The Syntax and Semantics of Paths

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Contents of the course

1 Types of paths **1**
1.1 What is a Path? 1
1.2 Jackendoff's clasification of paths 2
1.3 A more fine-grained classification of paths 3
1.3.1 Transitional Paths 4
1.3.2 Non-transitional paths 5
1.3.3 Orientation of paths 7
1.3.4 Delimitation of paths 8
1.4 Classification of paths 9

2 Path and Place **13**
2.1 The basic structure of directional expressions: Path and Place 13
2.2 Spelling out the tree structure 15
2.3 Summing up 17

3 Decomposing Path **19**
3.1 Background assumptions 19
3.2 Goal vs Source paths 20
3.3 Routes vs Goal and Source paths 23
3.4 Transitional vs non-transitional paths 26
3.5 Delimited and non-delimited paths 28
3.6 Summing up 31

4 The semantics of Paths **33**
4.1 The semantics of Place 33
4.2 The semantics of Goal 34
4.3 The semantics of Source 34
4.4 The semantics of Route 35
4.5 The semantics of Scale 36
4.6 The semantics of Bound 39
4.7 Summing up 41

Lecture 1

Types of paths

1.1 What is a Path?

- Roughly speaking, this is an expression of some kind of motion through space.

(1) The children walked along the river.

  - motion proceeding along a trajectory roughly parallel to a given landmark (the river)
  - no specification of the starting point or the end-point of the journey
  - no information about the direction of the movement

(2) The mosquito flew away from the lamp

  - information about the direction of movement – it starts close to the landmark (the lamp), and proceeds in a manner such that the distance between the mosquito and the lamp increases.
  - no specification of the precise location of the starting point and the end-point of the movement
  - some information about the starting point – it is closer to the lamp than any subsequent point in the trajectory followed by the mosquito

(3) The frog jumped into the lake.

  - information about the direction of motion – the movement of the frog is directed towards the lake
  - precise end-point of the movement: it is in the lake
  - the precise starting point remains vague, negatively defined as being not in the lake

- The established term for such movement trajectories is **path** (Bennet 1975, Jackendoff 1983, van Riemsdijk and Huybregts 2002, Kracht 2002, Creissels 2006, Zwarts 2008, Svenonius 2010, den Dikken 2010).

- The entity which moves is commonly referred to as the **Figure** (*the children*, *the mosquito*, *the frog*) (Talmy 2000).

- The entity which is stationary and with respect to which the Figure moves or is located is called the **Ground** (*the river*, *the lamp*, *the lake*) (Talmy 2000).

- Other terms for Figure and Ground used in the literature on paths are **trajector** and **landmark**, respectively (Lakoff 1987, Langacker 1987).

- Each of the paths in (1) to (3) relates to some location.
  (1) — each of the points of the path are located *at the river*
  (2) — the location of the starting point of the path is not precisely defined, but we know that if the path is extended towards its beginning, then the starting point will end up being *at the lamp.*
  (3) — the end-point of the path is *in the lake.*

- Due to this relation between path and location, Jackendoff (1983) proposes that the conceptual structure of path-denoting phrases can be broken down into two ingredients – PATH and PLACE, the latter associated with the location.

- Formally, the conceptual structure underlying path expressions is respresented as shown below:

(4) $[_{\text{Path}}$ PATH-FUNCTION $[_{\text{Place}}$ PLACE-FUNCTION $[_{\text{Thing}}$ y]]]

- The Path-functions can be TO, FROM and VIA, the

- Place-functions can be IN, ON, UNDER, etc.

- The THING is the reference object, or the Ground.

- This is how this multi-layered structure applies to the path expressions in (1)-(3).

(5) a. $[_{\text{Path}}$ VIA $[_{\text{Place}}$ AT $[_{\text{Thing}}$ *the river*]]]
b. $[_{\text{Path}}$ FROM $[_{\text{Place}}$ AT $[_{\text{Thing}}$ *the lamp*]]]
c. $[_{\text{Path}}$ TO $[_{\text{Place}}$ IN $[_{\text{Thing}}$ *the lake*]]]

1.2 Jackendoff's clasification of paths

- Jackendoff (1983) suggests that there are three main types of paths:
  - **bounded** paths. Bounded paths include
    - Source paths: *from, out of*
    - Goal paths: *to, into*

    * The characteristic property of bounded paths is that the PLACE is an extreme point of the path – either its beginning, as in Source paths, or its end, as in Goal paths.
    * The sentence in (3) is an example of a bounded Goal path.
  - **directions**: Directions, too, can be subdivided into two subtypes
    * Source directions: *away from*
    * Goal directions: *towards.*
    * The difference between bounded paths and directions is that, in the case of the latter, the PLACE is not a point of the path, but would be if the path were extended some unspecified distance.
    * The example in (2) illustrates a Source direction.
  - **Route** paths are represented by the prepositions *along*, *through* and others.
    * Here the PLACE falls on some intermediate points of the path and the extreme points are left unspecified.
    * The sentence in (1) expresses such a Route path.

- Jackendoff distinguishes thus five types of paths, which can be schematically represented as follows:

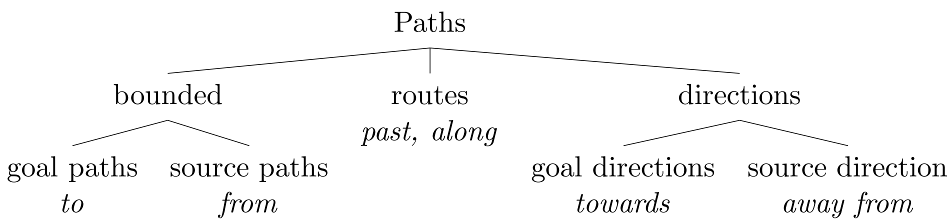


Figure 1.1: Jackendoff's (1983) typology of paths

1.3 A more fine-grained classification of paths

- In this class, we will investigate what types of paths there are and what properties each type has.

- Starting from the well established path-classification of Jackendoff (Figure 1.1), we will expand it, including into the picture more types of paths, some of which quite exotic.

- We will establish three differential properties of paths and will end up with eight types of paths in total.

1.3.1 Transitional Paths

- Let us begin with the last path expression in (3), repeated below as (6).

(6) The frog jumped into the lake.

- Properties of this path:
  - it has a direction, namely, it is oriented in the direction of the lake.
  - the lake is thus the **Goal** of the movement of the frog.
  - the end-point of the path is defined as being in the lake.
  - the starting point of the path, although not precisely located, is not in the lake.
  - Jackendoff (1983) calls such a path *bounded goal path*
  - Zwarts (2005; 2008) calls such a path *non-cumulative*
  - Zwarts represents such a path graphically like this:

(7) Goal path
$- - - - - + + + + +$
0 1 Zwarts (2008)

  - the plusses indicate location in the lake, and the minuses indicate location not in the lake.
  - the points 0 and 1 mark the starting point and the end-point of the path, respectively.
  - the *into the lake* path has a two stage structure: the first stage is not located *in the lake*, while the second stage is located *in the lake.*
  - the path thus contains a **transition** from one spatial domain to a complementary spatial domain.
  - Lets then call this path **transitional**.
  - Since it is Goal-oriented, the full label is **transitional Goal path**

- The same type of transition is expressed in the following sentence.

(8) The frog jumped out of the lake.

- This path is in a sense the opposite of the path in (6).
  - the location *in the lake* is not the end-point of the movement of the frog, but its starting point.
  - the lake is thus the **Source** of the motion.
  - no precise definition of the end-point of the path

– the Source path in (8) can be thus seen as the reverse of the Goal path in (6), as it includes a transition too, but, contrary to Goal paths, imposes a condition on the initial portion of the path.
– This kind of paths are visualized by Zwarts (2005; 2008) as in (9).

(9) Source path
$+ + + + + - - - - - -$
0 1 Zwarts (2008)

– this is a **transitional Source path**

- There is no restriction that there be only one transition per path.

(10) The boy ran past the tree.

– the path represented by the directional expression in (10) has some intermediate points *at the tree*.
– the starting point and the end-point of the path remain unknown
– adopting Jackendoff's (1983) terminology, I will call this path a Route path.
– since it has transitions, the full name is a **transitional Route path**
– According to Zwarts (2005; 2008), such paths involve a condition on their middle part and can be graphically represented as follows.

(11) Route path
$- - - - + + + + - - - - -$
0 1 Zwarts (2008)

- To sum up, so far we established that there are transitional paths which are subdivided in transitional Goal paths, transitional Source path and transitional Route paths.
- They all have at least one and maximally two transitions.
- They all have just one positive phase.

1.3.2 Non-transitional paths

- It is not always the case that the PLACE to which the path refers falls on the path.

(12) a. John ran to the house. (*transitional path*)
b. John ran towards the house. (*direction*)
(Jackendoff 1983:165)

- In (12a), John has reached the house, that is, the endpoint of John's path is *at the house*.

- In (12b), John probably hasn't reached the house, therefore, the location *at the house* is not a point on the path. However, it would be if the path were extended.
- The transitional path in (12a) and the "direction" path in (12b) have something in common — they are both Goal-oriented.
- Transitional Source paths also have corresponding Source-oriented directions, as shown below.

(13) a. John ran from the house. (*transitional path*)
b. John ran away from the house. (*direction*)
(Jackendoff 1983:165)

- Jackendoff (1983) calls such paths *directions*.
- Zwarts (2005; 2008) calls them *comparative*.
- Graphically, Zwarts represents comparative path as shown below, where the deeper shade of gray corresponds to a nearer location to the house

(14) *towards*-path
+ + + + + + + + +
0 1 Zwarts (2008)

(15) *away from*-path
+ + + + + + + + +
0 1 Zwarts (2008)

- The Zwartsian graphic representation of the *towards* and *away from* paths in (15) and (14) involves plusses.
- Jackendoff (1983), however, suggests that the location to which a *towards* path and an *away from* path refer does not fall on the path.
- Therefore, it seems more appropriate to represent such kinds of paths as a sequence of minuses in order to indicate that at no point in the path is the Figure located at the Ground.
- The representation for a *towards* and an *away from* path will then be as in (16) and (17), respectively, where the deeper shade of gray on a minus indicates a greater distance from the Ground object.

(16) *towards*-path
− − − − − − − − −
0 1

(17) *away from*-path
– – – – – – – – – –
0 1

- Let us call this type of paths **non-transitional**. The path in (16) is a **non-transitional Goal path**. The path in (17) is a **non-transitional Source path**.
- There are also non-transitional Route path.

(18) The children walked along the river.

- Zwarts (2008) proposes the following representation of such a path is shown, where every plus indicates a location at the river.

(19) *along*-Path
+ + + + + + + + + +
0 1 Zwarts (2008)

- The reason is that any of the points in the path *along the river* is *at the river*.

1.3.3 Orientation of paths

- So far, we have been looking at the division of paths into types, depending on whether they have or do not have the property *transition*.
- Paths can also be categorized depending on whether they have the property *orientation*.
- There are **non-oriented** paths, namely Route paths, where there is no indication as to the direction of the movement.
- There are **oriented** paths, where we know in what direction the movement proceeds.
- Source and Goal paths are examples of oriented paths.
- Oriented paths involve some asymmetry concerning the two extreme points of the path.
- Non-oriented (i.e., Route) paths have both extreme points equally defined.
  - In transitional Route paths both the starting and the end-point are not located in the region the path relates to, see (11).
  - In non-transitional Route paths, both the starting point and the end-point are located in the region the path relates to, see (19).

1.3.4 Delimitation of paths

- Consider the path encoded by the complex preposition *up to* in the English sentence in (20).

(20) The boy ran up to the house.

- In (20), the boy traverses a path that is oriented towards the house and terminates right before it.
- Such paths are referred to as **terminative**.
- The Terminative path in (20) is quite similar to the one in (21).

(21) The boy ran to the house.

- With the two differential properties of paths we have —transition and orientation—the sentences in (20) and (21) come out as synonymous.
- Still, there is a difference in the meaning—with *up to*, it is made explicit that the house is the limit of the boy's running.
- Terminative paths explicitly state that the Ground is the boundary of the movement.
- We can then assume that Terminative paths set the end of the path at the first point where the location to which the path relates is reached.
- The positive phase of a Terminative path thus contains a unique plus.

(22) *up to*-path
$- - - - - - - - - - +$
0 1

- The positive phase of non-terminative Goal paths, by contrast, contains a sequence of plusses, reflecting the fact that the path can "continue" within the location.

(23) *to*-path (repeated from (7))
$- - - - - + + + + +$
0 1

- Since Source paths are the opposite of Goal paths, we expect that there are "reversed Terminative paths"
- In such reversed Terminative paths, the "delimitation" will have to hold of the beginning of the Source path, because it is the positively located point. This will give rise to a path meaning *starting from*.
- The Egressive case in Permic languages has such a meaning.

(24) a. Célʲadʲ lóktënï škóla-išʲ.
children come school-ELAT
'The children are coming from school.'

b. Volgograd-šʲanʲ Elʲba vá-ëdz
Volgograd-EGR *Elba river*-TERM
'from Volgograd to Elba river'

- Graphically, then, such an Egressive (i.e., *starting from*) path can be represented as in (25).

(25) *starting from*-path
$+ - - - - - - - - - -$
0 1

- It contrasts with ordinary transitional *from*-paths in that the positive phase contains just one point.

(26) *from*-path
$+ + + + + - - - - - -$
0 1

- Summing up, Terminative and Egressive paths differ from their non-delimited counterparts in the number of plusses in their positive phase, which is either at the end or at the beginning of the path.
- In Route paths, the extreme points 0 and 1 are not in a locative relation with the Ground — the Ground cannot be set as the initial or final boundary for any of them.
- Even if the positive phase of a Route path contains just one plus it will not be a positively defined *extreme* point and cannot be interpreted as a limit for movement.

(27) $- - - - + - - - - - -$
0 1

- A parallel reasoning leads to the conclusion that a Source path can be only upper bound and a Goal path can be only lower bound.

1.4 Classification of paths

- We established three differential properties of paths: orientation, transition and delimitation.
- *Presence* or *lack of orientation*: Paths can be oriented or non-oriented. The oriented paths are subdivided into Source-oriented or Goal-oriented. Source paths can be seen as "reversed" Goal paths.

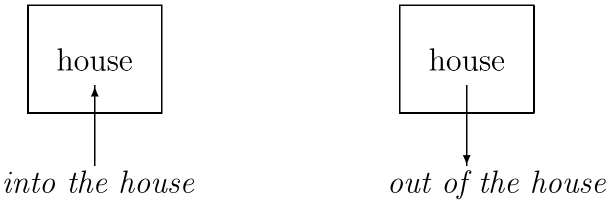


Figure 1.2: Source paths as reversed Goal paths

- The non-oriented (Route) paths have no inherent directionality and therefore they can be reversed without any meaning difference.

Figure 1.3: Reversibility of Route paths

- *Presence* or *lack of transition(s)*: Paths with transitions have two sub-types:
  - *transitional* paths
  - *delimited* paths: this property applies only to oriented (Goal and Source) paths and involves paths with an explicit boundary.
  - Route paths do not have a delimited subtype, because they do not specify the location either of the starting point or of the endpoint

- The interaction of the three properties of paths leads to eight distinct types of paths. Lets assume the following terminology:

(28) Path terminology

a. Coinitial – transitional Source-oriented path, e.g., *from the house*
b. Egressive – delimited Source-oriented path, e.g, *starting from the house*
c. Recessive – non-transitional Source-oriented path, e.g., *away from the house*
d. Cofinal – transitional Goal-oriented path, e.g., *to the house*
e. Terminative – delimited Goal-oriented path, e.g., *up to the house*
f. Approximative – non-transitional-Goal oriented path, e.g., *toward the house*
g. Transitive – transitional Route path, e.g., *past the house*
h. Prolative – non-transitional Route path. e.g., *along the house*

- An overview is presented in Table 1.1.

		Oriented		Non-oriented
		Goal	Source	Route
With transition	Transitional	Cofinal *to X* −−−−++++ 0 1	Coinitial *from X* ++++−−−− 0 1	Transitive *past X* −−−+++−−− 0 1
	Delimited	Terminative *up to X* −−−−−−−+ 0 1	Egressive *starting from X* +−−−−−−− 0 1	
No transition	Non-transitional	Approximative *towards X* −−−−−−−−−− 0 1	Recessive *away from X* −−−−−−−−−− 0 1	Prolative *along X* ++++++++++ 0 1

Table 1.1: Classification of paths

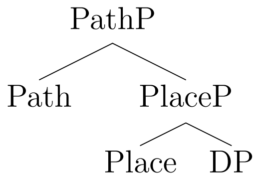
Lecture 2

Path and Place

2.1 The basic structure of directional expressions: Path and Place

- The syntactic structure underlying directional spatial expressions is commonly assumed to involve at least two projections (van Riemsdijk 1990, van Riemsdijk and Huybregts 2002, Koopman 2000, Svenonius 2010, den Dikken 2010):
  - a Place projection encoding static location
  - a Path projection, where we find directional markers
- Thus, there is a general agreement that the minimal syntactic structure for directionals looks like this:

(1)



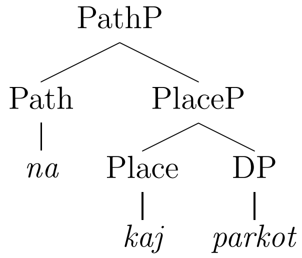
- The two syntactic positions in the structure in (1) have direct morphological counterparts in many languages.

(2) Macedonian (data provided by Eva Piperevska, p.c.)

a. Kaj parkot sum.
at *park*.DEF *be*.1SG
'I am at the park.'

b. Odam na-kaj parkot.
go.1SG *to-at* *park*
'I am going to the park.'

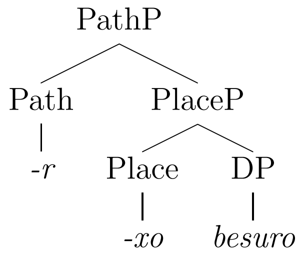
(3)



- The same mapping of morphemes onto syntactic structure is found in languages where spatial expressions are formed by means of case affixes.

(4) Tsez (data from Comrie and Polinsky 1998)
  a. besuro-xo
     fish-at
     'at the fish'
  b. besuro-xo-r
     fish-at-to
     'to the fish'

(5)

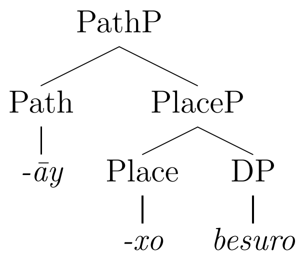


- The Path head is standardly assumed to be the host for directional elements expressing all kinds of paths.

- Hence, we find there, for example, Goal-encoding, Source encoding, Route-encoding, etc. morphemes.

(6) besuro-x-āy
    fish-at-from
    'from the fish'

(7)



- To sum up, there is a general consensus that directional expressions are built on top of locative expressions by adding to the locative structure the directional head Path.

- In many languages this is morphologically transparent.

Language	Genus	Location	Goal	Source	Reference
Garo	Baric	*-o*	*-o-na*	*-o-ni*	Burling (2003)
Estonian	Finnic	*-l*	*-l-le*	*-l-t*	Viitso (1998)
Lezgian	Lezgic	*-q*^{h}	*-q*^{h}*-di*	*-q*^{h}*-aj*	Haspelmath (1993)
Mwotlap	Oceanic	*l(V)*	*a l(V)*	*m*^{w}*ɛ l(V)*	Crowley (2002)
Yanesha	Arawakan	*-o*	*-o-net*	*-o-t*^{y}	Duff-Tripp (1997)

Table 2.1: Morphological containment of locative expressions inside directional expressions

- The two heads in the syntactic structure of directional expressions – Place and Path – presupposes also a semantic "decomposition" of directionals, as each of the heads in the syntactic structure is expected to have some semantic contribution
- This idea is developed in the work by Kracht (2002; 2007) and Zwarts (2005; 2008).

		IN	ON	AT
Source Ps	p(0)	*out of*	*off*	*from*
Goal Ps	p(1)	*into*	*onto*	*to*
Route Ps	p(i)	*through*	*across*	*past*

Table 2.2: Relation between paths and locations (Zwarts 2005)

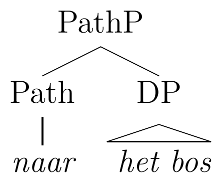
- Zwarts' semantics for paths is clearly compositional and can be made to converge with the structure [Path [Place DP]].
  - the IN/ON/AT bit is the semantic contribution of the Place head
  - the semantic content of the Path head specifies whether the locative condition encoded by the Place head holds of the starting point p(0), the end point p(1) of the path, or some intermediate point p(i)

2.2 Spelling out the tree structure

- So far, we examined languages where directional spatial expressions are built of two independent morphemes, each of which spells out one head in the tree.
- What happens in languages where path expressions involve only one morpheme?

(8) Dutch (den Dikken 2010)
naar het bos
to the woods

- One way to deal with the mismatch between the number of morphemes and the number of heads is to assume that the syntactic structure for directional expressions in Dutch does not contain two heads but just one.

(9)


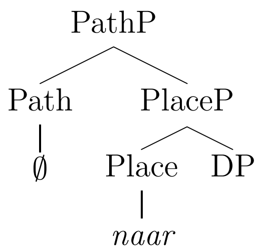
- This goes against Chomsky's (2001) *Uniformity Principle.*

(10) *Uniformity Principle* (Chomsky 2001:2):
In the absence of compelling evidence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances.

- It is therefore preferable to assume that, *in all languages*, the syntactic structure of directional expressions involves a Path projection taking as a complement a Place projection.

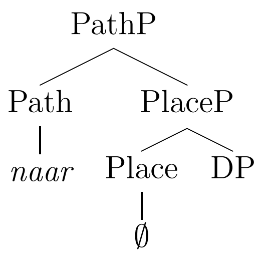
- How do we deal with Dutch, then. There are three possibilities.

  – Possibility 1: the preposition *naar* is merged under the Place head and the Path head is occupied by a silent directional preposition, as suggested in Koopman (2000).

  (11)
  

  Untenable, as it predicts that *naar* can also function as a locative preposition, contrary to the facts.

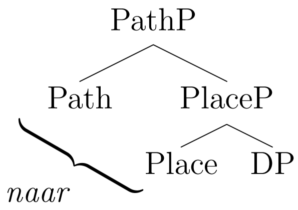
  – Possibility 2: the preposition *naar* is merged under the Path head and the Place head is occupied by a silent locative preposition, as suggested in den Dikken (2010).

  (12)
  

  This solution requires the availability of a silent locative preposition. This locative preposition, however, never surfaces in the absence of a strictly directional preposition.

– Possibility 3: the preposition *naar* spells out simultaneously the Path and the Place head (Caha 2010).

(13)



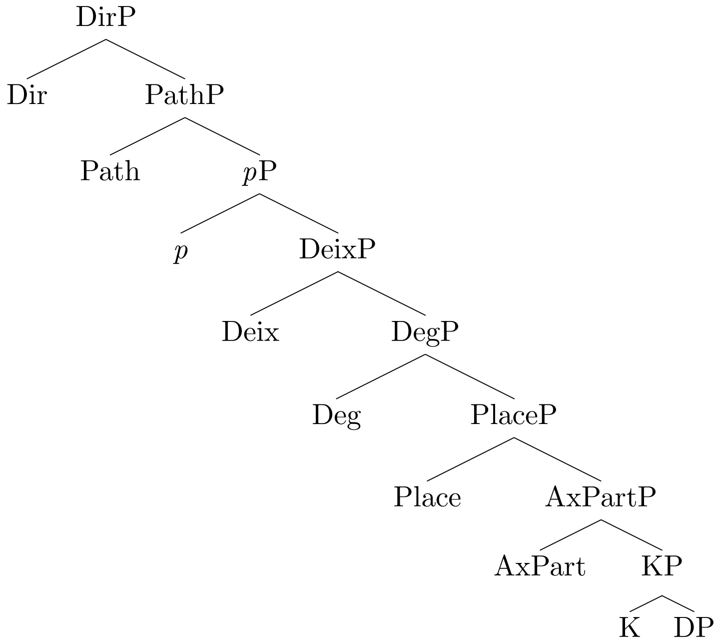
The Spell-out of multiple heads by one morpheme is assumed to be possible by Williams (2003), Borer (2005a;b), Ramchand (2008).

This is also one of the main tenets of the Nanosyntax framework (Starke 2005-2009, Fábregas 2007, Abels and Muriungi 2008, Muriungi 2008, Lundquist 2008, Caha 2009, Taraldsen 2010, Pantcheva 2010, for a representative collection of papers see Svenonius et al. 2009).

2.3 Summing up

- The syntactic structure of spatial directional expressions contains a Path head and a Place head.
- The Place head hosts morphemes that express locative spatial relations (*on, in, behind*)
- The Path head hosts morphemes that express paths (*from, towards, through*)
- In languages where directional spatial expressions are monomorphemic, the single morpheme lexicalizes both the Place and the Path head.
- Path and Place are not the only syntactic projections directional phrases consist of. To name a few others:
  - Koopman (2000) argues for a Deg head accommodating measure phrases
  - den Dikken (2010) proposes a Deix head for deictic elements
  - Svenonius (2006) proposes an AxPart for spatial elements encoding notions like INTERIOR, TOP, BEHIND, e.g., *front* in *in* **front** *of*.
  - For example, consider the structure proposed in Svenonius (2010).

(14)


DirP
Dir
PathP
Path
*p*P
p
DeixP
Deix
DegP
Deg
PlaceP
Place
AxPartP
AxPart
KP
K
DP

Lecture 3

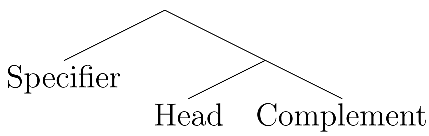
Decomposing Path

- The situation so far:
  - There are eight distinct types of paths.
  - There is one Path head to host morphemes expressing all these paths.
- In this lecture, we will examine how various paths are expressed across languages.
- The result:
  - The Path head can be decomposed into many heads.
  - Each type of path has a unique syntactic structure.

3.1 Background assumptions

- Assumption 1: There is a rigid Specifier-Head-Complement order (Kayne 1994).

(1)



- Assumption 2: Each morpheme corresponds to at least one independent syntactic head.
  - Ergo: whenever we are able isolate a morpheme in a given expression, this is an indication that there is at least one syntactic head corresponding to that morpheme in the tree structure underlying that expression.
- Assumption 3: Syntactic structure is universal.
  - Ergo: a syntactic head that is established on the basis of morphological data in a given language is universally present in all languages, even those which do not offer morphological evidence for its existence.

3.2 Goal vs Source paths

- Let us start with an investigation of the oriented paths: Goal and Source paths.
- We will focus on the following paths, leaving aside the rather rare delimited paths.

	Goal-oriented	Source-oriented
Transitional	Cofinal (*to*)	Coinitial (*from*)
Non-transitional	Approximative (*towars*)	Recessive (*away from*)

Table 3.1: Goal and Source paths

- In the majority of languages Goal and Source paths are encoded by elements of equal complexity.
  - In Scottish Gaelic both the Goal and the Source marker are monomorphemic.

(2) Scottish Gaelic (MacAulay 1992)

a. **gu** bocsa
to box
'to (a) box'

b. **bho** bocsa
from box
'from (a) box'

  - In Tsez, both the Goal and Source marker are bi-morphemic.

(3) Tsez (Comrie and Polinsky 1998)

a. besuro-**xo-r**
fish-at-to
'to the fish'

b. besuro-**x-āy**
fish-at-from
'from the fish'

- There are, however, languages where the morphological equality between Goal and Source markers does not hold.

(4) Imbabura Quechua (Cole 1985:119)

a. Utavalu-pi kawsa-ni.
Otavalo-LOC *live*-1
'I live in Otavalo.' (Location)

b. Utavalu-**man** ri-ni.
Otavalo-ALL *go*-1
'I go to Otavalo.' (Goal)

c. Utavalu-**manda** shamu-ni.
Otavalo-ABL *come*-1
'I come from Otavalo.' (Source)

- The Allative marker in Imbabura Quechua is *-man*, while the Ablative marker is *-manda* – it seems that the Ablative marker contains the Allative marker.

- Another language with a containment relationship between the Source marker and the Goal marker is Chamalal.

(5) Chamalal (Magomedbekova 1967b)

a. mik^{y}i-l-a
road-ON-LOC
'on the road' (Location)

b. mik^{y}i-l-**u**
road-ON-ALL
'onto the road' (Goal)

c. mik^{y}i-l-**u-r**
road-ON-ALL-ABL
'off the road' (Source)

- These were examples where a Coinitial path contains a Cofinal path, i.e., a transitional Source path contains a transitional Goal path.

- What about non-transitional Goal and Source path?

- The Source-oriented Recessive paths contain the Goal-oriented Approximative paths.

(6) Dime (Mulugeta 2008)

a. šiftaye taddeseka-**bow** tiŋ-i-n.
Shiftaye Taddese.COM-DIR *go*-PERF-3
'Shiftaye went towards Taddese.'

b. šiftaye taddeseka-**bow-de** ʔád-i-n.
Shiftaye Taddese.COM-DIR-ABL *come*-PERF-3
'Shiftaye came from the place where Taddese is found.'

(7) a. **kəm** kəshta-ta
towards house-DEF
'towards the house, in the direction of the house'

b. **ot-kəm** kəshta-ta
from-towards house-DEF
'from the direction of the house'

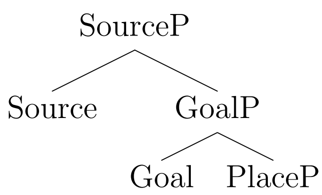
- An overview of languages where Source paths morphologically contain Goal paths is presented in Table 3.2.

Language	Location	Goal	Source	Reference
Bulgarian	*pri*	*kəm*	*ot-kəm*	Pashov (1999)
Dime	*-se*	*-bow*	*-bow-de*	Mulugeta (2008)
Chamalal	*-i*	*-u*	*-u-r*	Magomedbekova (1967b)
Ingush	*-ğ*	*-ga*	*-ga-ra*	Nichols (1994)
Jingulu	*-mpili*	*-ŋka*	*-ŋka-mi*	Blake (1977)
Mansi	*-t*	*-n*	*-n-əl*	Keresztes (1998)
Quechua	*-pi*	*-man*	*-man-da*	Jake (1985), Cole (1985)
Uchumataqu	*-tá*	*-ki*	*-ki-stani*	Vellard (1967)

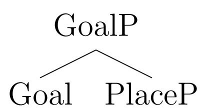
Table 3.2: Languages where the Source marker morphologically contains the Goal marker

- Importantly, there is evidence that many of the elements which attach to the Goal marker in the Source expression serve as an independent morpheme.
- Under the assumption that the presence of a morpheme always indicates the presence of a corresponding syntactic head, the syntactic structure of Source expressions should embed the syntactic structure for Goal expressions.

(8) a. Source phrase:

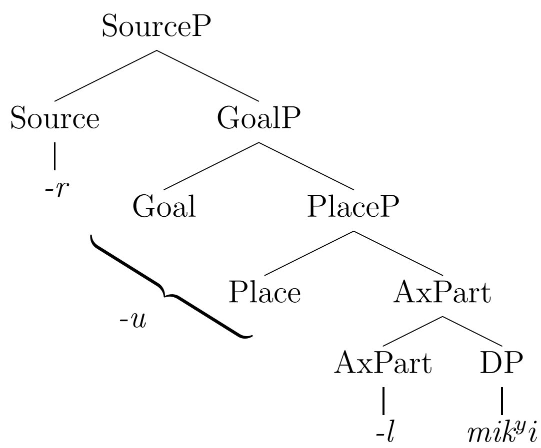


b. Goal phrase:



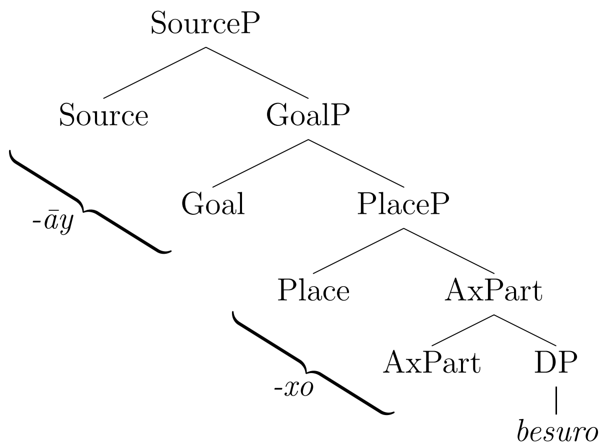
- The diagram in (9) shows how the syntactic structure for Sources is mapped to the morphological composition of the Chamalal Source expression *mik^y i-l-u-r* 'off the road':

(9)



- Syntactic structure is universal, hence, the structure in (8a) applies to all languages, including those where the containment relationship is not evident.
- In such languages the Source marker lexicalizes both the Goal and the Source heads. Example in (10) from Tsez:

(10)



3.3 Route paths versus Goal and Source paths

- The split within the oriented paths into Source and Goal-oriented ones has a morpho-syntactic reflex.
- Does the division between oriented and non-oriented path also have a morpho-syntactic reflex?

	Oriented	Non-oriented
Transitional	Cofinal (*to*) & Coinitial (*from*)	Transitive (*via*)
Non-transitional	Approximative (*towards*) & Recessive (*away from*)	Prolative (*along*)

Table 3.3: Oriented and non-oriented path

- We will follow the same approach – a cross-linguistic study of the morphological composition of markers expressing non-oriented paths.
- In Slovak, Route markers morphologically contain Goal markers.
- Consider first the *pod*-PP in a Goal path (P.Caha, p.c.).

(11) Slamu dal **pod** stôl-∅.
hay *put*.3SG *under* *table*-ACC
'He put the hay under the table.'

- To make a Route phrase, the morpheme *po* is added (P.Caha, p.c.).

(12) Na Forum Romanum vstupujeme **po-pod** oblúk-∅ Tita.
*On Forum Romanum.*ACC *enter.*1PL *po-under arch-*ACC *of.Tito*
'We entered the Forum Romanum by going under Tito's arch.' (lit.: via under)

- The data from Slovak suggests that Route paths are "bigger" than Goal paths.
- Given that Source paths are also "bigger" than Goal paths, a legitimate question arises: Is there a relationship between Route and Source paths?
- The answer is "yes" – Route paths are "bigger" than Source paths.
  - Akhvakh: Route paths are formed by the addition of the morpheme *-ne* to the Ablative (Source) case ending *-u*, thus deriving the complex Translative (Route) case ending *-u-ne* (Magomedbekova 1967a).
  - Table 3.4 presents the case system in Akvakh, based on data in Magomedbekova (1967a).

	Series	Location	Goal	Source	Route
on	*-g*	*-g-e*	*-g-a*	*-g-u*	*-g-u-ne*
at, near	*-x*	*-xar-i*	*-lir-a*	*-xar-u*	*-xar-u-ne*
at	*-q*	*-q-e*	*-q-a*	*-q-u*	*-q-u-ne*
in	*-l'*	*-l'-i*	*-l'-a*	*-l'-u*	*-l'-u-ne*
under	*-t*^{ə}	*-t*^{ə}*-i*	*-t*^{ə}*-a*	*-t*^{ə}*-u*	*-t*^{ə}*-u-ne*

Table 3.4: Spatial case system in Akhvakh (Magomedbekova 1967a)

  - Avar: the Route case (called Perlative) is formed by suffixing the Ablative case marker with the element *-n* (Uslar 1889, Charachidzé 1981, Blake 1994).
  - The data is shown in Table 3.5.

	Series	Location	Goal	Source	Route
on (top of)	*-da*	*-da*	*-d-e*	*-da-ssa*	*-da-ssa-n*
at	*-q*	*-q*	*-q-e*	*-q-a*	*-q-a-n*
under	*-ƛ'*	*-ƛ'*	*-ƛ'-e*	*-ƛ'-a*	*-ƛ'-a-n*
in, among	*-ƛ*	*-ƛ*	*-ƛ-e*	*-ƛ-a*	*-ƛ-a-n*
in a hollow object	*-∅*	*-∅*	*-∅-e*	*-∅-ssa*	*-∅-ssa-n*

Table 3.5: Spatial case system in Avar (Blake 1994)

- Let ">" represent the transitive relationship of morphological containment.

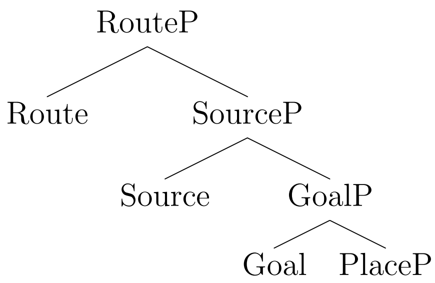
(13) a. Source path > Goal path
b. Route path > Goal path
c. Route path > Source path

- The pairs in (13) give rise to the following linear order:

(14) Route path > Source path > Goal path

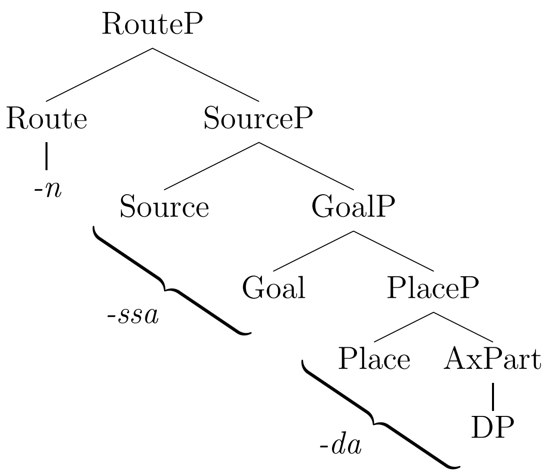
- Translated into syntactic structure, this order gives the following tree:

(15)



- Applied to the Avar data, the morphemes map onto the syntactic terminals in the following way (taking as an example the AT-series marked by *-da*).

(16)



3.4 Transitional versus non-transitional paths

	Transitional	Non-transitional
Goal	Cofinal (*to*)	Approximative (*towards*)
Source	Coinitial (*from*)	Egressive (*away from*)
Route	Transitive (*via*)	Prolative (*along*)

Table 3.6: Transitional and non-transitional paths

- It is a very common phenomenon cross-linguistically that non-transitional paths are more complex than the corresponding paths expressing transition – consider English *to* and *towards*.
- Tabasaran and Avar have special morphemes that attach
  - to a noun marked by the Allative (Goal) case to express a non-transitional Goal (*toward*) path.
  - to a noun marked by the Ablative case (Source) case to express a non-transitional Source oriented (*away from*) path.

	Goal	Source
Trans	*-de*	*-da-ssa*
Non-trans	*-de-ɣun*	*-da-ssa-ɣun*

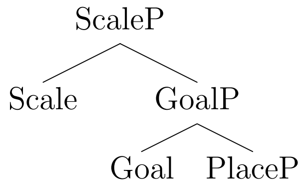
Table 3.7: Transitional and non-transitional paths in Avar (Uslar 1889)

	Goal	Source
Trans	*'-na*	*'-an*
Non-trans	*'-na-di*	*'-an-di*

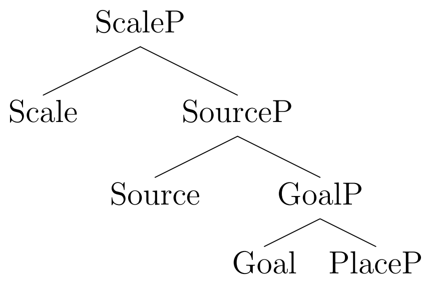
Table 3.8: Transitional and non-transitional paths in Tabasaran (Hanmagomedov 1967)

- Tabasaran and Avar clearly illustrate that non-transitional Goal and Source paths are built on top of the corresponding transitional paths.
- Drawing a parallel between oriented paths (Goal and Source) and non-oriented paths (Route), one would expect that non-transitional Route (Prolative) paths, too, are formed on the basis of transitional Route (Transitive) paths
- No data. Route paths are not routinely included in grammar descriptions and such data is not easily accessible.
- Let us assume the existence of a special Scale head that comes on top of any transitional path structure and turns it into a non-transitional path.

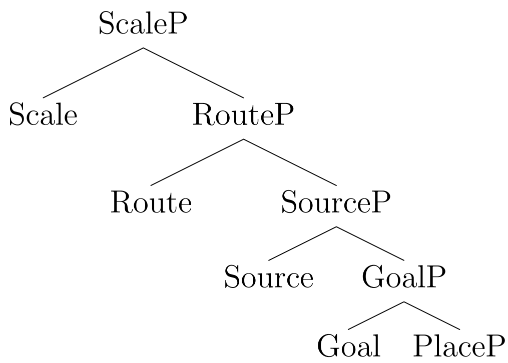
(17) a. Non-transitional Goal (Approximative) paths



b. Non-transitional Source (Recessive) paths

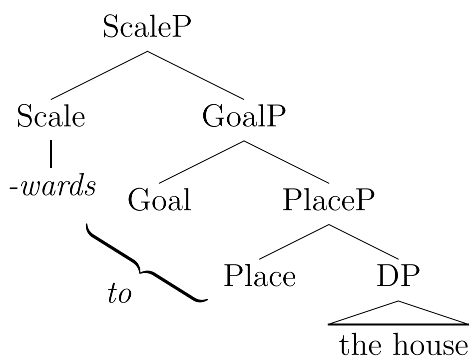


c. Non-transitional Route (Prolative) paths



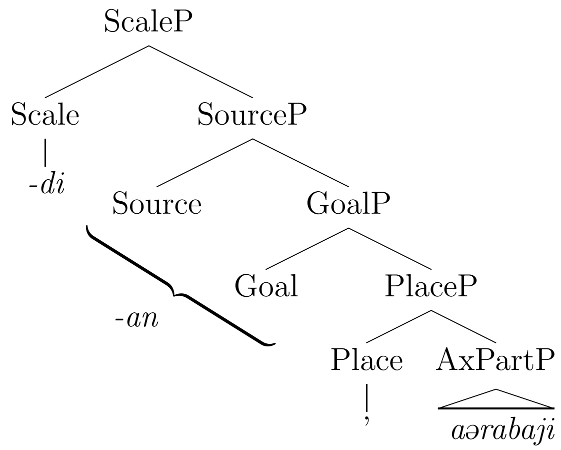
- In the English Approximative expression (*towards*), the morphemes are mapped to the syntactic structure like this:

(18)



- The morphological composition of the Tabasaran Recessive expression is mapped to the syntactic structure like this:

(19)



3.5 Delimited and non-delimited paths

- Let us now turn to the last dividing property of paths and see whether it has a morpho-syntactic reflex.

	Non-delimited	Delimited
Goal-oriented	Cofinal (*to*)	Terminative (*up to*)
Source-oriented	Coinitial (*from*)	Egressive (*starting from*)

Table 3.9: Delimited and non-delimited paths

- In many languages, Terminative paths are formed on the basis of Cofinal paths.

(20) Basque (Ibarretxe-Antuñano 2004)

a. etxe-**ra**
house-ALL
'to the house'

b. etxe-**raino**
house-TERM
'up to the house'

(21) Veps (Zajtseva 1981)

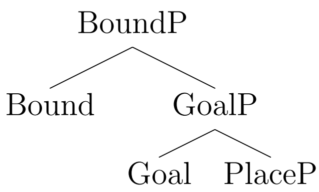
a. mec-**ha**
forest-ALL
'to the forest'

b. mec-**hasei**
forest-TERM

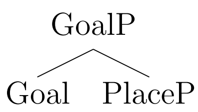
‘up to the forest’

- Both in Basque and in Veps the Terminative case suffix is complex and consists of the Goal suffix (*-ra* in Basque, *-ha* in Veps) and a “delimiting” morpheme (*-ino* in Basque, *-sei* in Veps).
- Since we can identify a separate terminative morpheme, this suggests the presence of at least one syntactic head in the structure which corresponds to the morpheme.
- Let’s label this head Bound.

(22) a. Delimited Goal (Terminative) paths

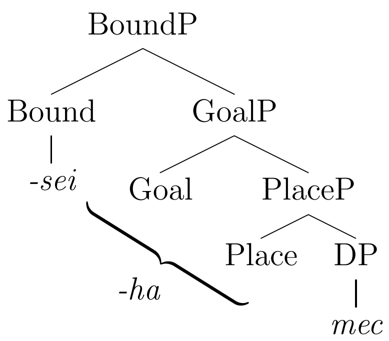


b. Non-delimited Goal (Cofinal) paths



- Terminative paths in the Veps:

(23)



- Let us now turn to Egressive paths.
- In Udmurt, the Egressive case ending *-i̮śen* morphologically contains the Elative case *i̮ś*, marking Coinitial paths.

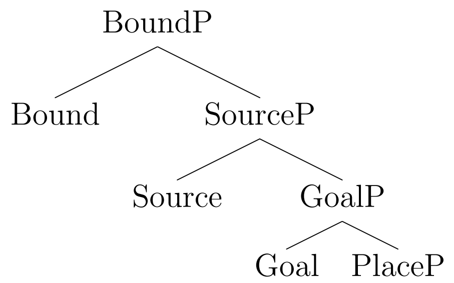
(24) Udmurt (Winkler 2001)

a. anaj gurt-**iś** pot-i-z.
mother village-EL *leave*-PRET-3SG
'Mother came out of the village.'

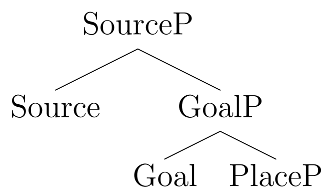
b. Ižkar-**iśen** Moskva-oź pojesdn-en min-i.
Iževsk-EGR *Moscow*-TERM *train*-INSTR *go*-PRET.1SG
'I went by train from Iževsk to Moscow.'

- The Egressive case marker *-en* lexicalizes the Bound head in delimited Source paths.

(25) a. Delimited Source (Egressive) paths

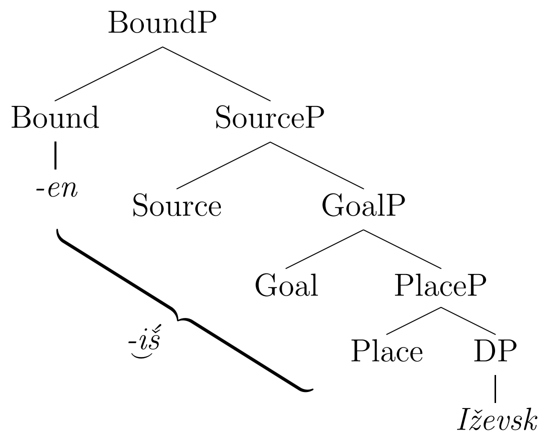


b. Non-delimited Source (Coinitial) paths



- The lexicalization of the structure in Udmurt:

(26)

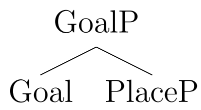


- In sum, delimited Goal and Source paths involve a special head Bound, that takes as a complement the corresponding non-delimited path.

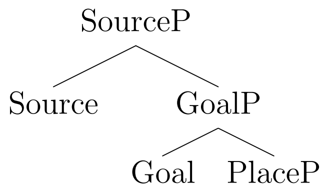
3.6 Summing up

- We established that in some languages:
  - Source paths morphologically contain Goal paths.
  - Route paths morphologically contain Source paths.
  - Non-transitional paths morphologically contain the corresponding transitional path.
  - Delimited paths morphologically contain the corresponding non-delimited path.
- Thus, each of the divisions in the path typology is brought about by a special head in the syntactic structure.
- Each type of path has a unique syntactic structure.
- For instance, the syntactic structure of paths varies depending on whether we have a Goal-oriented path, a Source-oriented path, or a non-oriented (Route) path.

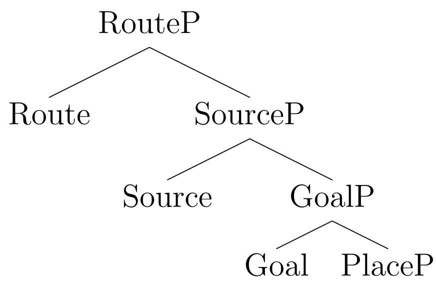
(27) a. Goal paths



b. Source paths

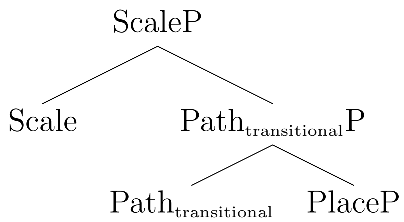


c. Route paths



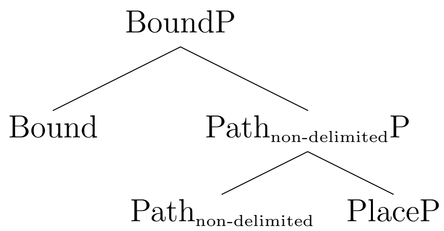
- The syntactic structure for non-transitional paths embeds transitional paths.

(28) Non-transitional paths



- Similarly, the structure for delimited paths embeds the non-delimited paths.

(29) Delimited paths



- These structures are universal across languages, although in many languages the real number of heads in the structure is obscured by lexicalization.

Lecture 4

The semantics of Paths

- In the previous lecture, we established the existence of multiple heads, which are part of the syntactic structure of paths: Goal, Source, Route, Scale, and Bound.
- In this lecture, we investigate the particular semantic function of each of these heads.

4.1 The semantics of Place

- Locative phrases are commonly analyzed in terms of *regions* (Wunderlich 1991, Herweg and Wunderlich 1991, Nam 1995, Kracht 2002; 2008, Svenonius 2008)
- Regions are modeled as contiguous sets of points in space.
- For instance, Wunderlich (1991) defines a function *p*, which gives for each Ground object the set of points it occupies (its *eigenspace*).
- He then defines a family of functions that give for each Ground object a set of surrounding or neighboring regions.
- Example:
  - EXT[v] is the external region of the Ground object (marked by v)
  - INT[v] is the internal region of the Ground object.
  - Interior location is then defined as in (1), where the Figure is u and the Ground is v.

    (1) $\langle u,v \rangle \in ||in||$ iff $p[u] \subseteq \textsc{int}[v]$

  - In simple words, u is in(side) v, iff the eigenspace of u is a subset of the region internal to v.

4.2 The semantics of Goal

- Recall the graphic representation of Goal paths (Zwarts 2008).

(2) John went into the house.

(3) Goal paths
$- - - - - + + + + +$
0 1
J. is not in the house John is in the house

- The minuses and plusses in (3) can be seen as an atemporal sequence of locations.
- The graphic representation in (3) contains a *transition* from a negative phase, where the locative relation between the Figure *John* and the Ground *house* does not hold, to a positive phase, where the locative relation between Figure and Ground holds (John is in the house).
- The Goal head can then be taken to encode **transition** from one region to another.
- Wunderlich (1991), Fong (1997), Zwarts (2005; 2008), Kracht (2008) all have transitions as part of the (Goal and Source) path semantics in one way or another.
- The transition encoded by the Goal head is *to* the spatial region encoded by the Place projection in its complement. The location denoted by PlaceP consequently holds of the end-point p(1) of the Goal path.

4.3 The semantics of Source

- Goal paths and Source paths are constructed in the same way — they both have a transition — but are the mirror images of each other.

(4) John went out of the house.

(5) Source paths
$+ + + + + - - - - -$
0 1
J. is in the house John is not in the house

- Source paths can be seen as the opposite of Goal paths (as also suggested in Zwarts 2005; 2008).
- Let us then assume that the Source head is the locus of a semantic **reversal operation**.
- The Source head just reverses the orientation of the path provided by the [Goal [Place]] configuration keeping all other things equal.

- The Source head assigns to each point i in the interval [0,1] the position that is assigned to $1-i$ in the denotation of the Goal path, where 0 and 1 are the starting point and the end-point of the path, respectively.
  - The end-point p(1) in the Source path is assigned the position of p(0) in the Goal path ⇒ the negatively defined starting point in the Goal path becomes the end-point of the Source path.
  - The starting point p(0) in the Source path is assigned the position of the end-point p(1) in the Goal path ⇒ the positively located end-point in the Goal path becomes the starting point of the Source path.
  - In this way, the spatial domain encoded by the Place head will hold of the first phase of the Source path, leading to a path of the type $+++---$.

4.4 The semantics of Route

- In syntax, Route paths are derived by adding a Route head on top of the Source path structure.

(6) Source path
$+ + + + + - - - - -$
0 1 Zwarts (2008)

- Route paths are bi-transitional and they have the positive phase "in the middle," — the locative relation between Figure and Ground holds of some intermediate points of the path.

(7) Route path
$- - - - + + + + - - - -$
0 1 Zwarts (2008)

- It appears that the Route head adds another **transition** to a positive phase (just like the Goal head).
- The whole computation, step by step:

(8) Syntactic and semantic derivation of a Route path
a. [Place ...]
b. merger of Goal →
c. [Goal [Place ...]] representing a path of the shape $---+++$
d. merger of Source →
e. [Source [Goal [Place ...]]] → reversal of Goal path → $+++---$
f. merger of Route →
g. [Route [Source [Goal [Place ...]]]] → adding a second transition → $---+++---$

- In this way, we can capture the bi-transitional character of bounded Route paths:
  - the first transition—from the positive (middle) phase to the negative (final) phase—is contributed by the [Source [Goal Place]] structure
  - the second transition—from the negative (first) phase to the positive (middle) phase—is the contribution of the Route head.

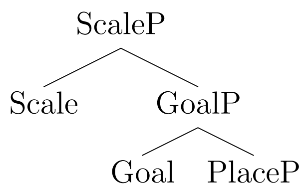
4.5 The semantics of Scale

	Goal	Source	Route
Transitional	Cofinal *to X* −−−−++++ 0 1	Coinitial *from X* ++++−−−− 0 1	Transitive *past X* −−−+++−−− 0 1
Non-transitional	Approximative *towards X* −−−−−−−−−− 0 1	Recessive *away from X* −−−−−−−−−− 0 1	Prolative *along X* ++++++++++ 0 1

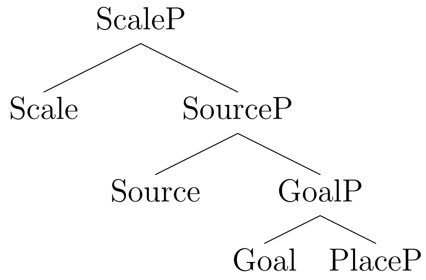
Table 4.1: Transitional and non-transitional paths

- Syntactically, non-transitional paths are derived by adding the Scale head on top of the corresponding transitional path.

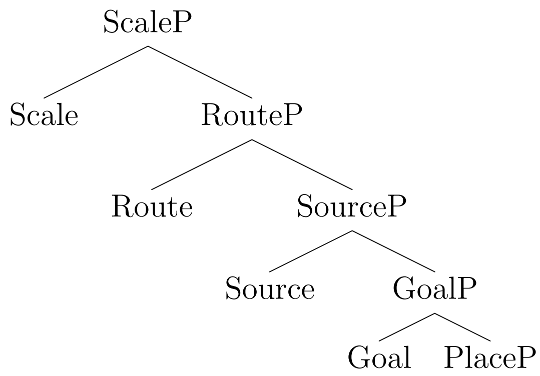
(9) a. Non-transitional Goal (Approximative) paths



b. Non-transitional Source (Recessive) paths



c. Non-transitional Route (Prolative) paths



- In the case of oriented (Goal and Source) non-transitional paths, the Scale head imposes a specific ordering on the points of the path in its complement: the darker minuses represent location further away from the Ground.
- In the case of non-oriented (Route) paths, the Scale head applies to a bi-transitional path structure to return a sequence of points where the location holds of each of the points in the new path.
- Thus, Prolative paths are different from Approximative and Recessive paths:
  - Prolative paths contain just plusses — at each point the locative relation between the Figure and the Ground holds.
  - Recessive and Approximative pathscontain just minuses — at no point in the path does the locative relation encoded by PlaceP hold.
- Semantically then, the Scale head has to pick out an interval from:
  - the positive phase of a Transitive (Route) path, so that the result is a path made just out of plusses.
  - the negative phase of Coinitial (Source) and Cofinal (Goal) paths, so that we get paths containing just minuses.

- To phrase this idea in more formal terms, we need an "auxiliary" function VAL which assigns the values T and F to the points in the path, depending on whether they are positively or negatively located.

(10) a. Let VAL(p(i))=T iff p(i) is a positively located point.
b. Let VAL(p(i))=F iff p(i) is a negatively located point.

- With the function Val in hand, we can define the following semantics for the Scale head.

(11) The Scale head is a function from a path p to a path p′which picks out the unique interval *I*, for which
a. if p(0) is negative, then p′(1)=p(i_n), such that VAL(p(i_n))≠VAL(p(i_{n+1}))
b. if p(1) is negative, then p′(0)=p(i_n), such that VAL(p(i_n))≠VAL(p(i_{n-1}))

- In prose: the Scale head selects a portion from the path in its complement such that it is to the left and to the right of the transition and this portion corresponds to the new path.
- The transition is defined as the point where the value at a point i_n is different from the value of the next point i_{n+1}, or the preceding point i_{n-1}.
- The Scale head also cuts out the transition itself, thus capturing the fact that Approximative, Recessive and Prolative paths do not involve any transition.

(12)
a. Scale applied to a GoalP $\boxed{-----}+++++$
0 $i_5\,i_6$ 1
b. Scale applied to a SourceP $+++++\boxed{-----}$
0 $i_5\,i_6$ 1
c. Scale applied to a RouteP $---\boxed{++++}---$
0 $i_3\,i_4$ $i_7\,i_8$ 1

- But non-transitional Goal and Source paths are not just a sequence of points at which the Figure is not at the Ground — there is an ordering between these points such that the distance between the Figure and the Ground decreases or increases.
- The Scale head maps the picked out negative interval on a gradient closeness scale, such that the "closer" a point was to the positively located extreme point in the original path p, the closer the Figure is located to the Ground at that point.
- In more technical terms:

(13) a. if p(1) is positive, then for each pair p′(i) and p′(j), if i<j, then at p′(j) the Figure is closer to the Ground than at p′(i).
b. if p(0) is positive, then for each pair p′(i) and p′(j), if i<j, then at p′(i) the Figure is closer to the Ground than at p′(j).

- The condition in (13a) gives us an Approximative path of the shape in (14).

(14) − − − − − − − − − −
0 1

- While the condition in (14b) derives a Recessive path, shown in (15).

(15) − − − − − − − − − −
0 1

- The conditions in (13) do not play a role in the case of a Prolative path — the extreme points of a Transitive path are negatively defined.

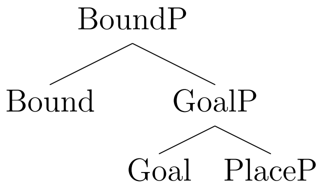
4.6 The semantics of Bound

	Goal-oriented	Source-oriented
Non-delimited	Cofinal *to X* −−−−++++ 0 1	Coinitial *from X* ++++−−−− 0 1
Delimited	Terminative *up to X* −−−−−−−+ 0 1	Egressive *starting from X* +−−−−−−− 0 1

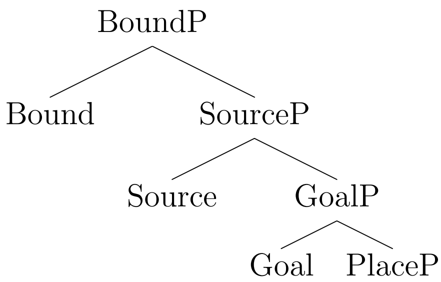
Table 4.2: Delimited and non-delimited paths

- Delimited paths are derived on the basis of "ordinary" transitional paths by the application of the Bound head.

(16) a. Delimited Goal (Terminative) paths



b. Delimited Source (Egressive) paths



- Let us examine what the semantic contribution of the Bound head could be.

(17) a. The boy ran up to the house. (Terminative path)
b. The boy ran to the house. (Cofinal path)

- The distinction between the two types of paths is:
  - The Terminative path involves just one point (the end-point) where the locative relation between the Figure and the Ground holds, hence the interpretation that the location is the limit for the movement along the path.
  - The positive phase of Cofinal paths, by contrast, can contain a whole sequence of positive locations, therefore there is no such effect.

- The semantic function of the Bound head is to “cut away” all but one point from the positive phase of the path in its complement.

- The Bound head picks out an interval from the path structure it applies to which contains the negative phase and *one* point from the positive phase.

- Formally:

(18) The Bound head is a function from a path p to a path p′ which picks out an interval I, for which
a. if p(1) is positive, then $\mathrm{p}'(1)=\mathrm{p}(i_{\mathrm{n}})$, such that $\textsc{Val}(\mathrm{p}(i_{\mathrm{n}}))\neq\textsc{Val}(\mathrm{p}(i_{\mathrm{n-1}}))$
b. if p(0) is positive, then $\mathrm{p}'(0)=\mathrm{p}(i_{\mathrm{n}})$, such that $\textsc{Val}(\mathrm{p}(i_{\mathrm{n}}))\neq\textsc{Val}(\mathrm{p}(i_{\mathrm{n+1}}))$

- In the case of Goal paths, where the end-point p(1) is positive, the Bound head selects an interval whose end-point is the first point after the transition.
- In the case of Source paths, where the starting point p(0) is positive, the picked out interval begins with the last point before the transition, thus leading to a path which begins with a unique positive point, followed by a transition to a negative phase.

(19)

a. Bound applied to a GoalP $\boxed{-\,-\,-\,-\,-\,+}+\,+\,+\,+$
0 i_5 i_6 1

b. Bound applied to a SourceP $+\,+\,+\,+\boxed{+\,-\,-\,-\,-\,-}$
0 i_5 i_6 1

- According to (18), the Bound head does not operate on Route paths, which have both p(0) and p(1) negatively defined.

4.7 Summing up

- The Place projection encodes a spatial region.
- The Goal head encodes transition to the spatial region denoted by PlaceP
- The Source head is the locus of a semantic reversal operation, which reverses the orientation of the Goal path in its complement position.
- The Route head introduces a second transition to the first (positive) phase of the Source path below it.
- The Scale head picks out a unique interval from the path structure below it, such that it is to the left and to the right of the transition(s). In addition, it imposes an order in the selected interval such that the "closer" a point is to the positive extreme points, the shorter the distance between the Figure and the Ground is at that point.
- The Bound head picks out an interval from the path structure below it which ends or begins with a unique positive point. This positively located extreme point of the path is interpreted as the limit for movement.

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