and a directional reading and ignore the fact that the availability of a directional reading for *in* and *on/op* depends on the type of verb it combines with (Rooryck 1996), (Koopman 1997), (van Riemsdijk and Huybregts 2001), (den Dikken 2003).

The directional readings that can be derived with *in* and *on* are all goal readings. In a cross-linguistic perspective we see, then, that there are different strategies to mark goals of directed motion events (17). These are found in the three languages under discussion as well as in languages discussed in the literature.

(17) STRATEGIES TO MARK GOALS

- a. **kick-verbs** + *in*, *on* and other locative Ps (Dutch, English; Norwegian, Tungseth (2006); Italian, Folli (to appear); see also Gehrke (in progress))  
*kick-verbs* + *in front of*, *between* (Russian, Gehrke (in progress))
- b. combining locative Ps with the goal P *to* into **complex PPs**: *into*, *onto*; *to behind*, *to under* etc. (English; Italian, Folli (to appear))
- c. *in*, *op*, *uit* in **postposition** (Dutch; Afrikaans, Biberauer and Folli (2004))
- d. **accusative case** marking on DP inside PP with (almost) all locative Ps (German; Czech, Russian; Latin, Greek, other Slavic languages)

In comparison with Talmy's (2000) typological observations, the following conclusions can be drawn. (17-b) is a satellite-framing strategy, where Path is associated with the satellite *to*, whereas (17-a) could be seen as a verb-framing strategy to express Path. Depending on the particular account of *kick-verbs*, these cases could alternatively be analysed as involving something like Higginbotham's (2000) telic pair formation (see below). This in turn cannot directly be accounted for under Talmy's typology because the Path component cannot be relegated to a single component in the sentence but is rather created by the composition of a locative PP with a verb expressing only Manner and Motion.

The other strategies are not verb-framing but also not really satellite-framing, unless we have a very fuzzy notion of the term 'satellite'. It is not the P itself (the 'satellite') that expresses Path with these strategies but rather some syntactic operation (with postpositions) or some morphological device (case marking) that derives a directional goal-reading. These strategies do not fit Talmy's two- or three-way distinction because it is not clear in the first place which one element in the sentence expresses the Path. Furthermore, there are languages that employ both verb-framing and satellite-framing strategies such as English and Italian. This in turn shows that Talmy's typology is too coarse-grained.

A full account of the facts, then, has to address the difference between *kick-verbs* and *swim-verbs* and make precise the mechanisms of deriving directional readings with *in* and *on/op* in English and Dutch as well as the case marking differences within German PPs. Whereas I will not discuss the case issue due to lack of space (see Gehrke (2006) for discussion), the other issues will be addressed after having introduced basic theoretical assumptions in the next section.

## 4 Theoretical assumptions

### 4.1 Paths and Places

Zwarts and Winter (2000), and Zwarts (2005) propose to account for the semantics of spatial PPs in terms of vector space semantics, because it allows a straightforward treatment of modification in the prepositional domain in a compositional way. A locative PP like *behind the house*, for example, is associated with the set of vectors, 'directed line segments between points in space',

that go from the house to points behind it. Thereby a location function (of type  $e(vt)$ ) derives sets of located vectors for locatives, mapping an  $e$ -type denotation of the reference object, the complement of P, to a vector (of type  $v$ ) that describes its location or dimension. The modified PP *5 metres behind the house*, then, is a simple composition, namely the intersection of two sets of vectors, those that are five metres long and those that are behind the house.

The semantics of directional PPs is addressed more directly in Zwarts (2005). The denotation of a directional PP is treated as an algebraically structured set of paths and directional prepositions are assumed to map the reference object to a set of sequences of vectors, paths, where each of these sequences determines a potential change in position of the located object. The denotation of a directional PP is treated as an algebraically structured set of paths (see also Zwarts and Winter (2000), with path defined as in (18)).

(18) A **path** is a function of type  $iv$  from the real interval  $[0,1] \in \mathbb{R}$  (of type  $i$ ) to vectors.

Zwarts (2005) argues that a property like boundedness, which is relevant to distinguish between atelic (unbounded) and telic (bounded) events in the verbal domain, or between mass (unbounded) and count (bounded) nouns in the nominal domain (e.g. Bach (1986)), is also at play in the prepositional domain. This leads him to make a further subdivision of directional prepositions into atelic / unbounded and telic / bounded ones (19).

- (19) a. *bounded, telic*: to, into, onto, from, out of, off, away from, past, via  
 b. *unbounded, atelic*: towards, along  
 c. *(un)bounded, (a)telic*: across, around, down, over, through, up

He convincingly shows that the distinguishing property between telic and atelic reference in the prepositional domain is cumulativity rather than divisivity or quantisedness. Cumulativity in the verbal and nominal domain is exemplified in (20).

(20) *drink water* (cumulative) vs. *drink a glass of water* (non-cumulative)

A PP, then, is bounded (telic) iff it does not have cumulative reference, which is defined in (21) (with **p** and **q** as variables over paths).

- (21) A set of paths **X** is **cumulative** iff  
 (i) there are **p** and **q**  $\in$  **X** such that **p+q** exists and  
 (ii) for all **p, q**  $\in$  **X**, if **p+q** exists, then **p+q**  $\in$  **X**.  
 (Zwarts 2005, 12)

The crucial operation involved here is concatenation (closure under sums), which is a partial operation subject to the condition that the second path has to start where the first path ends. Atelic PPs are closed under sums whereas telic PPs are not. For example, *into* is defined as a transition from one phase to another (22).

(22)  $\llbracket \text{into the house} \rrbracket = \{ \mathbf{p}: \text{there is an interval } I \subset [0,1] \text{ that includes 1 and that consists of all the indices } i \in [0,1] \text{ for which } \mathbf{p}(i) \text{ is INSIDE the house} \}$

*To* and *onto* are defined in a parallel fashion where the result is AT and ON (instead of INSIDE), respectively. These three goal-expressions are not cumulative, as they contain no paths that can be concatenated. For example, there are no two paths in the denotation of *to* that can be concatenated, since the final end-point (1) of a *to*-path is always just outside the reference

object whereas the initial end-point (0) is not. The denotations of the source prepositions *out of*, *from* and *off* do not involve any paths that can be concatenated, either, and are therefore non-cumulative as well; they are defined as the reverse of the goal ones. A full list of these definitions is given in (23).

- (23) { **p**: there is an interval  $I \subset [0,1]$  including ...  
 ... 0 and consisting of all the  $i \in [0,1]$  for which **p**( $i$ ) is AT  $x$  } =  $\llbracket$  from  $x$   $\rrbracket$   
 ... 0 and consisting of all the  $i \in [0,1]$  for which **p**( $i$ ) is ON  $x$  } =  $\llbracket$  off  $x$   $\rrbracket$   
 ... 0 and consisting of all the  $i \in [0,1]$  for which **p**( $i$ ) is IN  $x$  } =  $\llbracket$  out of  $x$   $\rrbracket$   
 ... 1 and consisting of all the  $i \in [0,1]$  for which **p**( $i$ ) is AT  $x$  } =  $\llbracket$  to  $x$   $\rrbracket$   
 ... 1 and consisting of all the  $i \in [0,1]$  for which **p**( $i$ ) is ON  $x$  } =  $\llbracket$  onto  $x$   $\rrbracket$   
 ... 1 and consisting of all the  $i \in [0,1]$  for which **p**( $i$ ) is IN  $x$  } =  $\llbracket$  into  $x$   $\rrbracket$

In other words, all of these prepositions have in common that they involve a two-stage structure, a negative and a positive phase. They all have exactly one positive phase that overlaps either with the starting point **p**(0) or the ending point **p**(1) (see also Fong (1997)). The definitions in (23) furthermore indicate that these PPs all involve some final location such as AT, ON, IN  $x$  (smallcaps in the definitions by me). These final locations can be syntactically represented as PlacePs that are embedded under PathPs as in (24).

- (24)  $\llbracket$  PathP  $\llbracket$  PlaceP  $\llbracket$  DP  $\rrbracket$   $\rrbracket$

The literature on the syntax of PPs usually assumes these to be internally complex with at least two hierarchically ordered functional projections to account for locative and directional readings (Koopman 1997), (Helmantel 2002), (van Riemsdijk and Huybregts 2001), (den Dikken 2003), (Svenonius 2004). There is thus a general consensus for the structure in (24) (give or take functional structure and with varying labels). The structure in (24) also mirrors the conceptual structure of prepositional phrases as outlined in Jackendoff (1983) and subsequent work.

Zwarts (2005) treats paths as direct counterparts to events, and both entities are strictly separated domains, namely space and time, respectively. Following Krifka (1998) and others, he argues that the link between verbs (denoting sets of events) and directional PPs (denoting sets of paths) is performed by a thematic function TRACE that maps events to their spatial trace. If  $e$  is a (motion) event, then TRACE( $e$ ) is the path followed by the theme of  $e$ . The compositional rule for combinations of a verb and a PP is given in (25).

- (25)  $\llbracket$  V PP  $\rrbracket$  =  $e \in \llbracket$  V  $\rrbracket$  : TRACE( $e$ )  $\in \llbracket$  PP  $\rrbracket$

Hence, a (directional) PP restricts the denotation of a verb (as set of events) to those events that have paths in the PP denotation as their trace.

## 4.2 Decomposing the event

Following Pustejovsky (1991), Higginbotham (2000), Ramchand (to appear), among others, I assume that events can be lexically and syntactically decomposed into sub-events. The idea that will be put forward then is that the difference between *kick*-verbs vs. *swim*-verbs observed in section 3, can be captured in terms of the event structure associated with these kinds of verbs. Pustejovsky (1991), for example, argues that events can be of three different types, namely states (26), processes (27), and transitions (28).

- (26) **State** ( $S$ ): a single event, which is evaluated to no other event

Examples: *be sick, love, know*

S  
|  
e

(27) **Process** (*P*): a sequence of events identifying the same semantic expression

Examples: *run, push, drag*

P  
└───┬───  
e1 ... en

(28) **Transition** (*T*): an event identifying a semantic expression, which is evaluated relative to its opposition (with *E* as a variable for any event type)

Examples: *give, open, build, destroy*

T  
└───┬───  
E1    ¬ E2

Similarly, Moens and Steedman (1988) assume an event nucleus of preparatory process, culmination, and consequent state. Pustejovsky's transition type is the one I will focus on in the following. This type has at least two subevents, namely a state/process and an opposite state/process with a transition from one to the other. In Vendler's (1957) classification of event types, this type subsumes accomplishments and achievements.

Higginbotham (2000) argues that accomplishments are syntactically represented by ordered pairs of positions for events. According to him, such an accomplishment interpretation may also stem from what he calls TELIC PAIR FORMATION ( $\langle E, E' \rangle$ ) associated with prepositions rather than with the verbal head (29).

(29) I flew my spaceship to the morning star.  
fly (I, my spaceship, e) & to (the morning star, (e, e'))

For (29), Higginbotham (2000) claims that *to* is the main predicate which bears an ordered pair of event positions. The first one of these events is a process which gets identified with the single event position in the verb *fly* when the *to*-phrase is combined with such a VP. Hence, *fly* is not ambiguous between a manner of motion reading (which is an activity or a process) and a directed motion reading, which can be a telic transition from one (process) subevent into another (consequent state), but it only supplies one event position (that of an activity or a process).

Put in different terms, combining the TRACE function and the definition of a *to*-phrase in (23) (Zwarts 2005), a *to*-PP restricts the denotation of *fly* (a process) to those events that are transitions into a location, which in this case is 'AT the morning star'.

Higginbotham (2000) also provides examples with locative PPs such as (30).

(30) a. They arrived at the airport.  
b. arrive (x, e)  $\leftrightarrow$  ( $\exists p$ ) [at(x,p,e) & ( $\exists e'$ ) (e' is a journey by x & (e,e') is a telic pair)]

*Arrive* is treated as a predicate applying to (instantaneous) events of being at a place, which constitute the terminus or telos of events of journeying to that place. Even if it is not entirely clear from Higginbotham (2000) where the e' part comes from here, what is relevant for this chapter is the treatment of PPs like *at the airport*. Higginbotham assumes that this PP does not

express a path or a result of the arrival, but simply identifies the place in question and thus still refers to a location only. So this is a case, where the meaning of directed motion is associated with the verb *arrive* rather than with the PP.

In this context, Higginbotham (2000) also addresses the difference between verb-framed and satellite-framed languages as discussed in Talmy (2000), according to which English *float under the bridge* is ambiguous between a locative and a directional reading but the Italian counterpart only has the locative reading (31).

- (31) a. *float under the bridge* (English)  
 directional reading:  $\lambda y\lambda e\lambda e'$ (float(y,e) & under(y,x,e') & telic-pair(e,e'))  
 locative reading:  $\lambda y\lambda e$ (float(y,e) & under(y,x,e))  
 b. *galleggiare sotto il ponte* (Italian)  
 float            under the bridge  
 locative reading:  $\lambda y\lambda e$ (float(y,e) & under(y,x,e))

Higginbotham (2000) claims that both the verb and the preposition are unambiguous in both languages, in the sense that the verb by itself only describes a process and the preposition by itself is only associated with a location. He furthermore assumes that the directed motion interpretation is due to the combinatorial operation of telic pair formation. He claims that there is a semantic parameter at work, since this operation is available in satellite-framed languages but not in verb-framed languages.

A question that arises in this context is whether the directional reading of examples like (31)[a] really comes about due to what Higginbotham calls telic pair formation. In Gehrke (2006), I show that the directional reading available in the English case (i.e. with *swim*-verbs and *under*) is not a goal but a route reading and furthermore that in Dutch only a locative reading is available in such cases. I furthermore argue that route readings do not involve transitions from a process into a state and thus no telicity.

A more general issue that arises in this context is how the operation of telic pair formation is restricted. The way Higginbotham (2000) describes it, this operation seems to be freely available in all contexts in satellite-framed languages like English. The discussion of the West Germanic data in section 3, however, shows that this is not the case since the availability of directional readings and in particular directional readings is highly restricted. Furthermore, it has been argued by for instance Beavers (2003) for Japanese or Folli (to appear) for Italian, that the operation of telic pair formation is also available in limited cases in these languages that are verb-framed according to Talmy (2000). This would be unexpected if the difference between the two types of languages was parametrised in the way proposed by Higginbotham.

Nevertheless, what decompositional approaches to event structure have in common is that they assume an ontology which contains a transition into a state, which I will call consequent state, using the terminology of (Moens and Steedman 1988). This could be thought of in terms of the BECOME-operator of Dowty (1979), which has also been used to capture the semantics of change-of-state predicates. Hoekstra (1992), Hoekstra (1994), Hoekstra (1999) proposes a small clause (SC) analysis for all change-of-state or position verbs, also where no overt secondary predicate is visible. Assuming that the SC complement denotes the (path towards an) end-state of the (deep) object, i.e. the VP-internal argument DP, he proposes the general structure in (32).

- (32) V [SC DP ... PRED]

I will use this kind of small clause structure for all the cases where there is a transition into a consequent state, which involves something like Higginbotham (2000)'s telic pair formation.

## 5 Event Structure and locative Ps

Given the theoretical assumptions outlined in the previous section, a possible explanation for the difference between *swim*-verbs and *kick*-verbs arises. We can assume that *kick*-verbs are lexically specified for two event positions, a process and a result state, and that locative PPs (PlacePs) can modify this result state. This is syntactically represented in (33).

(33)  $[_{VP} DP_i [_V \textit{jump} [_{SC} t_i [_{PlaceP} \textit{in the lake} ]]]]$

The meaning of directionality here is not associated with the PP itself, which lacks Path structure entirely, but is rather part of the verbal denotation. Here, I follow the insight of Higginbotham (2000) that the locative PP in (30) is not associated with a path but just with a location and that the meaning of transition or directed motion is rather associated with the verb. Hence, Path is part of the verb, not of the PP.

*Swim*-verbs, on the other hand, only identify a process. To obtain a directional reading they can combine with directional PPs as discussed in Higginbotham (2000) in (29) where the directional PP itself is structurally complex and provides Path and a meaning of transition (34).

(34)  $[_{VP} DP [_V \textit{swim} [_{PathP} \textit{in}_i\textit{-to} [_{PlaceP} t_i \textit{the lake} ]]]]$

The combination of a *swim*-verb with an *into*-phrase results in a process denoted by *swim* that leads on a path to a place inside the reference object, which is *the lake* in this case. Such an event is telic as well, but telicity here is not due to some transitional event structure provided by the verb (it can only supply a process subevent) but due to the process being bounded by the bounded directional path it combines with, as discussed in Zwarts (2005).

When *swim*-verbs combine with locative PPs (PlacePs), these can only modify the whole event denoted by the VP (35).

(35)  $[_{VP} [_{PlaceP} \textit{in the lake} ] [_{VP} DP \textit{swim} ]]$

The tree in (35) is more or less adapted from Tungseth (2006) who shows that the locative and the directional reading one obtains with locative PPs headed by *in* and *on* are associated with different structural positions that these phrases occupy with respect to the VP.

Hence, the PPs under discussion are unambiguously PlacePs, and a directional reading only comes about when some additional syntactic projection is present that can be further modified by a PlaceP.<sup>8</sup> This projection is either PathP, associated with some directional P, or the small clause structure licensed by a verb that is associated with a complex transitional event structure. This account goes directly against certain claims found in the literature. van Riemsdijk and Huybregts (2001), for example, argue that an English PP containing *on* is always ambiguous between a locative and a directional meaning. They support this claim by the fact that a directional reading is available with PPs in PP-with-NP constructions of the type in (36), without an additional element like e.g. a verb to provide the meaning of directionality.

(36) On the table with those plates! (van Riemsdijk and Huybregts 2001, 13)

I do not think this is a valid argument though. If PPs headed by *on* and the like were ambiguous between a directional and a locative reading they should be ambiguous in all contexts, irrespec-

<sup>8</sup>The claim goes further, since other locative PPs headed by *under* and *behind* can be included as well, which are generally treated as ambiguous in English. Due to lack of space, I cannot discuss this here, but see Gehrke (in progress) for extensive discussion.

tive of the environment they appear in. As shown in section 3 though, these PPs in combination with *swim*-verbs can only denote Places in both Dutch and English. I can think of no reason why a motion verb would block a directional reading that should be freely available with these prepositions if they were lexically ambiguous.

Dutch behaves similarly and can use *in* (*op*) either in preposition or in postposition in such cases (37).<sup>9</sup>

- (37) a. De gevangenis in met die crimineel! (Helmantel 2002, 35)  
           the prison       in with that criminal  
       b. In de gevangenis met die crimineel! (Mirjam Rigterink, p.c.)  
           in the prison       with that criminal

In German, the DP inside the PP in these cases always bears accusative case, hence is marked for directionality. I take this as a hint that the directional readings involved in the English and Dutch examples are structurally conditioned. This in turn means that cases like (37) involve some kind of verb ellipsis or some empty light verb of the *kick*-type that enables the path reading. I will leave this for future research.

In sum, with motion events where the verb cannot identify a resultative subevent by itself, namely with *swim*-verbs, a directional PP can denote a path providing a scale along which the event is 'measured out'.<sup>10</sup> With verbs of the transition type, namely *kick*-verbs, a locative PP can further modify the result state VP-internally. With motion verbs that are event structurally simple processes, i.e. *swim*-verbs, locative PPs headed by *in* and *on* cannot constitute a part of a directed motion event, since this reading only arises with locative PPs in case there is already a result state available in the structure. Rather, these PPs are not VP-internal but modify the whole event denoted by the VP.

## 6 The internal structure of PPs

This section addresses the cases where a locative preposition can obtain a directional meaning due to additional elements or operations. In English, a directional P element like *to* can be added to a locative PP headed by *in* or *on*, in Dutch the corresponding locative prepositions can appear in postposition licensing a path reading.

An English preposition like *to* heads a PathP because a *to*-phrase denotes a path ending at the point denoted by the reference object or GROUND, which is the DP inside the PP (Zwarts 2005). The heads *in* or *on* of PlacePs embedded under a PathP headed by *to* move and incorporate into this Path head to form *into* and *onto* (cf. den Dikken (2003), Svenonius (2004)) (38).

- (38) [PathP [Path' in<sub>i</sub>-to [PlaceP [Place' t<sub>i</sub> [DP the room ]]]]]

The PlacePs denote a location which is the result state or the end-point of the *to*-phrase, which in turn denotes a path that ends at the location denoted by the *in*-phrase (*in* DP).

In Dutch, on the other hand, the DP complements of PlacePs headed by *in* or *op* 'on' move to Spec PathP (see Koopman (1997), den Dikken (2003) for discussion), thereby identifying or licensing the Path structure (39).

<sup>9</sup>Apparently, with the preposition one stresses the P and with the postposition one stresses *gevangenis*. For a possible semantic difference between such minimal pairs, see Helmantel (2002, 72f.).

<sup>10</sup>In the sense of Tenny (1994). If this scale is bounded, the event is telic; if it is unbounded, the event is atelic (see Hay, Kennedy and Levin (1999), among others).

(39) [PathP [DP *het meer*] [Path'  $\emptyset$  [PlaceP *in t<sub>i</sub>* ]]]

Helmantel (2002) argues that this movement also has a semantic effect in that a DP in Spec PathP (DIRP there) receives a one-dimensional interpretation (in the sense of Verkuyl and Zwarts (1992)). Only if an object is one-dimensional it can be interpreted as a path. She furthermore claims that any element in the specifier of a directional phrase has to be interpreted as a one-dimensional entity, a path. Elements that cannot be construed as one-dimensional are banned from this position (40).

- (40) a. Jan stapt op de kiezelsteen. (Helmantel 2002, 73)  
 Jan steps on the pebble  
 'Jan steps on the pebble.'  
 b. #Jan stapt de kiezelsteen op  
 Jan steps the pebble on

With respect to the empirical discussion in section 3, then, Dutch *klimmen* 'to climb' and *stappen* 'to step' have to be *kick*-verbs since the whole sentence with a locative prepositional phrase involving *op* 'on' can still be interpreted directionally.

It is not clear, however, that all objects in postpositional phrases receive a path interpretation given examples like (41).

- (41) De man is het dak op geklommen.  
 the man is the roof on climbed  
 'The man has climbed onto the roof.'

In this sentence, *het dak* 'the roof' in the postpositional phrase is not really the path itself but the endpoint of the path. So the claim that any phrase in the specifier of a directional phrase has to receive a path interpretation is possibly too strong.

## 7 Conclusion

This chapter discussed conditions, under which locative PPs headed by *in* and *on* can be understood directionally in English, German and Dutch. It was shown that with these prepositions alone only *kick*-verbs but not *swim*-verbs can license a directional reading in English and Dutch. This has been accounted for in terms of the event structure associated with these verbs: *kick*-verbs license a complex transitional event structure where the result state subevent can be modified by locative PPs, whereas *swim*-verbs are simple processes, and locative PPs can only modify the event as a whole. In order to derive a goal reading with locative prepositions and *swim*-verbs, extra elements or operations are needed, such as additional goal phrases or certain kinds of movement to license a path structure. The combination of such process verbs with a Path then leads to a telic event interpretation if the Path is bounded. In German, a directional reading arises with these PPs if the DP inside them bears accusative case.

Hence, there are genuinely Germanic verbs that conflate path and motion, and thus behave like verbs in verb-framed languages, namely *kick*-verbs, contra Talmy (2000). Second, the prepositions under discussion are not ambiguous between a directional and a locative reading. In cases where PlacePs can be associated with directionality and thus with some path, this additional Path structure has to be licensed by movement, case or additional lexical items. Finally, the discussion showed that Higginbotham's (2000) telic pair formation is more restricted than suggested.

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