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On directional readings of locative prepositions

1 INTRODUCTION

Talmy (1985): verb-framed vs. satellite-framed languages
- verb-framed languages (e.g. Romance, Japanese): verbs conflate motion and path semantics
- satellite-framed languages (e.g. Germanic): verbs conflate manner and motion but do not encode path

Can Germanic verbs never encode path?

- locative PPs: denote sets of locations (places) (semantics), functional place structure (syntax)
- directional PPs: denote sets of paths made up of locations (semantics), functional path structure embedding place structure (syntax)

Can prepositions be ambiguous between a directional and a locative reading?

2 LOCATIVE PPS IN (WEST) GERMANIC

English in, on
- only locative with manner of motion verbs (Levin 1993) like crawl, walk, swim, henceforth swim-verbs

(1) a. Oscar jumped in the lake. (locative / directional-goal)
    b. Oscar swam in the lake. (locative / *directional)

Dutch in, op ‘on’
the same (contra Koopman 1997)

(2) a. Oskar sprong in het meer. (locative / directional-goal)
    b. Oskar zwom in het meer. (locative / *directional)

English and Dutch in, on / op directionally

English complex prepositions into, onto, Dutch in, op in postposition\(^1\) (cf. Koopman 1997, den Dikken 2003):

(3) a. English: Rick swam into the lake. (*locative / directional-goal)
    b. Dutch: Rick zwom het meer in.

German in, auf ‘on’
dative vs. accusative case on the DP inside the PP, irrespective of verb

(4) a. Oskar schwamm im See. (locative / *directional)
    Oskar.NOM swim.PST in-the.DAT lake
    b. Oskar sprang im See. 
    Oskar.NOM jump.PST in-the.DAT lake

(5) a. Oskar schwamm in den See. (*locative / directional-goal)
    Oskar.NOM swim.PST in the.ACC lake
    b. Oskar sprang in den See. 
    Oskar.NOM jump.PST in the.ACC lake

\(^1\) Neither English nor German can use in and on as postpositions.
What makes *put*-verbs different from *swim*-verbs?

**Why are under and behind different from in and on?**

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2 Out of some reason *über* 'over' is different from *unter* 'under' in that it only gets a trajectory reading even with the accusative, and that furthermore a postpositional trajectory element can also be used with an accusative DP for many speakers, although the dative is definitely preferred (see also den Dikken 2003 and Zwarts 2005b).
3 EVENT STRUCTURE AND Ps

(10) The syntax / semantics of the first phase (Ramchand 2005)

\[
\text{initP} \quad (e_1 – \text{initial state})
\]

\[
\text{initiator} \quad \text{init’}
\]

\[
\text{procP} \quad (e_2 – \text{process event})
\]

\[
\text{undergoer} \quad \text{proc’}
\]

\[
\text{resP} \quad (e_3 – \text{result state})
\]

\[
\text{resultee} \quad \text{res’}
\]

\[
\text{res} \quad \text{XP}
\]

all dynamic verbs identify at least a procP, the dynamic part of every event causing subevent (initP) and result state subevent (resP) are optional – not all verbs can identify these
Starke (2001): lexical items do not necessarily insert under a single terminal node; elements can merge and project and then remerge at a later stage of the derivation.

(11) Event Composition Rule (Ramchand 2005, p. 37)

\[ e = e_1 \rightarrow e_2: e \text{ consists of two subevents, } e_1, e_2 \text{ such that } e_1 \text{ causally implicates } e_2. \]

state embedded under a process: result state
State embedding a process: initial state

Ramchand & Svenonius (2002): English particles as particle phrases (PrtPs) in complement to resP [RP there]

(12) throw the dead rat out

a. \([\text{initP} \text{ INITIATOR throw-init} \text{ [procP UNDERGOER tv} \text{ [resP RESULTTEE out-res [PrtP the rat [Prt tvP]]]]}]\]
b. \([\text{initP} \text{ INITIATOR throw-init} \text{ [procP UNDERGOER tv} \text{ [resP the rat res [PrtP tvP tvP [Prt out]]]]}]\]

this framework applied to the Germanic data

put-verbs: come with a result state subevent; locative Ps can modify this result state
swim-verbs cannot identify resP; locative PPs with in, on modify the whole event denoted by the VP

three ways in which VP-internal P elements can be related to the event structure:

- (Germanic) particles identifying a result state subevent (12)
- with swim-verbs: a directional PP can denote a path
- with put-verbs: locative PPs can further modify the result state

locative PPs with swim-verbs: modify the whole event (VP-external modifier, cf. Maienborn 2003)
4 THE INTERNAL STRUCTURE OF PPs

in, on: English to licenses a pathP, place heads in and on move and incorporate into path° to form into and onto (cf. den Dikken 2003, Svenonius 2004):

(13) PathP
    \[ \text{Path} \rightarrow \text{PlaceP} \]
    \[ \text{Place} \rightarrow \text{Path} \]
    \[ \text{in} \rightarrow \text{to} \]
    \[ t_i \]
    \[ \text{DP} \]
    \[ \text{the house} \]

Dutch: DP complements of PlacePs headed by in, on move to spec PathP (cf. den Dikken 2003)

open issues: Why can Dutch onder and achter not appear as postpositions?
            Why is incorporation of English under and behind into to not possible?

Case inside German PPs

potential problem: not all directional PPs take accusative case
revised generalisation of Zwarts (2005b):

locative Ps + ACC: none
directional Ps + DAT: source: aus ‘out’, von ‘from’
genuine goal: nach ‘to’, zu ‘to’
directional Ps + ACC: genuine route: durch ‘through’, um ‘around’
derived route: über ‘over’
derived goal: an, auf, gegen(über), hinter, in, neben, über, unter, vor, zwischen

DAT with locatives and unambiguous source and goal (with all the ‘basic’ ones)

ACC with route and derived directionals

den Dikken (2003)
German accusative and dative case are assigned by the functional heads pathP and placeP, respectively. In directional contexts that trigger accusative case there is no placeP available and the DP complement of PP is assigned accusative case by path°.
contra: semantically there should be some place embedded under path

Zwart (2005a,b)
Accusative case on objects signals the presence of a subject and a dependency between subject and predicate rather than between predicate and object, as is traditionally assumed.

generalizing Zwart (2005a,b) to accusative case inside German directional PPs:
directional PPs are secondary, non-verbal predicates (e.g. Neelmen 1994)
subject of the non-verbal predicate: internal argument of the VP

Accusative case on the DP within the PP signals a subject-predicate dependency in analogue to the relation between nominative subjects and verbal predicates containing accusative DPs.
VECTOR SPACE SEMANTICS: PROJECTIVE VS. NON-PROJECTIVE LOCATIVE PREPOSITIONS

• Zwarts (2005a): locative (stative) vs. directional (dynamic) prepositions
• Zwarts & Winter (2000): semantics of locative prepositions

example: locative PP behind the house

set of vectors that go from the house to points behind it
location function assigns any physical entity in D its location in space – to derive sets of located vectors, mapping an e-type denotation of the reference object to a vector that describes its location or dimension

⇒ non-projective locative Ps: in, on, at

require only spatial knowledge about the location of figure and ground with respect to one another; defined as boundary vectors on sets of points:

(15) a. \( \text{in}^\prime = \lambda A. \lambda v. \text{int}(v, A) \) (Zwarts & Winter 2000, p. 4)
   b. \( \text{at}^\prime = \text{on}^\prime = \lambda A. \lambda v. \text{ext}(v, A) \land |v| < r_o \)

(with \( r_o \approx 0 \), \( A \) as a set of points, \( v \) as a boundary vector of \( A \))

⇒ projective locative Ps: over, under, behind

involve an axis modelled along three orthogonal unit vectors in the vector space \( V \) for up, right, front

(16) a. \( \text{under}^\prime = \lambda A. \lambda v. \text{ext}(v, A) \land c(-\text{up}, v) > |v_{\perp\text{up}}| \)
   b. \( \text{behind}^\prime = \lambda A. \lambda v. \text{ext}(v, A) \land c(-\text{front}, v) > |v_{\perp\text{front}}| \)

diagram:

additional axis element in the definition of projective modifiers enables directional (trajectory) reading
non-projective Ps need some additional structure to license a directional reading

other areas where axes play a role independently from projective prepositions:

• eventive and extent readings of extent verbs, degree achievements etc. (Gawron 2005)
• Fong’s (1997) diphasic locatives: the road (in)to / out of Ukiah (widens / narrows 5 feet at the wall).

open issue: Why can only English but not Dutch under, behind obtain a directional (trajectory) reading?

Presumably, English can make use of silent elements similar to the Dutch postposition door 'through' or langs 'along', whereas in Dutch these elements always have to be overtly expressed.

Svenonius (2004): silent to in cases where locative PPs can be directional

(17) The clouds raced beyond the city limits. (Svenonius 2004)

problem: is this really a goal reading (to)?

(18) The race car raced beyond the finish line. (goal)
6 SUMMARY AND OUTLOOK

- The difference between swim-verbs and put-verbs can be accounted for in terms of the event structure associated with them: put-verbs identify resPs, swim-verbs do not.
- In German, accusative case on the DP within the PP signals a subject-predicate dependency in analogue to the relation between nominative subjects and verbal predicates containing accusative DPs.
- An additional axis element in the definition of projective locatives like under or behind enables directional (trajectory) readings in English. With non-projective Ps, however, directional readings have to be licensed independently.

Can Germanic verbs encode path?
Yes. Talmy’s (1985) typology needs to be revised: different types can be found in one and the same language (see also Beavers 2004 for Japanese).

Can prepositions be ambiguous between a directional and a locative reading?
(Probably) no. Rather there are purely locative prepositions or purely directional prepositions.

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, additional lexical items etc.). However, projective locative Ps in English seem to be able to license some path since their lexical semantics involves an additional axis that can serve as an axis of change (see also Gawron 2005).

Some open issues

- Why can Dutch onder and achter not appear as postpositions? Why is incorporation of English under and behind into to not possible?
- Why can English but not Dutch under- and behind-phrases obtain a directional reading?
- What kind of verb is race? Is beyond different from under / behind? What is the role of the context?
- Is there a silent through with English under / behind?
- Do we want to make use of silent elements at all?
7 REFERENCES


den Dikken, Marcel (2003). On the syntax of locative and directional adpositional phrases. Ms. CUNY.


Svenonius, Peter (2004). Spatial P in English. Ms., University of Tromsø. (http://ling.auf.net/lingBuzz/)


8 APPENDIX: PREPOSITIONAL ASPECT (ZWARTS 2005)

directional Ps map the reference object to a set of sequences of vectors (paths), each of these sequences determines a potential change in position of the figure.

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

(20) A PP is bounded (telic) iff it does not have cumulative reference

(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 \(p+q \in X\).

concatenation: partial operation subject to the condition that the second path starts where the first path ends

atiec PPs are closed under sums, telic PPs are not

(22) 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

goal and source prepositions: transitions from one phase to another (Zwarts 2005):

(23) \{ p: there is an interval \(I \subset [0,1]\) including...
   (i) ... 0 and consisting of all the \(i \in [0,1]\) for which \(p(i)\) is at \(x\) \} = \([\text{from } x]\)
   (ii) ... 0 and consisting of all the \(i \in [0,1]\) for which \(p(i)\) is on \(x\) \} = \([\text{off } x]\)
   (iii) ... 0 and consisting of all the \(i \in [0,1]\) for which \(p(i)\) is in \(x\) \} = \([\text{out of } x]\)
   (iv) ... 1 and consisting of all the \(i \in [0,1]\) for which \(p(i)\) is at \(x\) \} = \([\text{to } x]\)
   (v) ... 1 and consisting of all the \(i \in [0,1]\) for which \(p(i)\) is on \(x\) \} = \([\text{onto } x]\)
   (vi) ... 1 and consisting of all the \(i \in [0,1]\) for which \(p(i)\) is in \(x\) \} = \([\text{into } x]\)