THE ORDER OF THINGS:
WHAT DIRECTIONAL LOCATIVES DENOTE

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Abstract

An outstanding puzzle posed by the Directional Locative (DL) Cases in Finnish is that they can occur with verbs that denote neither motion nor change of state (e.g., *unohtaa* 'forget', *löytää* 'find'). If DL Cases have the 'path' meanings commonly attributed to the equivalent class of directional prepositions in English, it would be difficult to explain their regular occurrence with classes of verbs that English DLs do not occur with.

I explain the distributional properties of Finnish DL predicates by arguing that Finnish DLs have certain semantic properties different from the equivalent class of directional prepositions in English. I introduce a diphasic model for the interpretation of DLs, locating the semantics of DLs at the level of ordered structures.

The main results are the following:

(i) Both English and Finnish DLs have a more abstract meaning than that normally assumed (in most analyses of English directional prepositions). In particular, I argue against a direct mapping of directional preposition meaning onto paths.

(ii) The lexical semantics of similar verb types in both languages are the same. However, Finnish DLs can operate on non-spatial semantic structures, namely, on the aspectual (temporal) structures of the verb, while English DLs generally do not.

(iii) The interaction between the semantics of DLs and verbs of motion motivates the idea of lexical aspect shift in the verb. This approach correctly predicts typological differences in the argument structures of languages like French, Mandarin Chinese,

Finnish, and English.

(iv) The analysis extends to the state cases in Finnish, thus showing that the proposal is not confined to analyzing directional locatives.

(v) Path meanings are re-constructed from the spatial or spatio-temporal mappings of objects and motion events. This gives a formal account of what, in conceptual semantics, the notion of 'path' refers to.

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Abbreviations

ABL	Ablative
ACC	Accusative
ADE	Adessive
ALL	Allative
CL	Classifier
CLI	Clitic
DL	Directional Locative
ELA	Elative
ESS	Essive
FUT	Future
GEN	Genitive
INE	Inessive
ILL	Illative
NOM	Nominative
PAR	Partitive
PASS	Passive
PERF	Perfective
POSS	Possessive
PCP	Participle
PL	Plural
QUE	Question-particle
1,2,3	1st, 2nd, 3rd Person
SG	Singular
TRA	Translative

Contents

Chapter 1

Setting the scene

1.1 Discovering order

When we look at the Directional Locative (DL) Cases in Finnish, and find that they are traditionally glossed with the equivalent class of prepositions in English (see Table 1.1), it comes as no surprise that the Finnish DLs occur in the same contexts as English directional prepositions.

Case	**Form**	**Traditional Gloss**
(Non-directional)		
INESSIVE	talo-**ssa**	'in a/the house'
ADESSIVE	kato-**lla**	'on a/the roof'
(Directional)		
ILLATIVE	talo-**on**	'into a/the house'
ELATIVE	talo-**sta**	'out of a/the house'
ALLATIVE	kato-**lle**	'onto a/the roof'
ABLATIVE	kato-**lta**	'off a/the roof'

Table 1.1: Finnish Directional Locatives

The expected occurrences include being complements of verbs of motion (1, 2), even metaphorical uses of verbs of motion (3), and as modifiers of concrete nouns (4).

(1) Kissa juoks-i huonee-sta.
cat run-PAST-3SG room-ELA
'A/The cat ran out of a/the room.'

(2) Sointu mene-e koulu-un.
Sointu go-3SG school-ILL
'Sointu goes to (lit. 'into') school.'

(3) Jo-ko on miehe-stä sisu men-nyt? (Penttilä 1963)
already-QUE has man-ELA perseverance go-PCP
'Has the man already lost his perseverance?'
(lit. 'Has perseverance already gone out of the man?')

(4) silta San Francisco-sta
bridge San Francisco-ELA
'a/the bridge out of San Francisco'

But there are puzzling occurrences too. In (5) and (6), the verbs do not express any motion, and the argument of the DL predicate (the book) does not traverse any path.

(5) Tuovi unoht-i kirja-n auto-on/ *auto-ssa.
Tuovi forget-PAST-3P book-ACC car-ILL car-INE
'Tuovi forgot a/the book in (lit. 'into'/ *'in') a/the car.'

(6) Tuovi löys-i kirja-n laatiko-sta/ *laatiko-ssa.
Tuovi find-PAST-3P book-ACC box-ELA box-INE
'Tuovi found a/the book in (lit. 'out of'/ *'in') a/the box.'

So are the locatives in (5) and (6) marked by quirky case, or is there a semantic reason for their occurrence, which has to do with the verbs 'forget' and 'find'? This dissertation argues for the latter position. I will show that the pervasiveness of such

a pattern, which is found across many classes of verbs, can be uniformly explained given a correct semantic interpretation of Directional Locatives.

I explain the distributional properties of locative predicates bearing DL Case in Finnish by arguing that DLs in Finnish have certain semantic properties different from the (much studied) equivalent class of directional prepositions (*into, out of, onto, off of*) in English.

The analysis makes the following points:

(i) DLs in both English and Finnish have a more abstract meaning than that normally assumed (in most analyses of English directional prepositions). In particular, I argue against a direct mapping of directional preposition meaning onto Paths.

(ii) The lexical semantics of similar verb types in both languages are the same. The differences in argument structures can be attributed to the fact that DLs in Finnish can operate on non-spatial semantic structures, namely, on the aspectual (temporal) structures of the verb, while English DLs generally do not.

(iii) The interaction between the semantics of DLs and verbs of motion bears on how the interaction between verb meaning and compositional semantics is conceived, especially within the sub-areas of aspectual transitions, and verbal alternations.

(iv) This analysis gives a formal account of what, in conceptual semantics, the notion of 'path' refers to.

1.2 The position of this work in semantics

While model-theoretic semantics is compatible with many of the concerns and directions taken in lexical semantics, there has not been much work bridging the common areas between the two. For one, model-theoretic semantics has to do with algebraic structure of language, and is concerned with truth conditions. And according to certain views, as exemplified in Partee (1993), conceptual semantics does not concern

itself with truth conditions. The closest most works have come to dealing with lexical meanings has been in the form of (Montagovian) meaning postulates.

The study of locatives and prepositional meaning has seen the beginnings of bridging attempts. 'Path' is considered a crucial notion in the perception or cognition of movement — a device, which is cognitively motivated, for representing changes of location (Miller and Johnson-Laird 1976, Cresswell 1978, Jackendoff 1983, 1990, Talmy 1975, 1985, etc.). The earlier attempts to account for lexical semantics of verbs and prepositions within model-theoretic frameworks include Verkuyl (1978) incorporating work by Gruber (1965), and Verkuyl and Zwarts (1992) interpreting Jackendoff's conceptual structures in a model-theoretic fashion. Recently, Nam (1995a,b) motivates an ontological domain of space within model-theoretic semantics, focusing on the denotational semantics of locative Preposition Phrases, and also building up a general logic for the semantics of spatial expressions. These works all attempt to give a model-theoretic interpretation of the localistic concept of Path (see also Verkuyl 1993).

Some of these works are summarized below.

1.2.1 Dowty (1979) and Wunderlich (1991,1993)

In predicate decomposition analyses of English directional prepositions, *into*, *onto*, *out of*, and *off of* are treated as involving a change or transition from one region to another. *Into*, for example, is considered to have a two-phase location property, a 'path' consisting of a source region and a goal region (Wunderlich 1991). Change can be captured in various ways (cf. Dowty (1979), Jackendoff (1990), Wunderlich (1991)), and I will use Dowty (1979) as illustration.

The semantic interpretation of directional prepositions is captured by Dowty (1979) with a BECOME predicate. The definition of BECOME takes a given time interval J, where there is a change from $\neg\phi$ to ϕ, and there is no other change within this interval (see (7)).

(7) [BECOME ϕ] is true at I iff (i) there is an interval J containing the initial bound of I such that $\neg\phi$ is true at J, (ii) there is an interval K containing the final bound of I such that ϕ is true at K..., and (iii) there is no non-empty interval I' such that $I' \subset I$ and conditions (i) and (ii) hold for I' as well as I.

A sample translation of English prepositions *out of* and *into* is given in (8). This is a simplification of Dowty's (1979) formulation — I use an extensional model, and treat Noun Phrases as individual constants.

(8) a. *out of*:
$\lambda z \lambda P \lambda y \lambda x$[P(x,y) CAUSE [BECOME[$\neg$be-in(y,z)]]]

b. *into*:
$\lambda z \lambda P \lambda y \lambda x$[P(x,y) CAUSE [BECOME[be-in(y,z)]]]

In (8), CAUSE is a two-place sentence connective (Dowty 1979:91), showing the causative relation between the activity denoted by a verb P, and the change of position that the Object y undergoes. For example, the sentence in (9a) gets the causative inference in (9b).

(9) a. Chris moved the armoire into the bedroom.

b. Chris moved the armoire, and the moving was the cause of its coming to be in the bedroom.

Wunderlich generalizes Dowty's use of the BECOME predicate by representing Path/directional prepositions with the predicate constant CHANGE, which expresses the transition from one region into another: CHANGE(D,Φ) (where D is some dimension in which the transition takes place). But basically, Wunderlich adopts the notion of change for English DLs, as argued for by Dowty (1979).

1.2.2 Jackendoff (1983, 1990)

Jackendoff considers Path and Place as 'conceptual constituents' — unitary pieces of mental representation (Jackendoff 1983).[1] The internal structure of Path consists of a path-function and a reference object, expressed syntactically with phrases like *toward the mountain*, *to the floor*. The conceptual structure for a sentence with directional preposition *into* (10a) is given in (10b) (Jackendoff 1983:163):

(10) a. The mouse ran into the room.

b. $[_{Path}$ TO $([_{Place}$ IN $([_{Thing}$ ROOM$])])]$

This point of view typifies what it means to treat directional prepositions as directly referring to paths.

1.2.3 Verkuyl and Zwarts (1992)

Verkuyl and Zwarts (1992) show that the conceptual semantics developed by Jackendoff (1978, 1983, 1990) can be related to the mathematical logics of model-theoretic interpretation.[2] In so doing, they fuse the insights from conceptual-semantic frameworks on the interaction between internal arguments of the verb and the temporal

[1] This is not uncontroversial. Wunderlich (1991, 1993), for example, does not accept Path and Place as primitives, because '[i]t is often not the place itself but some abstract configuration which fufills the conditions required by a proposition.'

[2] Verkuyl and Zwarts first discuss the schema for Paths developed in Jackendoff (1972, 1976), but show that the later development (Jackendoff 1978 onwards) is more general.

structure associated with the verb, with the model-theoretic semantics machinery of type theory and the use of sets in 'mental models'. Their model is able to explain the similar aspectuality of sentences involving different verb classes, as in (11):

(11) a. Chris walked to the store.

b. Sandy ate three sandwiches.

Both sentences in (11) above represent a change. In (11a), Chris moves from an unspecified position to the store, and in (11b), there is a sense in which Sandy causes three sandwiches to move into her mouth.

Jackendoff represents change with a GO function (12):

(12) GO_{α} (X,P)

Here, P represents a Path, and the Theme X relates to a region in which it moves. (12) indicates that 'there has taken place an event consisting of the motion of some object x along some path p [...]' (Jackendoff 1978:218ff). The subscript α is a variable for 'semantic field features' that distinguish the field in which the event is defined — for example, spatial, temporal, possessional or identificational.

In Verkuyl and Zwarts (1992) (and also Verkuyl 1993), the features used in Jackendoff's conceptual structure framework are interpreted as sets of model-theoretic structures. Of special interest are the features [n-DIMENSIONAL] and [DIRECTIONAL] in relation to Path structure.

(13) Model-theoretic interpretation of the features (from Verkuyl 1993:231ff):

a. [n-DIMENSIONAL]: The dimensionality of an object is the number of spatial orderings that can be imposed on the material parts of that object.

b. [+directional] is interpreted in terms of a linear ordering of the elements of a set. A set is directional if it is linearly ordered in one direction, yielding one unique beginning point and a potential end point. In localistic terms, directionality imposes a certain order on an unordered set; the linear order of a spatial path is the result of movement through space yielding a particular order, and not the result of an intrinsic ordering of space.

In Verkuyl and Zwarts's model, a spatial path is atemporal. But reference to time is available, as it is assumed that the movement to a goal involves a bounded sequence of moments of time $< t_1, \ldots, t_n >$ (thus retaining Jackendoff's idea that a temporal parameter is part of the Path notion). However, they assume (following Verkuyl (1987)) that there is an asymmetry in the composition of the terminative aspect of sentences like (11) above. The verb first takes its internal argument to form a VP, and the VP relates to the external argument. The result of the composition is a Situation (i.e., a (terminative) Event). The foundation of this situational structure is a temporal structure, provided by the GO function.

Compositionally, the application of GO to the spatial Path gives a mapping from the atemporal spatial Path into the temporal Path, creating a new spatio-temporal Path II, which consists of pairs of points in space and points in time: $< (t_1, p_1), \ldots, (t_i, p_i), \ldots >$. The theme of GO must then be related to the spatiotemporal path. This results in a situational Path, expressing what sort of position in space a thing occupies at a given time (p.501). For a sentence like *Chris walked to the store*, the path structure would be: $< (c, (t_1, p_1)), \ldots, (c, (t_n, p(s))) >$, which shows Chris as the moving object c that traverses the spatio-temporal path.

1.2.4 Nam (1995a,b)

Nam (1995a) provides a logical semantics for locative expressions built on the mereology of space (Σ) and its primitive concept **region** (p.65ff). The space Σ is the set of regions, and the primitive part-to-whole relation ($\subseteq$) is given between regions in the space. Nam builds up definitions for Path and Orientation based on the notion Region, and locatives are interpreted as denoting paths or orientations.

Nam defines paths as sequences of regions, which are 'time-free'. In other words, paths are assumed to be purely spatial, and non-temporal (Nam 1995a:75). This is similar to Verkuyl and Zwarts's (1992) view of atemporal spatial path. But the intuitive notion of path involves a movement of an object. To represent such movement, Nam introduces a predicate TRAV (which is similar to Jackendoff's GO function). The TRAV relation is used to interpret sentences referring to 'a path *and* [emphasis mine] a movement' (Nam 1995a:81). So *John ran into the house* is interpreted to be true if and only if 'John ran' and 'John traversed the path (such that the source of the path is outside the house and the goal is inside).'

Preposition phrases like *out of* α are treated as determining a path with a source located in the region of α. Paths are associated with the movement readings induced by a motion verb: for example, the sentence *Mary walked out of the office* is true only if there is a path π such that Mary walks and traverses this path, and the source of the path is the office region (see Nam 1995a:125).

1.2.5 The current work

By happy coincidence, one of the examples picked by Partee (1993) to illustrate the differences between model-theoretic and conceptual semantics involves a path preposition:

(14) John explained the picture to Bill.

Partee contends that the notion of Path Structure (in Jackendoff's work) has 'a status more like that of a very basic metaphor than that of a formal universal' — Path Structure is not part of the truth conditions of the sentence. As such, it is considered of no importance to the semantic theory whether there is any sense of 'going' in which the statement is literally true of (14).

But, what then accounts for why the verb *explain* can occur with a path preposition in English? If we take compositionality seriously, even model theoretic semantics will need the notion of how the meaning of *to* does/does not clash with the meaning of *explain*. This is the motivation for investigating the verb classes that co-occur with DLs, and for determining the proper interpretation of DLs.

Also, if we look beyond the English data, we find that DLs may occur in somewhat surprising contexts that await a more general explanation (see the Finnish examples above, and section 1.3). I will argue that DLs like *into* and *out of* in English and Finnish do not refer directly to Paths, contrary to what the previous works summarized above suggest. Rather, DLs must have a more abstract interpretation.

In addition, because this work looks at how locative predicates interact with verb meanings, it also has a stake in how lexical and syntactic theories deal with verbal polysemy and argument structure of verbs. I propose to show that given a predictive analysis of the semantics of DLs, we can find its ramifications in areas outside of model-theoretic semantics: in interface issues in verbal semantics, and argument structure.

1.3 The Finnish puzzle

An outstanding puzzle posed by the DL Cases in Finnish is that they can occur with verbs that denote neither motion nor change of state. Here, I summarize the distributional properties of Finnish DL predicates, and compare how Finnish differs

from a language like English with respect to the argument structure of verbs where DLs are concerned. I organize the distribution of DLs by the systematic verb classes that they occur with, and discuss the meanings of the DLs in their different uses.

I will propose that the difference between the two languages lies in the semantics of the DLs, and defend the view that the lexical semantics of similar verb types in both languages are the same.

1.3.1 Overview of the Finnish case system

The Case paradigm for Finnish nominals is given in Table 1.2.[3] The Local Cases are the Inessive, Illative, Elative, Adessive, Allative, and Ablative. The State Cases are the Essive, Translative, and Elative.[4]

The six Local Cases in Finnish form a sub-system of their own, sharing the basic function of expressing location. Their myriad functions have generated numerous discussions and analyses (Itälä 1984, Leino 1990, Nikanne 1990, Huumo 1995, *inter alia*). In traditional grammars, the Directional Local Cases (the Illative, Elative, Allative, and Ablative) are considered to have an additional path or directional meaning.

1.3.2 The distributional properties of DLs

In this section, I present some of the crucial systematic distribution patterns of DL Case with Nouns depicting locations. These include DLs as modifiers of nouns, and as complements of verbs. With verbs, I will organize the data according to systematic verb classes, and discuss the meanings of the DLs in their different uses accordingly.

[3]Classification adapted from Karlsson (1987), Vainikka (1989), and Blake (1994). The Case meanings provided here and in the glosses follow traditional definitions (see, for example, Karlsson (1987)).

[4]In the historical development of the State Cases, there was a gap left by the Partitive Case, which in contemporary Finnish is filled by the Elative Case (Leino 1990). So the Elative has both locative and state functions.

CASE	**FORM (Singular)**	**Notes**
NOMINATIVE	-∅	
PARTITIVE	-A/-tA/	
ACCUSATIVE	-n, -∅	
GENITIVE	-n	
ESSIVE	-nA	expresses a temporary state/function
TRASLATIVE	-ksi	expresses the end point of a movement/change
ABESSIVE	-ttA	'without'
COMITATIVE	-ine	'with, accompanied by'
INSTRUCTIVE	-n	'(instrumental) with, by'
Local Case (Non-directional)		
INESSIVE	-ssA	'in'
ELATIVE	-stA	'out of'
(Directional)		
ILLATIVE	-(h)Vn/-seen	'into'
ADESSIVE	-llA	'at/on'
ABLATIVE	-ltA	'from/off of'
ALLATIVE	-lle	'to/onto'

Table 1.2: The Case Paradigm for Finnish Nominals

As concrete noun modifiers

As modifiers of concrete nouns, DLs and English prepositions have spatial meanings. In (15), the DL modifier specifies the orientation of the bridge in (perspectival) space:

(15) silta San Francisco-on
bridge San Francisco-ILL
'a/the bridge into San Francisco'

(16) silta San Francisco-sta
bridge San Francisco-ELA
'a/the bridge out of San Francisco'

(17) a. Because you've not got **a good road into London** then — unless it's this M23 quite possibly ... (*London-Lund corpus*)

b. '...They brought you to my shop, which is the first on **the road into town**...' (Burroughs, *The Mad King*)

c. In one place, where **the road into the town** seemed suitably secluded, he took his encumbrance out of his pocket and tried it in his hat. (Wells, *The Crystal Egg*)

d. **The road out of Tafelberg** wound upward among tall trees toward the pass... (Burroughs, *The Mad King*)

With verbs of motion

As far as the selection of directional complements by verbs of motion is concerned (Jackendoff 1983, Talmy 1985), the Finnish Directional Locatives (DLs) behave very much like English prepositions (see (18)).

(18) a. The cat ran out of the room.

b. Tracy goes to school.

c. Tracy drove the car into the garage.

The examples in (19)–(21) show some of the Finnish verbs of motion that the DLs can occur with. Verbs of inherently directed motion are given in (19) and (20); verbs of manner of motion are given (21) and (22); transitive verbs of motion are given in (23) and (24). Note that in these cases, the DLs give unequivocal change of location readings.

(19) Sointu mene-e koulu-un.
Sointu go-3SG school-ILL
'Sointu goes to (lit. 'into') school.'

(20) Sointu tule-e huonee-seen.
Sointu come-3SG room-ILL
'Sointu comes into a/the room.'

(21) Kissa juoks-i huonee-sta. #Se jä-i huonee-seen.
cat run-PAST-3SG room-ELA it remain-PAST-3SG room-ILL
'A/The cat ran out of a/the room. #It remained in the room.'

(22) Kissa hyppäs-i laatiko-sta. #Se jä-i laatikko-on.
cat jump-PAST-3SG box-ELA it remain-PAST-3SG box-ILL
'A/The cat jumped out of a/the box. #It remained in the box.'

(23) Sointu aja-a auto-n autotalli-in.
Sointu drive- 3SG car-GEN garage-ILL
'Sointu drives a/the car into a/the garage.'

(24) Vieno kanto-i kirja-a Lontoo-seen.
Vieno carry-PAST-3SG book-PAR London-ILL
'Vieno was carrying a/the book to (lit. 'into') London.'

The subclasses of motion verbs include:

(25) **Verbs of plain motion:**

liikkua 'move, be in motion', *muuttaa* 'move', *matkustaa* 'travel, journey'

(26) **Verbs of inherently directed motion:**

edetä 'proceed', *karata* 'run, escape', *kulkea* 'go forward', *käydä* 'go', *langeta* 'fall, sink', *laskea* 'descend', *laskeutua* 'descend, land', *lähteä* 'leave', *mennä* 'go', *nousta* 'ascend, rise', *palata* 'return', *peruuttaa* 'reverse', *poistua* 'go away, depart', *pudota* 'fall, drop', *saa* 'get', *tipahtaa* 'drop suddenly', *tippua* 'drip, drop', *tulla* 'come', *upota* 'sink', *vaipua* 'sink'

(27) **Verbs of manner of motion:**

astua 'step', *juosta* 'run', *kahlata* 'wade', *kavuta* 'climb', *kävellä* 'walk', *kellua* 'float', *kiivetä* 'climb', *lentää* 'fly', *lipua* 'glide, drift', *liukua* 'slide, slip', *madella* 'crawl', *marssia* 'march', *nilkuttaa* 'limp', *polkea* 'trample', *pujahtaa* 'sneak, slip', *rynnätä* 'dash', *sukeltaa* 'dive', *syöksyä* 'rush, plunge', *syöstä* 'plunge', *tallata* 'trample, tread' *tanssia* 'dance', *uida* 'swim', *vieriä* 'roll'

(28) **Transitive verbs of motion:**

a. 'carry' verbs

hakee 'fetch', *kantaa* 'carry', *kuljettaa* 'transport', *opastaa* 'guide', *siirtää* 'move, transport', *tuoda* 'bring', *viedä* 'take'

b. 'throw' verbs[5]

heittää 'throw', *vierittää* 'roll'

(29) **Verbs of 'putting':**

asettaa 'place', *laittaa* 'put', *panna* 'put', *pudottaa* 'let fall, drop'

(30) Panna kirja pöydälle.
put book table-ALL
'Put a/the book on (lit. 'onto') the table.'

'Abstract motion' verbs

Verbs of motion can be used figuratively:

(31) Jo-ko on miehe-stä sisu men-nyt? (Penttilä 1963)
already-QUE has man-ELA perseverance go-PCP
'Has the man already lost his perseverance?'
(lit. 'Has perseverance already gone out of the man?')

[5]These are verbs described as verbs of 'instantaneously causing ballistic motion' (Gropen et al. 1989). The internal argument of the verb is set in motion, unaccompanied by the agent that initiates the motion. These verbs also can be used as 'verbs of change of possession by means of change of location (see Levin (1993)). I include here also verbs that do not involve ballistic motion, like 'roll'.

There are also 'abstract motion' verbs like those in (32):

(32) **Abstract motion verbs:**
alentaa 'demote', *vetäytyä* 'withdraw'

(33) Häne-t alenne-ttiin upseeri-sta sotamiehe-ksi.
s/he-ACC demote-PASS-PAST officer-ELA soldier-TRA
'S/He was demoted from (lit. 'out of') officer to soldier.'

With stative verbs, denoting direction

Orientation meanings can also arise with DL predication, if the verb is stative (see also Nam 1995a,b).

(34) Ikkuna-t anta-vat puisto-on.
window-PL face-3PL south-ILL
'The windows face south.'

(35) Puisto-on avautu-i näkymä.
park-ILL open-up-PAST view
'A view opened into the park.'

(36) *antaa* 'face (lit. give)', *avautua* 'open up', *katsoa* 'look', *suuntautua* 'to be directed, to be oriented'

Verbs with posterior/anterior entailments

Finnish and English differ in the following DL predication cases.

The use of DLs with verbs that denote neither motion nor change of state — for example, *jättää* 'leave', *unohtaa* 'forget' (in the sense of leaving something behind), *löytää* 'find', and *etsiä* 'look for' (see examples in (37)–(40)) — is perhaps the most unusual, from the perspective of DL predication in Indo-European languages.

(37) Tuovi jätt-i avaime-t auto-on/ *auto-ssa.
Tuovi leave-PAST-3P key-PLU car-ILL car-INE
'Tuovi left the keys in (lit. 'into'/ *'in') a/the car.'

(38) Tuovi unoht-i kirja-n auto-on/ *auto-ssa.
Tuovi forget-PAST-3P book-ACC car-ILL car-INE
'Tuovi forgot a/the book in (lit. 'into'/ *'in') a/the car.'

(39) Tuovi löys-i kirja-n laatiko-sta/ *laatiko-ssa.
Tuovi find-PAST-3P book-ACC box-ELA box-INE
'Tuovi found a/the book in (lit. 'out of'/ *'in') a/the box.'

(40) Hän etsi-i avaint-a tasku-sta. (Karlsson 1987)
he look.for-3SG key-PAR pocket-ELA
'S/He looks for a/the key in (lit. 'out of') her/his pocket.'

What these verbs have in common is that they have entailing posterior or anterior states. In none of the cases above need there be a change of location involved. The book could be in the car both before and after being forgotten or left behind (37, 38). The same is true for finding and looking for something. One need not remove the object after finding it (39, 40).

The same verbs in English notably do not select path prepositions, as shown in (41).[6]

(41) a. I left the keys in/ *into the car.

b. I forgot the keys in/ *into the car.

[6]However, in Shakespeare's *Henry VIII* (hence archaic), the directional locative *out of* occurs with the verb *seek*:

(i) ... his training such,
That he may furnish and instruct great teachers,
And never seek for aid **out of** himself.

c. I found the book in/*out of the box.

d. I looked for the book in/*out of the box.

Notice also that the Inessive Case, meaning 'location inside something', cannot occur with these Finnish verbs to predicate the location of the Object NP, while the English preposition *in* is the one that is selected by the English verbs. The minimal pair in (42) show the different meanings brought out by the Elative versus the Inessive locatives. In (42a), the Elative together with the verb *tavata* 'meet' give the meaning that there was a conscious searching for the person (cf. (40)). In (42b), there is no such presupposition with the Inessive predicate.

(42) a. Tapas-i-n hänet kirjasto-sta.
meet-PAST-1SG him/her library-ELA
'I found him/her in (lit. 'out of') the library.' (This is the result of conscious searching.)

b. Tapas-i-n hänet kirjasto-ssa.
meet-PAST-1SG him/her library-INE
'I met him/her in the library.' (This could be a random event.)

The following examples (from Flint (1980:113)) also bring out the difference between the non-directional and DL predicates. (43a) shows that a non-directional locative ('at the station') merely describes where the finding event takes place. For example, (43a) can describe a situation where I was searching a computer database at the railway station's lost-and-found office, and learn that my wallet is in fact at the police station. In (43b), however, the wallet has to be at the railway station.

(43) a. Löys-i-n lompako-n asema-lla.
find-PAST-1SG wallet-ACC station-ADE
'While I was at the station, I found a wallet.'

b. Löys-i-n lompako-n asema-lta.
find-PAST-1SG wallet-ACC station-ABL
'I found a wallet at the station.'

(44) **Verbs with anterior entailments:**

(Verbs that mean to search/look for something entail that the the being looked for is located at the place prior to being found.)

etsiä 'look for', *hakea* 'search', *löytää* 'find', *pyydystää* 'catch'

(45) Pyydystä metsi-stä jäniks-i-ä, sano-i-sta sukkeluuks-i-a.
catch forest-PL-ELA rabbit-PL-PTV word-PL-ELA witticism-PL-PTV
'For rabbits, hunt from the forest, for witticisms, from words.'

(Hakulinen 1961)

(46) **Verbs with posterior entailments:**

hylätä 'reject', *jäädä* 'remanin', *jättää* 'leave', *kätkeä* 'conceal', *kätkeytyä* 'hide oneself', *unohtaa* 'forget'

(47) Sinä et hylkää minun sielu-a-ni Tuonela-an.
you NOT-2SG reject my soul-PAR-POSS-1SG Tuonela-ILL
'You do not reject my soul into Hades.'

(*Psalm 16:10*, in Hakulinen (1961))

1.4 Difference between Finnish DLs and English prepositions

The occurrence of DL predicates with verbs like 'leave'/'find' in Finnish makes Finnish very different from Indo-European languages (see Hakulinen (1961)), and for the purposes of our discussion here, from English. A cross-linguistic generalization needs to explain why this behavior is possible in Finnish, but not in English.

One hypothesis, posited by Dahl (1987), treats verbs like 'remain' and 'leave' as borderline cases between location and direction. On the one hand, Dahl considers these verbs to pattern with motion verbs (e.g., 'move') in encompassing at least two points in time; on the other, they pattern with state verbs (e.g., 'be situated', 'sit') in involving only a single location. Dahl claims that Finnish 'remain' patterns like a directional verb, and takes a goal as complement, expressed by DL Case. English, however, treats 'remain' as a state verb, which does not take goal complements. To account for why Finnish 'remain' takes goal complements, Dahl also has to posit that Finnish defines goal as 'the point at which some object is situated as the result of what is said to take place,' whereas English defines goal as the final point of a movement (Dahl 1987:153ff). As such, 'in the grammar of Finnish, there will be a rule to the effect that if something suits [the goal definition for Finnish], the noun phrase[...]that refers to it will be marked with one of the directional cases' (Dahl 1987:154).

Dahl's theory overgeneralizes, however. Notice that sometimes, goals are expressed by Direct Objects, in Accusative or Partitive Case:

(48) a. Tuovi saavutt-i maali-n.
Tuovi-NOM reach-PAST-3SG goal-ACC
'Tuovi reached the goal.'

b. Tuovi tavoittel-i täydellisyytt-ä.
Tuovi-NOM strive-PAST-3SG perfection-PAR
'Tuovi strove for perfection.'

Also, note that 'remain'/'stay'-type verbs do not take 'goals' in Accusative Case:

(49) Tuovi jä-i *huonee-n/ huoneese-en.
Tuovi-NOM stay-PAST-3SG room-ACC room-ILL
'Tuovi stayed *room/in (lit. 'into') the room.'

Since 'goal' is a semantic/conceptual category as opposed to a morphological one, Dahl's theory of goal meanings, formulated to account precisely for the fact that 'remain' takes goal complements, does not in the end explain why 'remain' takes DL complements. Therefore, it is unclear why we should assume that 'remain' takes a goal in Finnish but not in English, and that the definition of goal is different in the two languages.

A second hypothesis, slightly more radical than Dahl's, would be that the verbs have different meanings in Finnish and English. Namely, in Finnish, the verbs have a path or change-of-state meaning, while in English, they do not.[7] If the Finnish and English verbs have different meanings, then it will not be surprising that they select different types of prepositions. If we hold this view, we can also assume that the semantic interpretation of the Finnish DL Cases is similar to that of English directional prepositions.

This hypothesis must, however, be rejected for the following reasons.

One: Causative/change-of-state verbs should participate in the resultative construction. The interpretation of this construction is that the Object of the verb undergoes a change, and the resultant state is expressed by another predicate, as exemplified in (50a) for English, and (50b) for Finnish.

(50) a. The magician changed the butterfly into a caterpillar.

b. Taikuri muutt-i perho-sen touka-ksi.
magician change-PAST-3SG butterfly-ACC caterpillar-TRA(nslative)
'A/the magician changed a/the butterfly into a caterpillar.'

If a verb like *jättää* 'leave' is a causative/change-of-state verb, then we would expect it to occur in the resultative construction, but this is not the case, as (51)

[7] *Leave* in English just means 'to maintain something at some location', without describing the actual putting of the entity in that location (as described in Levin (1993)).

shows. Given a context where the glass was full, 'I left the glass empty' cannot mean that the result of my leaving the glass was that it became empty.[8]

(51) #Lasi oli täysi. Jäti-n lasi-n tyhjä-ksi.
glass be-PAST-3SG full leave-PAST-1P glass-ACC empty-TRA
'The glass was full. I left it empty (i.e. the result of my leaving the glass was that it became empty).'

Two: A verb like *löytää* 'find' does not have a path meaning. In (39), the finding of the book does not entail that the book is taken out of the box upon being found. One could very well find a book and leave it where it is. The same is true in English: finding something does not entail that the thing gets removed. So basically 'find' has the same meaning in English and Finnish.

Three: In both languages, 'leaving the keys in the car' means that after the event of 'leaving', the keys remain in the car for some time. This is supported by evidence from what Dowty terms the 'internal reading' of adverbials, where the adverbial is supposed to specify 'the time that the *result* [Dowty's emphasis] of the action obtained.' (Dowty 1979:251) In (52), the adverbial 'for two hours' specifies that the result of leaving the keys in the car was that the keys were in the car for two hours.

(52) a. Tracy left the keys in the car for two hours.

b. Tuovi jätt-i avaime-t auto-on kahde-ksi tunni-ksi.
Tuovi leave-PAST-3P key-PLU car-ILL two-TRA hour-TRA
'Tuovi left the keys in a/the car for two hours.'

On the basis of these considerations, I reject the second hypothesis. The third hypothesis, which I defend, is that Finnish DL Cases have different semantic interpretations from English directional prepositions. To what extent do they differ? In

[8] 'I left the glass empty' is an example of depictive predication, in a context where the glass was empty in the first place.

the case of concrete noun modification, and also with verb classes involving motion, both English and Finnish DLs should have a uniform analysis. But in examples (37) through (40), the Illative predicate occuring with the verbs 'leave' and 'forget' indicates the location of the book after the event of 'leaving' and 'forgetting', and the Elative predicate occuring with the verbs 'find' and 'look for/search' depicts where the book was, or could have been, before the 'finding' and 'searching' of the book. Thus in these cases, DLs are sensitive to the temporal or event structure of the verbs they occur with. I claim that English DLs, on the other hand, can only have spatial, or spatio-temporal interpretations, and cannot therefore occur with verbs that do not have spatial mappings.

In Fong (1997c), I argued that DLs in Finnish have a temporal interpretation, where DLs denote anterior or posterior times in relation to the time that the action occurs. Elatives and Ablatives denote locations that hold at a time interval anterior to the event time, and Illatives and Allatives denote locations holding at a time interval posterior to the event time. Because the DLs do not introduce a path meaning, they do not conflict with the meaning of verbs that do not denote change. The problem with this idea is that it is not possible to posit temporal meanings for purely spatial uses of DL modifiers, as in the case of DLs modifying concrete objects (e.g., *the road into the city*). Thus, an even more abstract meaning of Finnish DLs is called for, something more abstract than space, and even time. Moreover, the use of a CHANGE predicate, or a GO function for the interpretation of English directional prepositions in previous approaches summarized above will not capture the orientation meaning of DL modifiers of concrete nouns in both English and Finnish.

The more abstract meaning that I will propose involves positing a diphasic structure for DL interpretation. Diphasic structures can be motivated both for objects and events. I will provide a semantic model for this in chapter 2. There, I show that the Elative/Ablative versus the Illative/Allative distinction is sensitive to the

ordering of phases. The Elative/Ablative are evaluated in the first of two phases, and the Illative/Allative are evaluated in the second phase. I will show that the diphasic approach captures the idea that objects, and events denoted by verbs belonging to the classes mentioned above, both have ordered structures.

1.5 What follows

In chapter 2, I provide the semantic analysis of Finnish DL predication. I motivate ordered, diphasic structures for the objects and events that DLs can occur with.

In chapter 3, I discuss motion events and path interpretations. Since DLs do not refer to paths, the question arises of how path readings get constructed when DLs occur with verbs denoting manner of motion. I also discuss the implication of this approach for theories of lexical aspect shifts and verbal polysemy.

Chapter 4 shows how the theory developed can be applied to two different types of phenomena. First, I show that the diphasic approach to DL Case meaning can be extended to a subset of the Finnish State Cases. Second, the explanation for how DL predication differs between English and Finnish will be used to explain the differences in secondary predication, which is sensitive to properties of argument structure and other aspects of the semantics.

Chapter 2

A semantic model for DL interpretation

2.1 Introduction

I have established that the occurrence of DLs with verbs like 'forget' and 'find' in Finnish is not due to a difference between the meaning of the Finnish verbs and their English counterparts.[1] I argued that the DL Cases in Finnish do not always have a spatial-path meaning. This is also true of DL modifiers of concrete nouns in English. In an example like 'the bridge into San Francisco', it is not the case that the bridge in any way moves into San Francisco.

As has been discussed, recent work in model-theoretic approaches to English preposition meaning has shown how directional locatives map their arguments onto paths, which then map onto the temporal structure of the verbs (e.g., Verkuyl and Zwarts 1992, Nam 1995a,b). Verkuyl and Zwarts analyze directionality of paths as the result of an entity moving through space, yielding a particular order. Nam makes

[1]This chapter is based on a paper I presented at SALT 7, Stanford University, 1997, which will appear in proceedings published by Cornell University (Fong 1997a).

a similar assumption.

But the Finnish DLs do not always occur in contexts where movement is involved. So DLs must have a more abstract semantics than a pure spatial or temporal interpretation.

In this chapter, I argue that DLs require only that the spatial or temporal structures they operate on have two distinct phases, and DLs are sensitive to the linear ordering of these phases. The analysis developed here entails a less direct mapping of prepositional meaning onto paths, contrary to Verkuyl and Zwarts's approach, among others (cf. also Bierwisch (1988), Piñón (1993)), and to what has been assumed in conceptual semantics (e.g., Jackendoff 1983, 1990).

2.2 The core data

The semantic analysis of DLs that I will give is based on how best to account for the following three crucial distributional properties of DLs.

(i) DLs in Finnish occur with (non-motion) verbs that entail anterior/posterior states, which is ungrammatical in English. Here, the DLs clearly do not denote paths. (1) entails that after forgetting happens, the thing forgotten remains for a time in the location denoted by the DL predicate, but it does not entail or presuppose anything about its location prior to the forgetting. A similar example with another verb ('leave'), is given in (2).

(1) Tuovi unoht-i kirja-n auto-on/ *auto-ssa.
Tuovi forget-PAST-3P book-ACC car-ILL car-INE
'Tuovi forgot a/the book in (lit. 'into'/ *'in') a/the car.'

(2) Tuovi jätt-i kirja-n auto-on/ *auto-ssa.
Tuovi leave-PAST-3P book-ACC car-ILL car-INE
'Tuovi left a/the book in (lit. 'into'/ *'in') a/the car.'

In (3), 'find' entails that the thing found must be in the location prior to the finding. The same entailment holds for 'look for' (4).

(3) Tuovi löys-i kirja-n laatiko-sta/ *laatiko-ssa.
Tuovi find-PAST-3P book-GEN box-ELA(tive) box-INE
'Tuovi found a/the book in (lit. 'out of'/ *'in') a/the box.'

(4) Hän etsi-i avaint-a tasku-sta. (Karlsson 1987)
he look.for-3SG key-PAR pocket-ELA
'S/he looks for a/the key in (lit. 'out of') her/his pocket.'

In none of the cases need there be a change of location involved. The book could be in the car both before and after being forgotten or left behind. The same is true for finding and looking for something. One need not remove the object after finding it.

Notice that the equivalent constructions in English are ungrammatical (see (5)).

(5) a. Pat forgot the book in/ *into the car.

b. Pat found the book in/ *out of the car.

(ii) With motion verbs, DL predication gives a path reading in both Finnish and English:

(6) Kissa juoks-i huonee-sta. #Se jä-i huonee-seen.
cat run-PAST-3SG room-ELA it remain-PAST-3SG room-ILL
'A/The cat ran out of a/the room. #It remained in the room.'

(7) Kissa hyppäs-i laatiko-sta. #Se jä-i laatikko-on.
cat jump-PAST-3SG box-ELA it remain-PAST-3SG box-ILL
'A/The cat jumped out of a/the box. #It remained in the box.'

(8) a. The cat ran out of the room. #It remained in the room.

b. The cat jumped out of the box. #It remained in the box.

(iii) As modifiers of concrete nouns, DLs have a spatial meaning. In (9) and (10), the DL modifier specifies the orientation of the bridge and the road, respectively, in (perspectival) space.

(9) a. silta San Francisco-on
bridge San Francisco-ILL
'a/the bridge into San Francisco'

b. silta San Francisco-sta
bridge San Francisco-ELA
'a/the bridge out of San Francisco'

(10) a. '...They brought you to my shop, which is the first on **the road into town**...' (Burroughs, *The Mad King*)

b. **The road out of Tafelberg** wound upward among tall trees toward the pass... (Burroughs, *The Mad King*)

The aim of this chapter is to provide an analysis of DL meaning that will treat both the nouns and the verbs modified by the DLs in a uniform way, thus achieving an integrated semantics for DLs. In addition, the difference in English and Finnish with respect to the data in (1)–(5) must be explained.

2.3 Outline of analysis

For objects, and events which verbs denote, I will first show that they can both be seen as ordered structures that DLs can operate on. I will motivate ordered structures for times, stages of events, segments of objects, and spatial traces of events. In this way, both the nouns and the verbs which DLs modify are treated in a uniform way. Second, I adopt the concept of an interval, which contains a phase change with respect

to an ordered structure of times/stages of events/parts of objects/spatial traces of events. Third, I will exploit the possibility provided by having intervals with phase changes to talk about the ordering of the two phases with respect to each other.

Let us start with times, and see how temporal phases are defined. I will take as given that time has an ordered structure, and an inherent direction. Also, time is dense. The *earlier than* relation ($\prec$) between two time points is transitive, and asymmetric.

I argue that the interval over which we evaluate the truth of DL predicates consists of two phases. The notion of ADMISSIBLE PHASE-INTERVAL can be formulated according to Löbner (1989:178), who defines temporal phases as follows: 'Any admissible interval starts with a phase of not-p and is monotone in terms of p: i.e., starting with times t for which $p(t)$=0, it may extend to later times t' with $p(t')$=1, but must not contain any yet later times t'' with $p(t'')$=0 again.' This is formalized in (11). In (11i), the interval $(t_i, t_e]$ indicates times in a half-open interval (open on the left, closed on the right).

(11) (From Löbner (1989))

I is an admissible interval in terms of p and t_e (in short: $I \in AI(t_e, p)$) iff

(i) I = $(t_i, t_e]$ for some $t_i \prec t_e$

(ii) I begins with a phase of not-p:
$\exists t' \in I\ \forall t \in I(t \prec t' \rightarrow \sim p(t))$

(iii) the function p is monotone in the interval I:
for all $t, t' \in I$, if p is defined for t, t' then
if $t \prec t'$ then $p(t) \rightarrow p(t')$

In the analysis developed here, I will in some cases deviate from the strictly ~p to p development in (11). Löbner (1989) also allows phase transition to be from positive to negative, or vice versa; the crucial point in (11) is the condition on monotonicity.

In general terms (to be made precise below), the admissible intervals for the DLs are given in (12). Given an ordering of phases, say $\sim p \prec p$, the 'into' predicate is evaluated in the second phase, p, while the 'out of' predicate is evaluated in the first phase $\sim$p. What is important to note is that the Illative and Elative predicates are evaluated in opposing phases. Whether the phases are ordered $\sim p \prec p$ or $p \prec \sim p$ is secondary. What the ordering tells us, intuitively, is whether the location depicted by the DL is at the beginning or the end of the ordered structure. For example, 'a bridge out of San Francisco' has to have its initial parts (the first phase) within San Francisco. This is what is meant by evaluating 'out of San Francisco' in the first phase.

(12) Admissible intervals for DLs:

a. 'Into'/Illative predicates take as their admissibile interval the monotone development from $\sim$p to p (or p to $\sim$p), where the truth of LOC-IN(a,b) is evaluated in the second phase.

b. 'Out of'/Elative predicates take as their admissible interval the monotone development from $\sim$p to p (or p to $\sim$p), where the truth of LOC-IN(a,b) is evaluated in the first phase.

In (12), and elsewhere, I take a simplified view of the spatial relation between objects/entities and the locations they occupy, since I am concerned with how 'directionality' is expressed, and not with the intricacies of spatial descriptions.[2] I will distinguish 'into'/'out of' versus 'onto'/'off of' with the predicates LOC-IN versus LOC-ON. For example, LOC-IN(a,b) represents location within the region of a place (represented as the constant b) that holds of an entity a.

[2]For works in the latter category, see Herskovits (1986), Vandeloise (1991), Zwarts (1995), Zwarts and Winter (1997), *inter alia*.

In our analysis, the LOC-IN/LOC-ON predicate is actually a three-place predicate. Besides the two arguments representing the region of space and the entity that occupies that space, the locative predicate is always anchored by a space-time phase element. In the analysis below, however, I will only invoke this third argument where it is pertinent to the discussion, in particular for the case of events. For example, objects are located in space; their existence in time is irrelevant for our purposes, since the objects we are concerned with here (say, bridges) do not really change or move over time. Thus, in the anlaysis for object modification by DLs in section 2.4.3, we will omit this space-time anchor for DL predicate interpretation. I also assume that events have a spatial as well as a temporal location. It is indubitable that events take place in time. But with motion events, especially, their location in space is particularly relevant, since there is change of position or location involved. Thus in the analysis of motion events in section 2.4.4, the locative predicate is anchored by a third spatio-temporal argument. For events without changes of location, the spatial element is constant, and therefore a spatial trace of that event is irrelevant to the analysis. This assumption constitutes a crucial distinction between motion events and the other events considered here. In section 2.4.6, only the temporal element appears as the third argument of the locative predicate.

I will now go on to discuss how events and objects can be seen as ordered structures, and how Löbner's notion of phases can be generalized to include eventualities and spatial configurations.

2.4 Events and Objects

2.4.1 Events

Events take place in space and time. I postulate a function μ that gives a mapping from events to space-time traces.

(13) $\mu(e_x)=(s_x,t_x)$

In Krifka (1989) and Piñón (1993), events are mapped onto time with a temporal trace function τ, which preserves any part structure present. In (14), the function τ (Krifka's temporal trace function of an event, or its 'run time') localizes events in time, and $\oplus$ is a primitive operation JOIN. Suppose a running event has two subevents of running as parts. What (14) says is that the result of joining the times of each subevent is identical to the join of the two subevents.

(14) $\forall e \forall e' [\tau(e) \oplus \tau(e') = \tau(e \oplus e')]$

Here, I will assume that the μ function also preserves part structures, and that it can be reduced to this temporal trace function τ for certain purposes, such as when we only want to refer to the temporal structure of the event. What the τ function does, then, is to give, for an event, the set of times such that there are coordinates (which give the location of a point) for which the time and the point (represented as s in (13)) are in the four-dimensional trace of the event (see (15)):

(15) $\tau(e)=\{t|\exists x,y,z <x,y,z,t> \in \mu(e)\}$

In (15), x, y, z stand for the coordinates that give the location of a point, and t stands for the time.

Mapping the temporal trace of an event onto the time line, which has an ordered structure, gives a pre-order of events in time. A pre-order is reflexive and transitive. This allows for the fact that different events can go on in the same period of time.

2.4.2 Objects

Can objects like bridges be treated in the same way? Jackendoff (1992, 1996), extending Marr's (1982) theory of encoding of object shapes, suggests that an object can be decomposed into a hierarchical arrangement of dimensions, where dimensionality is 'essentially the number of orthogonal degrees of freedom within an object' (Jackendoff 1992:29). In this hierarchy, the primary dimension of a road/river/bridge is a line. Moreover, any 1-dimensional axis can have a direction or orientation. Verkuyl and Zwarts (1992) define this notion of dimensionality of an object as the number of spatial orderings that can be imposed on the material parts of that object. A bridge can be seen as one-dimensional, because it can be partitioned into a set of parts that is ordered by one spatial relation, where one slice of the bridge follows another (Verkuyl and Zwarts 1992:496). This gives a 1-dimensional view of the object, with a linear order.

Here, I first introduce a spatial trace of an object, o, analogous to the temporal trace in (14). In (16), the function σ is the 1-dimensional spatial ordering of an object o, which localizes o in space, and preserves any part structure present.

(16) (Spatial trace function):

$$\forall o \forall o' \, [\sigma(o) \oplus \sigma(o') = \sigma(o \oplus o')]$$

Adopting the idea that a one-dimensional object can be partitioned into a set of parts (Verkuyl and Zwarts 1992), the spatial trace function can give the parts of the bridge (s_1, s_2, etc):

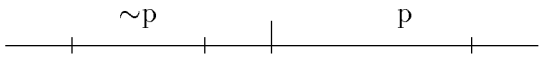
(17) $s_x = \sigma(b_x)$.

Second, I postulate that an object construed as being 1-dimensional can have an orientation or direction. This will be discussed in the following section.

2.4.3 Phases for objects

Objects like bridges are easy to view as consisting of phases. The viewing of objects as 1-dimensional entities, and the spatial trace function (see (16)) allow us to look at a bridge as consisting of parts, as discussed above. The parts of the bridge which are outside of a region — for example, San Francisco — can be one phase (call it ∼p) and the part of the bridge that is within San Francisco is the other (p) (see (18)). In other words, phases are defined in terms of locations occupied by the parts of the bridge as it spans out in space.

(18)



We derive the ordering of phases from knowing the location of San Francisco in relation to parts of the bridge and a given narrative perspective. Whether a bridge can be called a bridge 'into San Francisco' or 'out of San Francisco' depends on the narrator's/speaker's perspective in fixing the point of origin of the bridge. With 'a bridge out of San Francisco', the point of origin is fixed at San Francisco, and the part of the bridge that is located in San Francisco is ordered *before* the part located outside of the city. With 'a bridge into San Francisco', the point of origin is fixed outside of San Francisco, and the part of the bridge that is located in San Francisco is ordered *after* the part located outside of the city.

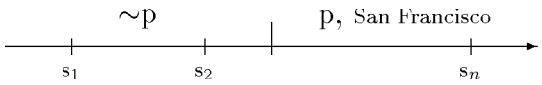
Imagine a bridge that straddles the San Francisco Bay, with one end in San Francisco. Let the phase p be defined in terms of the location predicate applying to San Francisco, LOC-IN(SAN FRANCISCO), such that p contains parts of the spatial trace of the bridge that are within San Francisco (see (19)).

(19) $p(s_x)=1$ iff:

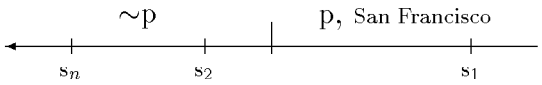
$\exists b_x\ [s_x=\sigma(b_x) \wedge \text{LOC-IN}(s_x, \text{san francisco})]$

And suppose we order the phases p and ∼p as follows: ∼p≺p. This is depicted in (20a) with the axis pointing to San Francisco.

(20) a. 'into' San Francisco:



b. 'out of' San Francisco:



Now, the ordering in (20a) gives the admissible interval I (in terms of p and s) over which we can evaluate *silta San Franciscoon/bridge into San Francisco* (see (21)). We have an interval in which there is a monotonic phase change from ∼p to p, and the truth of the directional locative predicate can be evaluated in the second phase.

(21) I is an admissible interval in terms of p (LOC-IN(san francisco)) and s iff

(i) I = $(s_i, s_e]$ for some $s_i \prec s_e$

(ii) I begins with a phase of not-p:
$\exists s' \in I\ \forall s \in I(s \prec s' \rightarrow \sim p(s))$

(iii) the function p is monotone in the interval I:
for all $s, s' \in I$, if p is defined for s, s' then
if $s \prec s'$ then $p(s) \rightarrow p(s')$

I will assume here that the semantics of both the Finnish and English expressions are the same, hence I will define the truth conditions just for 'a bridge into San Francisco' in (22).

(22) a. a bridge into San Francisco

b. $\exists$a(bridge(a)) and

(i) *I* is an interval, which is an ordering of the range of σ(a), and contains one phase change ($\sim$p$\prec$p) with respect to the location of some part of the spatial trace of the bridge in San Francisco; and

(ii) $\exists s \in I\ \forall y \in I(y \prec s \rightarrow \neg$LOC-IN(y,san francisco)) $\wedge$

$\exists s' \in I\ \forall z \in I(s' \prec z \rightarrow$ LOC-IN(z,san francisco))

Condition (i) is satisfied by having a well-defined admissible interval, as given in (21), that is, there is one and only one phase change. Condition (ii) says that if one part, y, of the spatial trace of the bridge, is early enough in the ordering, it should be located outside of San Francisco, and a later part, z, if it is late enough in the ordering, should be in San Francisco. This condition ensures that the bridge that we are talking about is neither wholly outside of San Francisco, nor wholly inside, but rather, the bridge has to straddle the two regions.

Conversely, *bridge out of San Francisco/silta San Franciscosta* would have the ordering of phases p$\prec\sim$p, if we keep p as the location predicate applying to San Francisco. The ordering is different because the perspective is switched — see (20b), where the axis points away from San Francisco. So, we would evaluate the truth of the Elative predicate at p (see (19)), which is now the first of two phases.

(23) a. a bridge out of San Francisco

b. $\exists$a(bridge(a)) and

(i) *I* is an interval, which is an ordering of the range of σ(a), and contains one phase change (p$\prec\sim$p) with respect to the location of some part of the spatial trace of the bridge in San Francisco; and

(ii) $\exists s \in I\ \forall y \in I(y \prec s \rightarrow$ LOC-IN(y,san francisco)) $\wedge$

$\exists s' \in I\ \forall z \in I(s' \prec z \rightarrow \neg$LOC-IN(z,san francisco))

Consequences

Several consequences follow from this analysis:

First, the semantics given here shows up the empirical (i.e., 'real-life') indeterminacy of what constitutes the transition from ∼p to p for objects like bridges. Notice that condition (ii) in (22) specifies an 'early enough' part of the bridge, and a 'late enough' part of the bridge in terms of ordering of parts. But exactly which part of the bridge is the transition point is left vague. In real life, for example, the renowned Golden Gate Bridge links San Francisco and Marin County. Drivers going from Marin to San Francisco can see a sign that says 'welcome to San Francisco' before crossing the bay.[3] So, while one might think that the coastline of northern San Francisco should be the phase-transition point for the Golden Gate bridge being described as 'the bridge into San Francisco', it need not be strictly so.

Second, in this account, the meaning of DLs is not tied to the idea of fictive motion (cf. Matsumoto (1996b, 1996c), Talmy (1996), Langacker (1987), among others). Fictive motion is invoked by the authors mentioned for linguistic expressions that do not express a real, physical motion of the Subject, but rather some sort of subjectively conceptualized notion of motion. For example, in the examples below (from Talmy (1996)), the road/the mountain range is depicted as 'moving'.

(24) a. This road goes from Modesto to Fresno.

b. That mountain range goes from Mexico to Canada.

But note that the examples in (9)–(10), where DLs are modifiers of nouns, do not involve motion verbs. Also, the orientational reading of the DLs in (9) and (10) cannot be attributed to stative verbs inducing the stative/orientational interpretation

[3]Vignette courtesy of H. de Swart.

(cf. Nam (1995a,b)). Consider the examples below, where directional locatives like *across* and *through* can give a stative reading when they occur with stative verbs:[4]

(25) a. The cat is sitting across the street.

b. Chris saw the cat through the window.

Since the data in (9)–(10) involve neither verbs of motion nor stative verbs, this account of DLs provides an interpretation that is confined within the domain of objects.

Finally, the proper interpretation of noun phrases with DL modifiers will have to take into account the use of these expressions. For example, while a road that has a phase in San Francisco and a phase outside of it can be called *a road into San Francisco*, the same road, if it leads to a toll-booth before entering San Francisco is not usually termed *a road into the toll-plaza*, presumably because roads are usually not seen as helping one to (merely) end up at a toll-booth.

Also, the expression *a ribbon into the city* may seem anomalous, but if a context is provided where the ribbon has some function/use, for example, for ants to crawl on, then the phrase is acceptable. The diphasic model for DL interpretation requires that the modified object be conceived as a 1-dimensional entity, with a particular direction or orientation, thereby giving the ordering of parts. The meanings of 'road' and 'bridge' are conventionally associated with direction — in fact, typically with two directions, depending on where the point of origin is established. But the meaning of 'ribbon' does not come with a conventional direction. Ribbons are usually used for decorating, accessorizing, or for tying things together. If a ribbon straddles two regions — one part being outside the city and the other inside the city, it is clearly semantically compatible with DL modification. What is odd about the expression

[4]I will not be dealing with such cases here. In chapter 5, I discuss a way of handling DL interpretation with stative verbs.

is that we cannot immediately see how the directionality is established. But given that ants use the ribbon, then the ants' passage gives the ribbon a particular point of origin, hence an ordering of its parts.

Below, I show that the present analysis based on phases relates orientation and path structure in a uniform way.

2.4.4 Phases for motion verbs

I have already discussed how events take place in time, and how events can be mapped onto times, given the temporal trace function. But in addition, motion events are closely related to space as well. An entity in motion moves through time, passing through points in space. In other analyses of motion events (Bierwisch 1988, Verkuyl and Zwarts 1992, Piñón 1993, Nam 1995a,b, *inter alia*), the spatio-temporal mapping of motion events is what defines the notion of Path as change of location.

In Verkuyl and Zwarts (1992), for example, a prepositional phrase headed by 'to' is interpreted as an atemporal spatial path $P_{to}=\langle p_1,\ldots p_i,\ldots,p_s\rangle$. Motion events involve a GO function, which provides a temporal structure $\langle t_1,\ldots t_i,\ldots\rangle$. The application of the GO function to the spatial path will be a mapping from the atemporal spatial Path into the temporal Path, creating a new spatiotemporal path $\langle(t_1,p_1),\ldots(t_i,p_i),\ldots\rangle$.

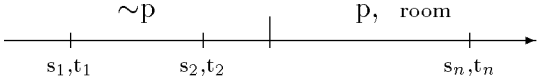
But in the present analysis, it would be wrong to assume that the DLs under consideration refer to paths directly, since with objects and non-motion verbs, no change of location is involved. Motion events involve change of position or location through time, and this is where the space-time trace ((13), repeated here as (26)) comes in useful.

(26) $\mu(e_x)=(s_x,t_x)$

Given that we have the space/time coordinates, the admissible interval for motion events is defined in terms of the change in location of the entity moving through time.

For motion *into a room*, for example, the part of the spatio-temporal trace of the motion event that occurs outside the room can be one phase (call it ∼p), and the part that is within the room can be another (p). The ordering of phases is ∼p≺p.

(27) Order of phases for 'dancing into the room': ∼p≺p.



The truth condition for 'LOC-IN(Pat, room)' is evaluated at p, the second phase. Let p be defined as the phase containing the space-time coordinates of Pat being located in the room (see (28)).

(28) $p(s_x,t_x)=1$ iff:
$\exists e_x[(s_x,t_x)=\mu(e_x) \wedge \text{LOC-IN}(\text{Pat,room},(s_x,t_x))]$

The interpretation of a sentence like 'Pat danced into the room', abstracting away from tense, is given below:

(29) a. Pat danced into the room.

b. ∃e(Dance(Pat,e)) and
(i) I is an interval which is an ordering of the range of μ(e), and contains one phase change (∼p≺p) with respect to the location of Pat in the room at some time; and
(ii) $\exists(s,t)\in I\ \forall(a,b)\in I((a,b)\prec(s,t) \rightarrow \neg\text{LOC-IN}(\text{Pat,room},(a,b))) \wedge$
$\exists(s',t')\in I\ \forall(x,y)\in I((s',t')\prec(x,y) \rightarrow \text{LOC-IN}(\text{Pat,room},(x,y)))$

I do not claim that all dancing motions have a trajectory that yields this ordering of positions. Dancing can well trace random lines/curves in space, and yet not have a trajectory that gives a change of location from ∼p to p. For example, in one dancing event, a dancer can be dancing all around a ballroom, without actually moving out of

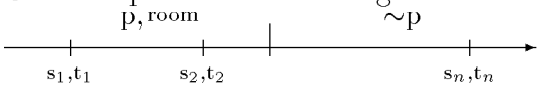
the ballroom. In this case, the dancing event can be given a spatio-temporal mapping, but the mapping does not yield a structure where the dancer is in the ballroom in one phase, and not in the ballroom in the second phase. However, all we need is this: *if* dancing involves a trajectory that crosses a spatial boundary (say, moving across the ballroom door), we get the right structures for defining possible phases; and DLs can only be interpreted given this particular structure. Therefore, the analysis predicts that when dancing has some other configuration, the event is incompatible with DL interpretation.

A related issue (also raised by Löbner (1989)) is that given the definition of admissible intervals as being monotone in terms of p, a dancing event (for example, dancing a tango) that involves going in and out of the room, or that involves backtracking, will have to be ruled out in this model. In such cases, the entire event is correctly predicted to be incompatible with the description 'dancing into the room'. But if we allow the event to be broken down into small enough chunks, that is, if we relativize the points in space/time where there is a trajectory involving one phase change, then that smaller event chunk can be described with the DL. Witness the well-formed description with a DL predicate in (30), in a context where a couple dances the tango all over the house, going in and out of various rooms:

(30) While performing the tango in the house, the couple **danced into the kitchen**.

Let us look briefly at 'dancing out of the room'. Keeping the phases p as location inside the room, and ∼p as location outside the room, the ordering of phases is p≺∼p. And the truth condition for 'out of the room' is evaluated at p, the first phase.

(31) Order of phases for 'dancing out of the room': p≺∼p



The interpretation of a sentence like 'Pat danced out of the room', abstracting away from tense, is given below:

(32) a. Pat danced out of the room.

b. $\exists$e(Dance(Pat,e)) and

(i) I is an interval which is an ordering of the range of μ(e), and contains one phase change (p$\prec\sim$p) with respect to the location of Pat in the room at some time; and

(ii) $\exists(s,t)\in I\ \forall(a,b)\in I((a,b)\prec(s,t) \rightarrow$ LOC-IN(Pat,room,(a,b))) $\wedge$
$\exists(s',t')\in I\ \forall(x,y)\in I((s',t')\prec(x,y) \rightarrow \neg$LOC-IN(Pat,room,(x,y)))

2.4.5 Differences between objects and events

The above treatment of objects and events also predicts how objects and events are different.

For motion events, the ordering of spatial positions, and also the ordering of phases, are dependent on the progression of the motion event through time, and time has an inherent direction. One logical consequence of the spatiotemporal mapping of motion events pursued here is that two expressions such as 'dancing into the kitchen' and 'dancing out of the (same) kitchen' cannot describe the same event in a given time interval. That is, at a given time t, dancing in the kitchen cannot be both a phase p and a phase $\sim$p, in our model. Rather, the two expressions must be interpreted either as (i) describing consecutive events — for example, dancing into the kitchen at time t, and dancing out of the kitchen at time t$'$ (t$\prec$t$'$), or vice versa; or (ii) describing two separate events (i.e., with different participants) that take place at the same time t, given our assumption that the mapping of events onto time gives a pre-order of events in time (section 2.4.1).

On the other hand, recall that the axis representing the spatial ordering of parts of objects has two possible directions, depending on the perspective taken. 'A bridge into San Francisco' and 'a bridge out of San Francisco' can describe the same bridge,

depending on the perspective taken. The bridge has no temporal mapping, and so perspective shift can occur at any point (and any time). But perspective shift cannot be invoked for the manner-of-motion events (denoted by verbs of manner of motion like 'dance', 'run', etc). As discussed above, 'dancing into the kitchen' and 'dancing out of the (same) kitchen' cannot describe the same event at the same point in time.

Even if manner-of-motion verbs do not allow perspective shift, what about verbs like 'come' and 'go', which are deictic verbs of inherently directed motion? Are they susceptible to a similar treatment with objects? The answer is still no.

I described perspective shift for objects as the speaker placing a particular point of origin on a part of the object. Depending on where the point of origin is, a bridge can be described as either 'a bridge into X' (when the point of origin is outside of X) or 'a bridge out of X' (when the point of origin is inside X). But deictic verbs of inherently directed motion (e.g., 'go', 'come') are perspectival in a different way. The speaker places the deictic center either at the point of origin of the motion ('go'), or at the end point ('come'). The example in (33) shows how the same motion event can be described with both the verbs 'go' (33a) and 'come' (33b), with the same DL predicates (the same holds for English (34)). The context for interpreting the following examples is one where Sointu/Tracy leaves the house, and steps into the garden.

(33) a. Sointu mene-e talo-sta puutarha-an.
Sointu go-3SG house-ELA garden-ILL
'Sointu goes out of the house into the garden.'

b. Sointu tule-e talo-sta puutarha-an.
Sointu come-3SG house-ELA garden-ILL
'Sointu comes out of the house into the garden.'

(34) a. Tracy goes out of the house, into the garden.

b. Tracy comes out of the house, into the garden.

Both the (a) and (b) sentences depict motion out of the house, into the garden. Even though 'come' and 'go' have different deictic centers, this does not affect the spatio-temporal mapping of the motion event, which determines the direction of movement. That is why the DL predicates remain constant in both the (a) and (b) examples. In this way, the semantic model developed here reveals the difference between perspective-taking for object description and for event-description.

The above discussion has shown how the present analysis captures the difference between the use of DLs as modifiers of concrete nouns, and as modifiers of motion events. The difference falls out from the ontological properties of time versus space, which we exploit in our temporal and spatial trace functions.

2.4.6 Event structures

We now come to verbs that have posterior, or anterior, entailed states, such as 'forget' and 'find', respectively. How do we motivate the appropriate phases over which to interpret Finnish DLs when they occur with these verbs?

This class of verbs, like motion verbs, denote events that can be given a temporal trace. But they differ from motion verbs in two important ways. First, they do not denote motion, so there is no movement through space, and thus the spatial trace of the argument of the DL predicate is irrelevant. Second, these verbs are culminated events (Moens and Steedman 1988, Steedman 1997). A verb like 'forget' is a typical culminated event, with an entailed consequent or result state. So these verbs have a different lexical aspectual representation from motion verbs, which are processes.

The phases for interpreting DLs with verbs like 'forget' and 'find' will not be defined in spatial terms in the same way as for objects and motion events, because

there is no change of location over time/space. Instead, I argue that Finnish DLs can also be interpreted in phases defined in terms of aspectual development or transition.

The aspectual structure of a verb like 'forget', for example, consists of the event, and a consequent state. The culmination of an event of forgetting a book can be seen as the transition point from one state of affairs to a consequent state. We can consider the consequent state of a forgetting event as a phase p, where there is no longer any potential change of location of the thing forgotten, so the consequent state maintains the position of the book. Supporting evidence for this interpretation of the semantics of 'forget' comes from temporal adverbials which 'specify the time that the *result* [Dowty's emphasis] of the action obtained' (Dowty 1979:251), as shown in (35) for both English and Finnish:

(35) a. I forgot the cake in the oven for two hours.

b. Unohd-i-n kaku-n uuni-in kahde-ksi tunni-ksi.
forget-PAST-1P cake-ACC oven-ILL two-TRA hour-TRA
'I forgot the cake in the oven for two hours.'

Prior to forgetting, however, there is still potential for acting on/doing something with the book, so to speak. Let us call this anterior phase ∼p. So, the culmination of 'forgetting' is a transition between a phase with potential for change, and a second phase with no potential for change. We now have an interval I that has exactly one phase change with respect to the aspectual structure of forgetting.

The phases can be defined in terms of the temporal trace of the aspectual properties of the verb. Recall that the temporal trace of an event is given as (36).

(36) $t_x = \tau(e_x)$

However, for our present purposes, getting the temporal trace of the event (i.e., the time at which the forgetting ocurs) is insufficient. We want to access the consequent

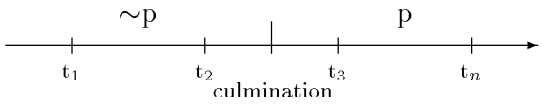
or result state of the event as well, because this is what defines the phase for the interpretation of the Illative/Allative predicates. Since having this type of consequent state is part of the lexical semantics of the verb, I will term this larger semantic property, which encompasses the event denoted by the verb, and its entailed consequent state, the aspectual semantic property of the verb. I will simply label this as 'A'. We can give a temporal trace of A, equivalent to the one we have for the event alone (see (37)).

(37) (Temporal trace of aspectual semantic property):

$t_x = \tau(A_x)$

The temporal trace function τ relates what is a prior and a consequent state of affairs as time-points on a time-line. And because the event of forgetting is a culminated process, the time of forgetting is represented as a point on the time line (the culmination point), within the interval in which we can talk about the aspectual property of the verb (see (38)).

(38)



The Illative predicate is evaluated at p (see (39)). The truth condition for 'Pat forgot the book car-ILLATIVE', abstracting away from tense, is given in (40).

(39) $p(t_x)=1$ iff:

$\exists A_x[t_x = \tau(A_x) \wedge \text{LOC-IN}(\text{book},\text{car},t_x)]$

(40) a. Pat forgot the book car-ILLATIVE

b. $\exists$e(Forget(Pat,book,e)) and

(i) *I* is an interval, which is an ordering of the range of τ(A), and contains one phase change ($\sim$p$\prec$p) with respect to the potential change of location of the book; and

(ii) $\exists$t$\in$I (LOC-IN(car,book,t) $\wedge$ $\forall$t$'\in$I(t$\prec$t$' \rightarrow$ LOC-IN(car,book,t$'$)))

'Forget' does not presuppose anything about the location of the book prior to the culmination of the event. So the prior location of the book is undefined in (40b). What (40bii) says is that given a time t within the admissible interval when the book is located in the car, we know that for all times following *t*, the book will be in the car.

Conversely, the aspectual structure of a verb like 'find' consists of the event, and an anterior entailed state of affairs, that is, the book must be in that location prior to being found. The culmination of the event can be seen as the transition point from this anterior state to another state of affairs. In terms of potential for change, prior to finding the book, there is no potential for changing the location of the book, but after finding it, there is a potential of removing it. Given that the culmination of the 'finding' event is the transition point, we can see two phases, the first phase p where there is no potential for change, and the second phase $\sim$p where there is potential for change.

(41) a. Pat found the book car-ELATIVE

b. $\exists$e(Find(Pat,book,e)) and

(i) *I* is an interval, which is an ordering of the range of τ(A), and contains one phase change (p$\prec\sim$p) with respect to the potential change of location of the book; and

(ii) $\exists$t$\in$I (LOC-IN(car,book,t) $\wedge$ $\forall$t$'\in$I(t$'\prec$t $\rightarrow$ LOC-IN(car,book,t$'$)))

'Forget' only occurs with Illative/Allative predicates, and 'find' only with Elative/Ablative predicates. This falls out from our modelling of the phases based on the inherent entailment properties of the verbs. The Illative predicate only gets an interpretation in a *second* phase p, when p is well-defined by the posterior entailment property of 'forget'. The Elative predicate only gets an interpretation in a *first* phase p, when p is well-defined by the entailment property of 'find'.

This predicts that verbs with posterior entailment properties cannot occur with Elatives, and verbs with anterior entailment properties cannot occur with Illatives, as confirmed in (42) and (43), respectively.

(42)*Tuovi unoht-i kirja-n auto-sta.
Tuovi forget-PAST-3P book-ACC car-ELA

(43)*Tuovi löys-i kirja-n laatiko-on.
Tuovi find-PAST-3P book-GEN box-ILL

In summary, Finnish DLs can be interpreted in the phases determined by the temporal trace of the lexical aspectual structure of verbs. The crucial difference between English and Finnish, I argue, is that English DLs can only access phases that are defined spatially, or spatio-temporally. Thus English DLs do not occur with verbs like 'forget' and 'find' because these verbs do not depict any change of location, and as a result, do not have the relevant mappings of structures in space.

2.5 Predictions

Supporting evidence for this treatment of Finnish DLs comes from the occurrence of DLs with various classes of verbs that share similar aspectual structures as the verbs 'forget' and 'find'.

2.5.1 Verbs of change of state

First, verbs of change of state clearly have two phases in their event structures. The point of change divides a prior and a resultant state. These verbs take directional locatives.

(44) **Verbs that take Illative/Allative complements:**
eksyä 'get lost', *hajota* 'disintegrate', *hukkua* 'drown', *ilmaantua* 'appear', *jakaantua* 'to be divided', *jakautua* 'break down/be divided', *kiintyä* 'become attached to', *kuolla* 'die', *luhistua* 'collapse', *nääntyä* 'die from deprivation', *sortua* 'collapse', *syntyä* 'be born', *syttyä* 'catch fire', *särkyä* 'break', *takertua* 'to become stuck', *tuhoutua* 'be destroyed', *väsähtää* 'get tired'

The Illative predicate in (45) indicates the location in which one remains lost:

(45) Tallella on koti-in-sa eksy-nyt. (Proverb, in Hakulinen (1961))
safe is home-ILL-POSS-3SG get-lost-PCP
'The one is safe who got lost in his home.'

Example (46) is interpreted as the old man getting tired, and remaining on the road.

(46) Ukko väsy-i tie-lle. (Hakulinen 1961)
old-man get-tired-PAST road-ALL
'The old man got tired on the road.'

In (47), the DL predicate indicates not just the place where the birth took place, but has the effect of highlighting the consequence of being born at that location.

(47) Joulu-na Jumala synty-i hevo-n heinähuonehe-sen.
Christmas-ESS God born-PAST-3SG horse-GEN stable-ILL
'At Christmas God was born in a/the horse stable.'
(folk-poetry, in Hakulinen (1961))

'Die' as a change of state verb also takes Illative locatives:

(48) Soma-p' on sota-han kuolla. (*Kalevala*, in Hakulinen (1961))
sweet-CLI is war-ILL die
'It is sweet to die in war.'

(49) **Verbs that take Elative/Ablative complements:**
hävitä 'disappear', *katketa* 'break off', *kuoriutua* 'hatch', *lohjeta* 'break off', *selvitä* 'recover'

The Elative predicates below indicate the prior location/state before a change (although in (51), the change is negated).

(50) Tää-ltä pyrki-i häviä-mä-än tavaro-i-ta. (Penttilä 1963)
here-ABL tend-3SG disappear-INF-ILL thing-PL-PTV
'From (lit. 'off of') here, things tend to disappear.'

(51) Ei se siitä hulluude-sta taida selitä. (Penttilä 1963)
NOT he/she that-ELA madness-ELA may recover
'He/she may not recover from (lit. 'out of') his/her madness.'

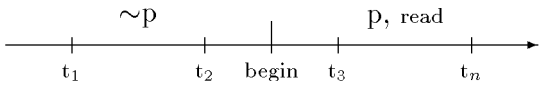
2.5.2 Aspectual verbs

Second, consider aspectual verbs like *ruveta* 'begin', and *lakata* 'stop'. Aspectual verbs that describe the onset of an event (e.g., 'begin', 'start') describe the action of turning the event on (i.e., a transition terminating its off-state and starting an on-state of the same type) (ter Meulen 1995). In Löbner's (1987) phase-semantic account, 'begin' and 'stop' refer to an implicit time parameter t° (which may differ from the time of utterance, because of tense operators, for example), and 'these verbs tell something about the close future, how things go on from t° with respect to the proposition embedded' (Löbner 1987:73). The relevant time interval has two phases,

∼p and p, which contain t°. For stop(p,t°), the first phase is p and has started before t°. If t° is the last point of this phase, then stop(p,t°) is true.

In Finnish, aspectual verbs like *ruveta* and *lakata* take verbal complements that are suffixed with DL Case. Notice therefore that DL Case is not used only in spatial contexts. 'To begin reading' has an anterior phase where no reading occurs, and a transition point starting the reading phase. So the phases here are defined over the temporal-aspectual mapping of 'begin'.

(52) Toini rupea-a luke-ma-an.
Toini begin-3SG read-INF-ILL
'Toini begins reading (lit. 'Toini begins into reading').'

(53) 

'To stop reading', on the other hand, presupposes a posterior phase of reading, then the point of stopping is a transition point, which is followed by a phase where there is no reading.

(54) Toini lakka-a luke-ma-sta.
Toini stop-3SG read-INF-ELA
'Toini stops reading (lit. 'Toini stops out of reading').'

Notice that the Illative occurs with 'begin', and the Elative occurs with 'stop'. This is similar to the patterning with 'forget' and 'find'. In the discussion above, I argued that the Illative predicate only gets an interpretation in the second of two phases (phase p), when p is well-defined by the entailment property of 'forget' (entailing a posterior state of affairs). Here, the Illative predicate gets an interpretation in the second of two phases (phase p), when p is well-defined by the temporal aspectual mapping of 'begin', which describes the start, and continuation thereafter, of a reading event. The Elative predicate gets an interpretation in the first of two phases,

when the first phase is well-defined by the temporal aspectual mapping of 'find' and 'stop'.

This predicts that the Elative cannot occur with 'begin', and the Illative cannot occur with 'stop', as confirmed below:

(55) *Toini rupea-a luke-ma-sta.
Toini begin-3SG read-INF-ELA

(56) *Toini lakka-a luke-ma-an.
Toini stop-3SG read-INF-ILL

(57) **Aspectual verbs:**
alkaa 'begin', *heittää* 'stop', *herjätä* 'stop', *lakata* 'stop', *ruveta* 'begin', *ryhtyä* 'begin', *tauota* 'pause'[5]

2.5.3 Speech act verbs

Third, verbs of exhortation like *kehoittaa* 'encourage', *neuvoa* 'advise', *kieltää* 'forbid', and *varoittaa* 'warn', are intended to bring about a change in another person's actions or intentions. Notice once again the different selections of Illative or Elative predicates by these verbs:

(58) Sointu kehoitt-i Toini-a laula-ma-an.
Sointu encourage-PAST-3P Toini-PAR sing-INF-ILL
'Sointu encouraged Toini to sing.'

(59) Sointu neuvo-i Toini-a lähte-mä-än.
Sointu advise-PAST-3P Toini-PAR leave-INF-ILL
'Sointu advised Toini to leave.'

[5]Compare English *pause from doing X*.

(60) Sointu kiels-i Toini-a poltta-ma-sta.
Sointu forbid-PAST-3P Toini-PAR smoke-INF-ELA
'Sointu forbade Toini to smoke.'

(61) Sointu varoitt-i Toini-a lähte-mä-stä.
Sointu warn-PAST-3P Toini-PAR leave-INF-ELA
'Sointu warned Toini against leaving.'

The distribution of Elative versus Illative predicates here can be understood in terms of the interpretations of speech act verbs and their complements. I will not formalize things here, but merely sketch out the possible interpretations in order to illustrate the idea of phases here; for more detailed discussion, see for example, Wierzbicka (1988) and Rohrbaugh (1995).

Rohrbaugh (1995), integrating work by Horn (1972), Hirschberg (1985), and Merin (1994), shows that deontic speech acts (permissions and commands) involve scalar implicatures. In Rohrbaugh's analysis, options are modelled as a set of branches in a branching time structure. Generally, permitting Φ has the effect of adding Φ branches to this set, while forbidding Φ would remove the respective Φ branches.

For our purposes, we can consider the following: for *kieltää* 'forbid' and *varoittaa* 'warn', the speaker removes an initial set of options available to the addressee, but the verbs do not carry any expectations as to what might happen next. The verb suffixed with Elative Case in (60) and (61) is a predicate that refers to the initial option (the first phase). In the case of *kehoittaa* 'encourage' and *neuvoa* 'advise', the speaker considers 'a future action of the addressee' (cf. Wierzbicka 1988:36ff), but the initial set of options available is irrelevant. The Illative verbal predicate in (58) and (59) refers to this 'future action' (in the second phase).

2.5.4 Two meanings of 'remain'

Finally, in Finnish, there is a difference in meaning between the verbs *jäädä* (which I gloss as 'remain') and *pysyä* 'stay'. This is reflected in the locative predicates that the verbs select: *jäädä* takes DL predicates (62), while *pysyä* does not (63).

(62) Neva-n suu jä-i Täyssinä-n rauha-ssa venäläis-i-lle.
Neva-GEN mouth remain-PAST-3SG Täyssinä-GEN treaty-INE Russian-PL-ALL
'In the Treaty of Täyssinä the mouth of the Neva went to the Russians.' (Perhaps the Neva changed hands.)

(63) Neva-n suu pysy-i Täyssinä-n rauha-ssa venäläis-i-llä.
Neva-GEN mouth stay-PAST-3SG Täyssinä-GEN treaty-INE Russian-PL-ADE
'In the Treaty of Täyssinä the mouth of the Neva stayed in the possession of the Russians.' (There was no change of hands.)

In (62), there is a possibility that the Russians might not have had claims on the River Neva before the treaty, and after the treaty, they definitely did. This is captured by the DL predicate (the Allative). On the other hand, (63) with *pysyä* does not presuppose any change could have taken place, and so, we cannot postulate any phases where there might be a change. As such, DL predicates do not occur with such a verb.

Another example is given in below. In (64), the situation is such the initiative may have been given to the people; prior to that, someone else might have had the initiative. No such interpretation is found with (65).

(64) Aloitteen teko jä-i mei-lle.
initiative- action remain-PAST-3SG us-ALL
(Interpretation:) 'We were left with the task of making the initiative.'

(65) Aloitteen teko pysy-i mei-llä.
initiative- action stay-PAST-3SG us-ADE
(Interpretation:) 'The initiative remained with us.'

2.6 Summary

The meanings of English DLs have always been noted to encode a meaning of change (Dowty 1979, Jackendoff 1990). The question for such an interpretation is how orientation meanings can come about. Finnish DLs can be seen as lacking a change meaning, and therefore they can occur with verbs that do not denote change (Fong 1997c). The question for this approach is how these locatives can occur with motion verbs to denote change of location.

I have shown that the diphasic approach to the interpretation of DLs presented here gives a uniform treatment of the meaning of DLs in cases where Finnish and English behave the same (i.e., with motion verbs and objects). In addition, I have shown that Finnish differs from English in allowing the interpretation of DL predicates in non-spatial domains.

In this semantic model, DLs have a very abstract meaning, independent of space and time. DLs are interpreted in one of the two ordered phases. Their occurrence with particular classes of verbs, and types of nouns are explained by the spatial, spatio-temporal, or temporal-aspectual mappings of objects and events giving rise to diphasic, ordered structures. One might ask then whether reflexes of Finnish DL Case can be found outside the space-time domain. And indeed there are such cases, as shown below.

The usual comparative construction in Finnish uses the function word *kuin* 'than'.

(66) Pekka on vanhe-mpi kuin Matti.
Pekka is old-COMP than Matti
'Pekka is older than Matti.'

However, in some dialects of Finnish (e.g., Karelia and Häme), comparatives can also be formed using the Elative Case:

(67) Pekka on Mati-sta vanhe-mpi.
Pekka is Matti-ELA old-COMP
'Pekka is older than Matti.'

On a scale of oldness, Matti precedes Pekka, and so Matti gets the Elative suffix.

In (68), on the scale of greatness, 2 precedes 3.

(68) Kolme on kahde-sta suure-mpi.
three is two-ELA great-COMP
'Three is greater than two.'

In the semantic model, the number line is a pure ordering relation, independent of time and space. But the above examples show that this is sufficient for DL interpretation. Attested occurrences of such constructions include the following transcriptions of spoken language:[6]

(69) Kun s- ol kymmenev vuotta minu-st vanhe-mp.
as s/he was ten year-PAR I-ELA old-COMP
'As s/he was ten years older than me.'
(lit.) 'As he/she was ten years out of me older.'

(Asikkala parish, Häme)

(70) Se ta... taas renki-stä pikkusen yle-mpi miäs se on.
he again again farmhand-ELA a-little high-COMP man he is
'He again was a man of slightly higher rank than a farmhand.'
(lit.) 'He again out of a farmhand a slightly higher man he was.'

(Hattula Parish, Häme)

What DLs are sensitive to is the order of things: for events, whether states of affairs precede or follow events; for objects, whether the point of view regards one

[6]I thank Tarja Heinonen for providing me with the data from Lauseopin arkisto (the Finnish Syntax Archive).

piece of object as preceding or following another. In addition, the analysis I developed here exploits the (physical?) nature of objects and time. This allows us to predict that perspective shifts can take place for objects, but not for events.

Chapter 3

Manner-of-motion verbs and path structures

In the discussion of how DLs get change of location interpretations with manner-of-motion verbs, I argued that it is the spatio-temporal mapping of motion events that gives rise to appropriate structures for DL interpretation in both Finnish and English.[1] I proposed that only if the motion event involves a trajectory (giving a change of location) do we get the right structures for defining the necessary phase-transitions, and DLs can only be interpreted given this particular structure.

In this chapter, I will elaborate on how the appropriate structures are established in the composition of DLs with verbs of manner of motion. Verbs like 'dance' and 'run' specify a manner of motion, but do not indicate a specific direction of motion. It is generally considered that the basic meaning of these verbs does not refer to a specific Path. I have argued that the DLs like *into* and *out of* (and their equivalents in Finnish) do not directly refer to Paths. But when a manner-of-motion verb occurs with DLs, as shown in (1), there is an unequivocal change of location interpretation:

[1] Parts of this chapter contain revised material from a paper I presented at WCCFL 16, University of Washington, 1997, which will appear in the proceedings published by CSLI (Fong 1997b).

(1) a. The cat ran out of the room.

b. Kissa juoks-i huonee-sta.
cat run-PAST-3SG room-ELA
'A/The cat ran out of a/the room.'

In these examples, the path of movement must be such that the cat moves from inside the room to the outside at the end of the event. This raises the question of how change of location readings get constructed in sentences like (1).

An answer to this question inevitably has to take into account the semantics of parts of the sentence, particularly the semantic contribution of the DL predicate, and of the verb. In sections 3.1 through 3.4, I propose that manner-of-motion verbs in Finnish and English are consistent with both directed and non-directed motion. I argue that this class of motion verbs are capable of incorporating change of location meanings in their event structures.

The issues raised, and the solution proposed in this chapter weigh in on the current debate among theories of verbal polysemy, about how semantics ties in with argument structure and the aspectual interpretations of sentences. The issues behind the debate will be summarized, and I will argue for a lexicalist approach to verbal polysemy. I show in section 3.5 that this approach correctly predicts typological differences in the argument structures of languages like French, Mandarin Chinese, Finnish, and English.

3.1 Aspectual alternation in the verb

I have argued that the DLs operate on a diphasic structure. We found that diphasic structures may be inherent in the way objects are placed in the real world, or in the entailment structures of events. Motion events, which take place in space and time, can be given spatio-temporal mappings, such that, depending on the actual

course of motion, diphasic structures can also be established. I proposed that only if the motion event involves a change of location (reflected as phase-changes in the diphasic model, from one location, p, to another, ∼p), do we get the right structures for defining the appropriate phase-transitions, thereby giving the proper structures for DL interpretation.

Motion verbs like 'come', 'go', 'descend', and 'fall' have inherent trajectories, and in this framework, their occurrence with DL predicates is unproblematic.

(2) Sointu tule-e huonee-seen.
Sointu come-3SG room-ILL
'Sointu comes into the room.'

(3) Sointu mene-e koulu-un.
Sointu go-3SG school-ILL
'Sointu goes to (lit. 'into') school.'

(4) Puu kaatu-i vete-en. (Penttilä 1963)
tree fall-PAST-3SG water-ILL
'A/The tree fell into water.'

In contrast to 'come', 'fall', etc., manner-of-motion verbs like 'dance' and 'run' specify a manner of motion, but do not indicate a specific direction of motion. As Levin and Rappaport Hovav (1995:147) point out, 'although the action described by a verb of motion inherently describes a kind of change, it is not directed.' Asher and Sablayrolles (1995) label this class of verbs as verbs of **inertial change of position**, and define them as implying (note: not entailing), by default, a change of position for the moving entity. With spatial ('non-directional') locatives, these verbs do not show change of location (see (5, 6)).

(5) a. The mouse danced on the roof.

b. Hiiri tanss-i kato-lla.
mouse dance-PAST-3SG roof-ADE.
'A/The mouse danced on a/the roof.'

(6) a. The mouse danced on the spot.

b. Hiiri tanss-i paika-lla-an.
mouse dance-PAST-3SG spot-ADE-POSS.
'A/The mouse danced on the spot.'

The spatial locatives in (5, 6) introduce the location where the event takes place, but the entire event occurs inside this location.

However, the felicitous use of DL predicates with manner-of-motion verbs requires that the movement involves a change of location. In (7), the mouse has to be located in the kitchen when it starts dancing, and outside the kitchen after.

(7) a. The mouse danced out of the kitchen. #It remained in the kitchen.

b. Hiiri tanss-i keittiö-stä. #Se jä-i keittiö-ön.
mouse dance-PAST-3SG kitchen-ELA it remain-PAST-3SG kitchen-ILL
'A/The mouse danced out of a/the kitchen. #It remained in the kitchen.'

From this set of data, we can come to three different conclusions about how change of location meanings get constructed. One, the manner-of-motion verbs are able to depict both non-directed motion, and directed motion (i.e., motion with change of location). Gruber (1965), for example, claims that motion verbs in English can express a change or transition of some sort, through time, based on English examples similar to (7a). He does not however address the cases where verbs of motion can have a non-transition reading, such as those in (5, 6). Crucially, what distinguishes the two different interpretations of (5) and (6) on the one hand, and (7) on the other,

is the additional meaning of **change of location** in (7). The consequence of viewing manner-of-motion verbs as unspecified for directed or non-directed motion is that the non-directional locatives in (5, 6), and the directional ones in (7) merely serve to disambiguate the possible situations that manner-of-motion verbs describe. This position resonates with our analysis of DLs in chapter 2.

Alternatively, manner-of-motion verbs can be treated as specifying only the manner of motion. DLs change the interpretation of the verb, giving a directed motion reading at the VP level when the verb combines with the DLs. This view entails that the DLs are responsible for the shift in meaning in (7).

Both approaches share a common assumption of compositionality in sentential meanings. The second approach is strictly compositional. That is, it requires that all entailment relations in a sentence result from the direct contribution of some lexeme of the sentence.[2] No additional semantic rules are required in accounting for the sentential meaning: the meanings of the parts combine to give the meaning of the whole. The first approach is also compositional, but not strictly so. It allows for certain lexemes to have more than one meaning. For example, when a manner-of-motion verb is unspecified for non-directed and directed motion (meanings a and b), and a preposition has meaning c, the composition of the two elements in a sentence may give rise to a meaning $a + c$. That is, the meanings of the parts can be more than the meaning of the whole.

A third possible conclusion is that the change of location meaning in sentences like (7) is non-compositional: the meaning of the parts cannot determine the meaning of the whole. So there has to be an additional constructional meaning that accounts for the meaning of the construction.

The three points of view outlined above represent the stances that current theories take on variable verbal behavior. Manner-of-motion verbs — just one of many verb

[2]I am adopting Carter's (1988) definition of Strict Compositionality here.

classes exhibiting variable behavior — are not merely confined to the change of position/change of location contexts discussed above. An illustration of the combinations of arguments and adjuncts that agentive manner-of-motion verbs can take is given in (8).

(8) a. Hobbes ran (for/ *in two minutes).

b. Calvin ran into the ice-cream parlor (*for/in two minutes).

c. Calvin and Hobbes ran clear of danger.

d. Calvin and Hobbes ran themselves ragged.

e. Calvin ran the soles of his sneakers flat.

In the following sections, I will couch the discussion of specific theories in terms of how they would handle the alternation between change of position/location meanings that manner-of-motion verbs exhibit. This type of alternation has been viewed as an aspectual alternation between Activity and Accomplishment meanings (as the well-known aspectual test with time adverbials shows in (8a,b)).[3]

3.1.1 Lexicality

The first approach can be dubbed the lexicalist approach. In most lexicalist approaches, the verb is seen as ambiguous, and has different lexical entries, each one determining one of various syntactic outputs (Levin and Rappaport Hovav 1995, Rappaport Hovav and Levin 1996, Pinker 1989, Jackendoff 1990, *inter alia*). Individual approaches differ: Dowty (1979) uses meaning postulates; Levin and Rapoport (1988),

[3]This abstracts away from other factors that may affect the telic/atelic aspectual reading of a sentence, such as the Imperfective or the Progressive operators, and the semantic type of the nominal categories involved as arguments of the verb.

and also Carrier and Randall (1993), use lexical subordination. For example, Levin and Rappaport Hovav (1995) classify verbs of manner of motion as unergatives.[4] But they note that these verbs can acquire an additional meaning — as verbs of directed motion — when they occur with directional phrases. In this case, they behave like unaccusatives. The additional meaning acquired by the verb is attributed to the application of a lexical rule.

In their latest series of papers, Levin and Rappaport Hovav claim that verbal polysemy involves systematic verb classes, and verbal ambiguities are thus not accidental. They argue that verbs denoting Activities can extend their meanings to yield various kinds of Accomplishments that involve an addition of a resulting state/location (Levin and Rappaport Hovav 1992, 1995, Rappaport Hovav and Levin 1996). In their framework, verbs are associated with semantic templates modelled after Dowty's predicate decomposition of aspectual classes, illustrated in (9). The grammatically-relevant aspects of verb meaning are those which define event types. The lexical semantic template is called an 'event structure template', reflecting the observation that combinations of primitive predicates (e.g., CAUSE, BECOME, ACT, STATE) correspond to generally acknowledged event types (Rappaport Hovav and Levin 1996).

(9) a. Activity: [x ACT]

b. Accomplishment: [[x ACT] CAUSE [BECOME [y AT <PLACE>]]]

[4]From Levin and Rappaport Hovav's (1995) Government and Binding perspective, the difference between unergative verbs and unaccusative verbs is structural, with the D-Structure configurations in (i).

(i) a. Unergative verb: NP [$_{VP}$ V]

b. Unaccusative verb: __ [$_{VP}$ V NP/CP]

Verbs of manner of motion classify as unergatives because Levin and Rappaport Hovav's argument linking rule says that the immediate cause of the eventuality described by the verb is the external argument; verbs like 'run' only have one argument, and that argument is the immediate cause. In contrast, 'arrive'/'come' verbs, which are verbs of inherently directed motion, are classified as unaccusatives.

(10a) shows how a manner verb, which modifies an activity, is associated with an Activity template. The variation in verb meaning is attributed to (monotonic) FREE COMPOSITION, which allows more complex event structure templates to be built on simpler ones. Accomplishments are made up of the causing event (an Activity) and the change of location or state it brings about. So, the Accomplishment meaning of a manner verb would arise via Free Composition, resulting in (10b).

(10) a. [x ACT$_{<\text{MANNER}>}$]

b. [[x ACT$_{<\text{MANNER}>}$] CAUSE [BECOME [y AT <PLACE>]]]

Verbs denoting States are associated with the template in (11a), and by Free Composition, they can extend their meanings to become Achievements (11b).

(11) a. State: [x <STATE>]

b. Achievement: [BECOME [x <STATE>]]

Thus in Levin and Rappaport Hovav's approach, the multiple lexical representations of verbs is modelled by template expansion. I will be exploiting their idea of aspectual shift from Activity to Accomplishment in my account of Finnish locative predication below.

3.1.2 Type coercion in aspectual transitions

The second approach is typified by Pustejovsky 1995. Pustejovsky's (1995) idea of co-composition is a syntactic account of verbal polysemy. While recognizing that the lexical semantics of verbs are involved in the meaning of verb phrases (VPs) with directional prepositional phrases (PPs), he attributes directional PPs as being responsible for deriving new verb senses, and so the conflated sense for the verb 'exists only phrasally and not lexically' (Pustejovsky 1995:125ff).

Pustejovsky (1995) argues that event structure constitutes one level of semantic specification for a lexical item. In his framework, there are three basic event types that a verb can belong to: STATES, PROCESSES, and TRANSITIONS (cf. also Vendler (1957), Dowty (1979), Bach (1986), Verkuyl (1993), Piñón (1995), de Swart (to appear)). English PPs are treated as as compositionally providing the transformation from process to transition. The PP (e.g., *to the store*) projects its own event structure, the STATE of being at the store. The preposition *to* is analyzed as denoting a relation between states and processes, such that the resulting type is a transition. So the PP is a function from processes to transitions. When a verb denotes a process (e.g., *run, push*), and there is a phrase present which denotes a function from processes to transitions, then the event type of the entire VP is construed as a transition (e.g., *Mary ran to the store*). The advantage of having type coercion is that it retains the idea of (strict) compositionality, while allowing for different interpretations of a given expression.[5] The new sense of the verb arises out of syntactic and semantic composition in the grammar, and there is no need to postulate additional word sense for the verb.

3.1.3 Constructional approaches

The third approach, which invokes constructional meanings, takes several forms. I summarize two versions here.

Hoekstra: Small Clauses

In Hoekstra's (1992) view, the multiple meanings associated with verbs are determined by the constructions — the distinct syntactic representations — they appear

[5]Compare the literature on type shifting with respect to aspectual interpretations (e.g., de Swart (to appear)), and in other domains like Noun Phrases (e.g., Klein and Sag (1985), Partee and Rooth (1983), Partee (1987)).

in. Hoekstra (1984, 1992) and Hoekstra and Mulder (1990) use the the small clause structure configuration to account for result-location readings with manner-of-motion verbs in English and Dutch. In their framework, the semantic complexity of Accomplishment readings is reflected by syntactic complexity. All Accomplishments have a small clause that is governed by a verb (see (12)):

(12) NP_i INFL V $[_{SC}$ t_i PP]

In this representation, the verb is unergative (a view also shared by Levin and Rappaport Hovav, as discussed above), and the PP is a complement, not an adjunct. Also, the S-structure subject forms a Small Clause with the PP-predicate at D-structure.

Hoekstra and Mulder (1990) cite as supporting evidence for this representation the facts of PP predication and auxiliary selection in Dutch, as given in (13). When the auxiliary *hebben* is selected, the locative PP does not denote an endpoint of motion; rather, it denotes the location where the activity takes place (13a,b). When *zijn* is selected, the predicate denotes a change of location (13c,d).

(13) a. dat Jan in de sloot gesprongen is/heeft.
that Jan in the ditch jumped is/has

b. dat Jan naar Groningen gewandeld is/heeft.
that Jan to Groningen walked is/has

c. dat Jan naar de overkant gezwommen is/ *heeft.
that Jan to the other-side swum is/ *has

d. dat de vogel het raam uit gevlogen is/ *heeft.
that the bird the window out flown is/ *has

Hoekstra and Mulder claim that the verb always retains its basic activity meaning and the change of location interpretation is the result of interpreting the PP as denoting either the endpoint, or the location where the activity occurs. They maintain

that 'for anything to have an impact on the aspectual nature [of a construction], it must be a complement' (Hoekstra and Mulder 1990:8). The adjunct status of the PP when it occurs with the auxiliary *hebben* is apparent in (14). (14a) shows that the PP is optional. In (14b), the PP occurs in post-verbal position. In (14c), the PP can be separated from the verb by other material.

(14) a. dat Jan gesprongen heeft.
that Jan jumped has
'that Jan has jumped.'

b. dat Jan gesprongen heeft in de sloot.
that Jan jumped has in the ditch
'that Jan has jumped in the ditch.'

c. dat Jan in de sloot vaak gesprongen heeft.
that Jan in the ditch often jumped has
'that Jan in the ditch often has jumped.'

Hoekstra and Mulder claim that with the auxiliary *zijn*, none of these possibilities exist (see (15)), and so the PP in this case must be a complement. There is one caveat to this generalization: (15a) is actually good if there is an implicit directional reading. For example, in a suicide context where jumping could mean jumping off a bridge, or in front of a train, (15a) can be used felicitously (de Swart, p.c.).

(15) a.*dat Jan is gesprongen.
that Jan is jumped

b.*dat Jan is gesprongen in de sloot.
that Jan is jumped in the ditch

c.*dat Jan in de sloot vaak gesprongen is.
that Jan in the ditch often jumped is

However, I will show below that the complement/adjunct distinction proposed by Hoekstra (1992) and Hoekstra and Mulder (1990) cannot correctly predict differences in aspectual readings for manner-of-motion verbs in Mandarin Chinese. Moreover, as pointed out by Zaenen (1993), Hoekstra fails to account for the fact that auxiliary selection does not pick out the same class of verbs as the test for whether a verb has an impersonal passive alternate (see Perlmutter (1978)). Thus, Hoekstra's approach does not give a complete analysis of the verb alternation phenomena.

Goldberg variations

Goldberg (1995, 1996) argues for grammatical constructions that are pairings of form and meaning, which exist independently of particular verbs. According to Goldberg (1995), the semantics of particular expressions is the result of integrating the semantics of verb classes and the semantics of the constructions.[6] That there is an extralexical level of constructions in grammar is a central claim of Construction Grammar (see Fillmore and O'Connor (1988), Fillmore and Kay (1993)).

Recently, Goldberg (1997) argues that her constructional approach and Levin and Rappaport Hovav's lexical approach share the common assumption that there are two sources from which argument structure draws semantic information. The first is tied more closely with semantic properties of individual verbs, the verb's core meaning, and the second is associated with constructions that the verb appears in, independent of the core lexical meaning of the verb.

At least in the case of aspect shift, I find that a lexical account provides a means of discussing how languages differ, as will be shown in section 3.5.1.

[6] As pointed out by Taylor (1995), constructional meaning is rather broad, and may include information on conditions and context of use.

3.1.4 The case for lexicality

It has been argued that the strictly compositional approach is advantageous from a computational perspective, since no multiple meanings of verbs need to be posited (Pustejovsky 1995). However, the first approach (allowing verbs to have variable meanings) can be supported if we can show independently that motion verbs are indeed capable of having both directed and non-directed meanings. This is what I will defend here. Further, I argue that similar systematic alternation exists in other classes of verbs as well. Given that a compositional (albeit not 'strict') approach is defensible, it follows that constructional meanings need not be invoked for these cases.

The reasons why DLs should not simply be thought of as contributing change of location meanings are as follows: First, DLs occur in cases where a Path reading is a defeasible implicature. (16) shows that 'breaking a vase off a shelf' does not entail that the vase falls off the shelf. The Ablative predicate describes the location of the vase prior to the cat breaking it.

(16) Kissa rikko-i maljako-n hylly-ltä. Palase-t jä-i-vät
cat break-PAST-3SG vase-ACC shelf-ABL piece-PLU remain-PAST-3PLU
hylly-lle.
shelf-ALL
(lit.) 'A/The cat broke a/the vase off a/the shelf. The pieces remained on the shelf.'

Second, DLs can occur with stative verbs like *jäädä* 'remain' (17), and verbs denoting culminated events like *unohtaa* 'forget' (18), and *saapua* 'arrive' (19), where change of location meanings are unmotivated.

(17) Toini jä-i komero-on/ *komero-ssa.
Toini-NOM remain-PAST-3SG closet-ILL closet-INE
'Toini remained in (lit. 'into'/ *'in') the closet.'

(18) Toini unoht-i kirja-n auto-on/ *auto-ssa.
Toini forget-PAST-3P book-GEN car-ILL car-INE
'Toini forgot a/the book in (lit. 'into'/ *'in') a/the car.'

(19) Juna saapu-i asema-lle
train arrive-PAST-3SG station-ALL
'A/the train arrived onto a/the station.'

Now, if we maintain that DLs do not have a change of location meaning, then we have to consider what variation of verb meaning examples like (5) and (7) involve. In (5), there is the basic meaning of *tanssia* 'dance', which is 'to move in a dancing manner', but there is no specification of a particular direction of motion, and this sense of the verb is compatible with no change of location (6). Let us call this the Activity reading of the verb (following Vendler (1957)). In (7), there is the additional meaning of change of location — let us call it the Accomplishment reading, since Accomplishments are recognized as complex events comprising a causing event and the resultant change of location (or change of state).[7]

In the literature on event semantics and Aktionsarten, it is generally acknowledged that processes can shift their event type to become transitions (cf. Hinrichs (1985), Moens and Steedman (1988), Krifka (1989), Pustejovsky (1991, 1995)). Here, I propose that manner-of-motion verbs, which are basic Activity verbs, can undergo LEXICAL ASPECT SHIFT to become Accomplishments.

Aspect shift is found elsewhere in Finnish and English — consider the cases below.

[7]This event structure for Accomplishments is adopted variously by Dowty (1979), Parsons (1990), Pustejovsky (1992, 1995), Rappaport Hovav and Levin (1996) and Van Valin (1993).

3.2 Other aspect shifts

3.2.1 States and Achievements

Another type of verb that undergoes aspect shift is the class of posture verbs.[8] These include, for English, the list in (20).

(20) *bend, bow, crouch, flop, hang, kneel, lean, lie, perch, plop, sit, slouch, slump, sprawl, squat, stand, stoop, straddle*

These verbs can have either States or Achievement meanings. Levin (1993) calls the verbs with State meanings verbs of spatial configuration, and those with Achievement meanings verbs of assuming a position. An example is given in (21). (21a) is ambiguous between a State and Achievement meaning (notice that *behind* does not have a path meaning), while (b) and (c) provide contexts where the verb is unambiguous.

(21) a. He crouched behind a lilac bush. (OED, citing Marryat, *Jacob Faithful*) [State/Achievement]

b. A pair of cats, crouching on the brink of a fight. (Webster, citing A. Huxley) [State]

c. At the sound of the whistle, the sprinters immediately crouched and waited for the gun. [Achievement]

The ambiguity is clear in Finnish. As (22a) shows, the Achievement meaning of *istua* 'sit' that is (optionally) present cannot come from a DL, as there is none. The natural explanation, then, is that the verb itself is ambiguous. (22b) and (22c) give the disambiguating contexts.

[8] See Levin (1993) and Talmy (1985) for more discussion of these verbs.

(22) a. Tuovi istu-i. [State/Achievement]
Tuovi sit-PAST-3SG
'Tuovi sat.'

b. Tuovi istu-i nojatuoli-ssa. [State]
Tuovi sit-PAST-3SG arm-chair-INE
'Tuovi sat in the arm-chair.'

c. Tuovi istu-i nojatuoli-in. [Achievement]
Tuovi sit-PAST-3SG arm-chair-ILL
'Tuovi sat down in the arm-chair.'

Another example with the verb *kumartua* 'bend' is given in (23). (23a) describes the static position of the trees. (23b) involves Tuovi assuming a bending position.

(23) a. Puu-t kumartu-vat joe-n yli.
tree-PLU bend-3PLU river-GEN over
'The trees bend over the river.'

b. Tuovi kumartu-i poimi-ma-an kynä-n lattia-lta.
Tuovi bend-PAST-3SG pick-INF-ILL pen-ACC floor-ELA
'Tuovi bent to pick a/the pen of the floor.'

The verbs belonging to this class include those in (24).[9]

(24) *istua* 'sit', *kaartua* 'bend', *kumartua* 'bow', *polvistua* 'kneel'

Another class of verbs that show a State-Achievement alternation is the class of internally caused change-of-state verbs in English (Levin and Rappaport Hovav 1995, Rappaport Hovav and Levin 1996). This includes the following verbs:

(25) *bloom, blossom, burn, stagnate*

[9]In addition, *nojata* 'lean' only takes Illative DLs, but it can be construed as either assuming a leaning position or being in a leaning position. This further supports the argument that it is the verb, and not the DL predicate, that is responsible for the alternation in meanings.

These verbs have both a 'be-in-state' reading and a 'change of state' reading.

(26) a. The amaryllis blossomed for ten days. [State]

b. The tree blossomed in a day. [Achievement]

There seems to be a dialectal difference with regard to the acceptability of *bloom* and *blossom* verbs as States. Some speakers only accept the Achievement-type readings, while others — generally British English speakers, I have found — accept both uses of the verbs. Nevertheless, attested State readings can be found:

(27) a. There the rose of joy bloomed immortal by dale and stream[...] (L.M. Montgomery, *Anne of Avonlea*)

b. The once unshorn face of nature had given way, and the farm now blossomed with a splendid harvest. (W.W. Brown, *Clotelle*)

c. [...] behold, the bush burned with fire, and the bush was not consumed. (*The King James Bible, Exodus 3:2*)

d. Whenever air stagnates long, it becomes unwholesome. (OED: W. Buchan, *Domestic Medicine*)

Similar patterns are found with Finnish verbs *kasvaa* 'grow', *kukkia* 'bloom', and *palaa* 'burn'.

(28) a. Sananjalka kukk-i. [State/Achievement]
fern bloom-PAST-3SG
'A/The fern was in bloom/bloomed.'

b. Sananjalka kukk-i koko juhannusyö-n. [State]
fern bloom-PAST-3SG whole midsummer-night-ACC
'The fern bloomed throughout the midsummer night.'

c. Yhtäkkiä sananjalka kukk-i häne-n silm-i-e-nsä
suddenly fern bloom-PAST-3SG s/he-GEN eye-PL-GEN-POSS-3SG
edessä. [Achievement]
before-INF
'Suddenly the fern bloomed before his/her eyes.'

(29) Talo palo-i. [State/Achievement]
house burn-PAST-3SG
'The house was burning/burned.'

(30) a. Oja-n piel-i-ssä kasvo-i pajupensa-i-ta. [State]
ditch-GEN side-PL-INE grow-PAST-3SG willow-bush-PL-PAR
'On the sides of the ditch there were growing willow bushes.'

b. Oja-n piel-i-in kasvo-i pajupensa-i-ta.
ditch-GEN side-PL-ILL grow-PAST-3SG willow-bush-PL-PAR
'Willow bushes sprouted up on the sides of the ditch.'
[Achievement] (Penttilä 1963)

By assuming aspect shift, therefore, we can uniformly account for Activity and State verbs becoming Accomplishment and Achievements, respectively, in both Finnish and English.

3.3 Motion verbs again

The present approach, which appeals to the alternation of aspectual properties of the verb, differs from Pustejovsky (1995) and other aspectual coercion approaches in one respect. Pustejovsky, for example, treats English PPs as functions from processes to transitions. He argues that in examples like (31), the new sense of the manner verb (31b) arises out of the syntactic and semantic composition in the grammar.

(31) a. The bottle floated in the cave.

b. The bottle floated into the cave.

Pustejovsky's proposal is untenable for Finnish DLs. As I have shown, DLs do not encode change of location meanings in the various contexts discussed in (16–19). Moreover, the 'input' (or argument) for the DL functor need not always be a process. DLs can occur with stative verbs like *jäädä* 'remain', verbs denoting culminated events (which are inherently transitions) like *unohtaa* 'forget', and *saapua* 'arrive'.

There is a problem with Pustejovsky's analysis of English as well. With the examples in (31), English verbs of manner of motion seem to work as Pustejovsky suggests: the conflated sense for the verb may be built up when it combines with a 'Path' preposition. But what about examples like (32) below, which, as Leech (1970) and Carter (1988) (among others) have observed, are ambiguous between process and transition readings? (32a), for example, can mean either that the hamster was running around under the table, or that it ran and ended up being under the table (whether it went on running after is unspecified).

(32) a. The hamster ran under the table.

b. The frog jumped on the table.

c. The bottle floated under the bridge.

And the usual meaning associated with (33) is that of walking past under the ladder:

(33) It is also very unfortunate to walk under a ladder...

(C. MacKay, *Extraordinary Popular Delusions*)

The problem is that if the verb is not polysemous in such cases then Pustejovsky's approach is committed to positing ambiguous prepositions. The prepositions *under*

and *on* must have a pure locational meaning to give the process interpretations, and in addition, they must have a Path meaning for the transitional interpretations. It is valid to ask, then, whether positing ambiguous prepositions is computationally less costly than positing ambiguous verb classes.

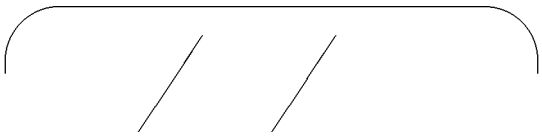
Also, for independent reasons, I argue that these prepositions do not have additional Path meanings; rather, the English manner-of-motion verbs must allow aspect shift too. If *under* is ambiguous between a Path and non-Path reading, we would expect the ambiguity to show up elsewhere. However, this expectation is not borne out. Consider the example in (34), which we will use to describe a particular road.

(34) a road under the bridge

(34) captures a scenario where both the road and bridge have the same orientation, with the road being wholly beneath and covered by the bridge, as depicted in (35).

(35) 

The question is whether (34) also constitutes a well-formed description of the road in scenario two, depicted below (36). Here, the road passes under the bridge crosswise — that is, the road passes from under one side of the bridge, and (possibly) out the other.

(36) 

This is somewhat similar to a scene with a bridge crossing the boundary of a city,

such that part of the bridge is in the city. We have seen that an appropriate locative modifier for the bridge would be a DL like 'into the city'. Similarly, a DL might be used to modify the road in scenario two. But observe that if we use *under* as in (36), we do not get the desired effect. *The road under the bridge* does not constitute a well-formed description of the road in scenario two. The closest we can come to using *under* appropriately in this context would be in (37), but here, we have to use a motion verb such as *go* to provide the 'Path' reading:

(37) The road goes under the bridge.

Otherwise, the use of (34) with *under* as modifier may be used to describe a part of the road that is under the bridge, but not the entire road.

Potential refutations of this line of argument come in the form of examples like (38):

(38) a. the pathway under the railroad tracks

b. the walkway under the railroad tracks

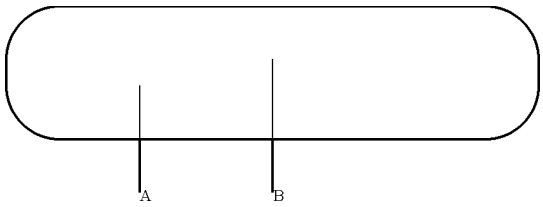
Here, the NPs seem well-suited for describing the scenario depicted in (36). However, in these cases, one can appeal to the fact that the nouns *pathway* and *walkway* canonically refer to paths, and provide the 'Path' reading, just as a verb like *go* does in (37). So, even here, it need not be the case that *under* has to provide a change of location reading.

A further consideration: O'Keefe (1996:291) shows that a sentence like (39),

(39) Stick A was under the table, but stick B was even farther under it,

describes the following: 'both sticks A and B and the table (top) have projections onto the XY-plane and these projections overlap [...] Further, the magnitude of some aspect of the projection of B onto the table is greater than that of A.' A diagram is provided in (40).

(40)



The meaning of (39) shows that *under* is concerned with the length of each stick measured from the edge of the table to the furthest edge of the projection of the stick into the area under the table, and not with the parts that are sticking out. That is, *under* does not take into account any diphasic property of the object it modifies. On the other hand, DLs like *into* precisely require a diphasic structure.

These considerations suggest that *under* does not behave in the same way as the DLs we have considered so far. So, *under* does not have similar meaning as these other DLs.

Moreover, motion verbs occurring with stative types of prepositions like *in front of*, and *behind*, for example, can also have ambiguous readings:[10]

(41) a. The director walked in front of the camera.
[Activity]: The walking took place in front of the camera.
[Accomplishment]: The director walked and went in front of the camera.

[10]The equivalent examples in Finnish are not ambiguous, because postpositions like 'behind' have different suffixes for stative versus directional readings.

(i) a. Kilpikonna u-i riuta-n taa/ taa-kse. [Accomplishment]
tortoise swim-PAST reef-GEN behind-to/ behind-TRA
'A/The tortoise swam behind the reef.'

b. Kilpikonna u-i riuta-n taka-na. [Activity]
tortoise swim-PAST reef-GEN behind-ESS
'A/The tortoise swam behind the reef.'

b. The tortoise swam behind the reef.
[Activity]: The swimming took place behind the reef.
[Accomplishment]: The tortoise swam and went behind the reef.

As such, even if Pustejovsky's approach can avoid verbal polysemy, it is faced with polysemy in the category of prepositions, as far as the examples in (32) are concerned. Also, stative prepositions would have to be ambiguous to support the readings in (41). In fact, we do not want to consider prepositions like *under* to be ambiguous, since they do not have the same interpretive requirements that directional prepositions like *into* do (i.e., requiring ordered, diphasic structures). Therefore the examples of English manner-of-motion verbs in (32) and (41) present another case in support of verbal aspect shift.

3.4 Summary

To reiterate our position, Finnish DLs do not contribute a change of location meaning but they require a diphasic structure for their interpretation. With motion events, diphasic structures are provided by the spatio-temporal trace of motion events. I argue for the view that manner-of-motion verbs are compatible with motion in any shape, in any direction. Activity verbs can undergo a systematic aspect shift to become Accomplishments, in which case they take on a directed change of location meaning, giving the right structures for DL interpretation. This results in a change of location reading when manner-of-motion verbs occur with DLs. In addition, there is evidence that English verbs also allow this type of aspect shift.

Also, I argued that Pustejovsky's idea of deriving new meanings compositionally at the phrasal level cannot adequately account for the facts of variable verb behavior in English and Finnish. In short, to explain DL predication in these languages, a lexical (verbal) approach to aspect shift is needed.

This approach, where the DL requires the verb to provide the appropriate diphasic, ordered structures for their interpretation is advantageous in another way. We have seen that Finnish aspectual verbs like *ruveta* 'begin', and *lakata* 'stop' take verbal complements with DL suffixes:

(42) Toini rupea-a luke-ma-an.
Toini begin-3SG read-INF-ILL
'Toini begins reading.'

(43) Toini lakka-a juokse-ma-sta.
Toini stop-3SG run-INF-ELA
'Toini stops running.'

Now, the aspectual verbs themselves already tell something about how things go on from an implicit time t°, with respect to the embedded proposition (Löbner 1987). If, according to the Pustejovsky-type approach, DLs have the function of taking processes to transitions, then that function is incompatible with the event structure of aspectual verbs. And if DLs denote anterior or posterior times in relation to the time of the event (Fong 1997c), then there is a redundancy in aspectual verbs selecting DL complements, since both the verb and the complement provide (the same) temporal information. But within the current approach, the DLs merely agree with the diphasic temporal mapping of the aspectual verb. The event structure, and hence the temporal mapping of that meaning, comes solely from the verb.

3.5 Cross-linguistic evidence

In this section, I look at variable-behavior verbs from a cross-linguistic perspective, and discuss how constructional and type coercion approaches handle these cases. I show that the lexicalist view I adopted (in the spirit of Levin and Rappaport Hovav's approach) accounts for the apparent differences in locative and resultative predication

across languages like French, Mandarin Chinese, Finnish, and English. The notion of verbal aspect shift correctly predicts the typological differences in the argument structures of these languages.

3.5.1 French

As we have seen with Finnish and English, verbs of manner of motion allow for alternations between Activity and Accomplishment readings. French motion verbs, on the other hand, do not show such alternations. Fong and Poulin (forthcoming) find that (i) one class of manner-of-motion verbs (of the *danser* 'dance' type) does not allow Accomplishment reading with non-directional prepositional phrases (44a), but do so when accompanied by PPs that encode a specified endpoint (44b); (ii) another class (of the *bondir* 'leap' type) incorporate both manner and change of location meanings, and an unambiguous change of location/Accomplishment reading is available with non-directional prepositional phrases (44c).[11] Crucially, in (44a), there is no ambiguity, while the equivalent English examples are ambiguous (see (45).

(44) a. La souris a dansé sous la table.
'The mouse danced under the table.'

b. La grenouille a nagé jusqu'au nénuphar.
'The frog swam up to the lily.'

c. Le tigre bondit sur sa proie.
'The tiger leaped onto its prey.'

(45) a. The mouse danced under the table.

b. The bottle floated under the bridge.

[11]The French data are from Fong and Poulin (forthcoming), unless otherwise stated.

Fong and Poulin conclude that with the appropriate goal prepositions (e.g., (44b)), Accomplishment meanings can be built up compositionally in French, but (zero-derived) aspect shift in the verb is unavailable.

A related fact is that both Finnish and English have resultative predications, but French does not. Resultative predication gives Accomplishment readings, and is analyzed by Rappaport Hovav and Levin (1996) as involving template expansion:

(46) a. Activity: [x ACT (y)]

b. Accomplishment: [[x ACT] CAUSE [BECOME [y <STATE>]]]

English and Finnish, which allow aspect shift with verbs of motion, have resultative predication with manner-of-action verbs:

(47) a. Pat wiped the table clean.

b. Tuovi pyyhk-i pöydä-n puhtaa-ksi.
Tuovi wipe-PAST-3SG table-ACC clean-TRA
'Tuovi wiped a/the table clean.'

But (48) shows that resultative predication with a verb like *essuyer* 'wipe' is impossible in French.[12]

[12]Legendre (1997:47) reports some limited instances of resultatives in French, as exemplified in (i).

(i) a. Pierre a peint les murs en blanc.
'Pierre painted the walls (in) white.'

b. Il a frappé son adversaire à mort.
'He beat his adversary to death.'

Yet Legendre also maintains that such examples are different from English resultatives, first because the predicates in (i) are more like adjuncts, and second because the resultative predicate is categorially restricted to prepositional phrases in French. Example (ii) is a rare exception, but even here, the predicate is not an adjective, but an adverb, since it does not show plural agreement with the noun phrase *les cheveux* (Legendre 1997:46):

(48)*Dominique a essuyé la table propre.
'Dominique wiped the table clean.'

On the assumption that resultative predication is analyzed the same way as locative predication, that is, as involving aspect shift in the verb, the pattern observed in French can be explained by assuming that French verbs in general do not allow aspect shift (Fong and Poulin forthcoming). Manner verbs like *danser* 'dance' and *essuyer* 'wipe' have a basic Activity meaning, but unlike in Finnish, there is no systematic aspect shift from Activity to Accomplishment, which will derive a causative change of state/location reading. Thus there is no ambiguity when a manner verb *danser* occurs with a non-directional preposition, and *essuyer* does not appear in resultative constructions.

In addition, recall that Finnish and English posture verbs, and internally caused change-of-state verbs are ambiguous between State and Achievement readings. In French, there are separate verbs for each State or Achievement reading (Fong and Poulin 1997):

(49) a. Claude est debout.
'Claude is standing.'

b. Claude se lève.
'Claude is standing up.'

(50) a. Claude est assis.
'Claude is sitting.'

(ii) Il lui a coupé les cheveux court.
'He cut her hair short.'

b. Claude s'assoit sur une chaise.
'Claude is sitting (down) in a chair.'

By assuming a lack of lexical aspect shift, we can account for these apparently disparate phenomena in French.

Recently, de Swart (to appear) argues that tense operators (the Passé Simple and the Imparfait) coerce aspectual transitions in French. De Swart shows that coercion operates on the aspectual character of the eventuality description — that is, on the composite predicate-argument structure. But what we are concerned with in the above discussion is exactly the predicate-argument structure differences between French on the one hand, and Finnish and English, on the other. Thus, while aspect shift in French may be coerced by an external aspectual operator, lexical (verbal) aspect shift *within* the level of argument structure must be kept distinct as a separate phenomenon.

Fong and Poulin's (forthcoming) analysis provides an alternative explanation to the oft-cited observation by Talmy (1985, 1991) that French and English are typologically different. In Talmy (1985), English is classified as a manner-type language. In manner-type languages, the verb encodes manner of motion only, and the path is expressed by elements associated with the verb. French is classified as a path-type language: the verb (e.g., *entrer* 'enter') encodes path only, and manner has to be expressed in subordinate structures (for example, a gerundive). However, as (51) shows, there are verbs that encode both path and manner.

(51) Le tigre bondit sur sa proie.
'The tiger leaped onto its prey.'

In Talmy (1991), English is grouped with languages like German, Latin, and Chinese, as 'satellite-framed' languages. French, on the other hand, is 'verb-framed'. The distinction is based on how path is typically expressed in the language — whether it

is expressed by a satellite,[13] or a verb. But, as (52) shows, French manner verbs do take satellites.

(52) La grenouille a nagé jusqu'au nénuphar.
'The frog swam up to the lily.'

So, French and English differ in their predicate-argument structures, but not in the way that Talmy suggests. Rather, the difference resides in the relative aspectual flexibility of the verbs in these languages.

Within constructional approaches, Hoekstra (1984, 1992), and Hoekstra and Mulder (1990) have argued that in both directional locative predication and resultative predication, the verb selects a small clause complement. But in this view, there is no deeper explanation of why English and Finnish verbs select small clause complements, while French verbs do not.[14] Moreover, notice that French allows depictive predication, as shown in (53) (Legendre 1997, Fong and Poulin forthcoming). Thus it cannot be the case that French in general disallows predication by a predicate other than the main verb:

(53) a. Camille est arrivée fatiguée.
'Camille arrived tired.' (i.e., Camille was tired when she arrived.)

b. Il est mort jeune. (Legendre 1997)
'He died young.'

c. L'ours a mangé le gruau chaud.
'The bear ate the oatmeal hot.'

[13]A satellite is 'the grammatical category of any constituent other than a nominal complement that is in a sister relation to the verb root' (Talmy 1991:486).

[14]See also Levin and Rappaport Hovav's (1995) critique of Hoekstra's account of resultative constructions.

d. Pierre a servi la viande congelée. (Legendre 1997)
'Pierre served the meat frozen.'

Instead, (53) strengthens the claim that both French and English have available syntactic positions for the expression of secondary predicates. The difference lies in which classes of verbs can be associated with the particular syntactic structures.[15]

Goldberg (1995) has argued for a 'metaphorical link' between caused-motion[16] and resultative constructions, where change of state is interpreted as a metaphorical change of location. Assuming this view, one could claim that French does not have a change of location construction, and therefore no 'metaphorical' change of location (the resultative construction) either. But such a proposal cannot be correct, since French allows resultative predication when the verb — for example, *rendre* 'render/make' — has a change of state meaning (Fong and Poulin forthcoming).

(54) a. L'éclairage rend la chambre lugubre.
'The lighting makes the room look gloomy.'

b. Ce bruit rend le chien fou.
'That noise drives the dog crazy.'
(Adapted from *The Oxford-Hachette French Dictionary*)

[15]Legendre (1997) also subscribes to the view that the French verbs do not allow lexical processes to alter their basic semantic representation, unlike English. This is compatible with our argument that French verbs in general do not allow aspect shifts, but English verbs do. Legendre goes further to argue that the internal structure of secondary predicates in French is different from English, a point which I will leave for future comparative study.

[16]Caused motion constructions are different from the motion constructions that have been considered here. Examples of caused motion are of the type given in (i), involving transitive verbs.

(i) a. Chris kicked the bottle into the ditch.

b. Pat threw the candlestick off the table.

While it may be argued that *rendre* is a light verb, and may have different predication properties, other verbs like *changer* 'change', *métamorphoser* 'metamorphose', and *transformer* 'transform' show that this pattern is more general:

(55) a. La sorcière a changé le prince en crapaud.
'The witch turned the prince into a toad.'

b. Zeus métamorphosa Niobé en rocher.
'Zeus metamorphosed Niobe into a rock.'

c. Claude a transformé le garage en bureau.
'Claude transformed/converted the garage into an office.'

Goldberg (1995) also acknowledges that caused-motion and resultative constructions, although related by metaphorical link, should be kept distinct, since certain verbs are compatible with only one or the other construction. The similarity between her approach and the one adopted here is that both have to take into account the semantics of the verb. In the present analysis, the crucial semantic property that is explicitly appealed to is the aspectual property of the verb.

Nonetheless, the existence of a resultative construction in which manner verbs do not participate remains to be explained in the constructional account. This problem does not arise in the lexical approach, because verbs like *rendre* 'render' and *transformer* 'transform' are inherently Accomplishment verbs, and so the resultative predication observed in (54, 55) is not a result of aspect shift involving an alternation between Activity and Accomplishment verb meanings.

In this section, we have seen that the notion of verbal aspect shift can account for the participation of verbs in both locative and resultative predications. The possibility of aspect shift is what distinguishes between languages that show a wider range of variable verb behavior (e.g., Finnish and English) and those that do not (e.g., French).

3.5.2 Mandarin Chinese

More evidence of the verb as the locus of meaning variation comes from Mandarin Chinese. Mandarin does not pattern exactly like Finnish and English — it seems to be an intermediate type between the languages whose verbs appear in a wide range of syntactic contexts, and a language like French, whose verbs show less flexibility in this respect. I will argue that such differences between languages can be attributed to aspect shifts being confined to certain verb classes in some languages. The data examined below also suggest that Mandarin Chinese does not group (as tightly) with Finnish and English as Talmy's (1991) typology suggests.

Interplay of motion verbs and locatives

In Mandarin, it has been observed that VP-internal locative adverbials (headed by *zài* 'be-located') give a path/result-location reading (56a), whilst VP-external locatives modify the event denoted by the verb (56b) (Li 1975, Tai 1975, 1993, Li and Thompson 1981, Mulder and Sybesma 1992, *inter alia*).

(56) a. Lǐsì [$_{VP}$ zuì-dǎo zài zhuōzi dǐxià]. [Result-location]
Lisi drunk-fall be-located table under
'Lisi got drunk and fell on the ground underneath the table.'

b. Lǐsì zài zhuōzi dǐxià [$_{VP}$ zuì-dǎo] (le).
Lisi be-located table under drunk-fall LE
'Lisi got drunk under the table (and fell over).'

In (57), we see that the motion verb *tiào* 'jump' participates in this alternation.[17]

(57) a. Lǐsì [$_{VP}$ tiào zài chuáng shàng] (le). [Result-location]
Lisi jump be-located bed top LE
'Lisi jumped *on/onto the bed.'

[17]Speakers differ in their judgements about whether (57a) is acceptable, although this example is attested in the literature (e.g., Tai (1975)).

b. Lǐsì zài chuáng shàng [$_{VP}$ tiào].
Lisi be-located bed top jump
'Lisi jumped on/ *onto the bed.'

Tai (1975) proposes that pre-verbal and post-verbal *zài* locatives have different semantic representations: post-verbal *zài* is within the scope of a BECOME predicate, but pre-verbal *zài* is not. Thus post-verbal *zài* gives the result-location (or Accomplishment) reading, while pre-verbal does not. This is precisely the kind of evidence which can be used for motivating a constructional account of aspect shift like Hoekstra's. Recall that in Hoekstra's account, the syntactic position of the prepositional phrase (whether as adjunct or as complement) is crucial to the aspectual nature of the construction.

However, post-verbal *zài* does not always occur in contexts with a BECOME interpretation. For example, some manner-of-motion verbs, which include *fēi* 'fly', *fú* 'float', *piāo* 'float in the air', *yóu* 'swim', can occur with post-verbal *zài* without a result-location meaning (see (58), where the (a) and (b) examples have the same meaning).

(58) a. niǎo-er zài tiānkōng zhōng [$_{VP}$ fēi].
bird be-located sky middle fly.
'The bird flew in the sky.'

b. niǎo-er [$_{VP}$ fēi zài tiānkōng zhōng].
bird fly be-located sky middle
'The bird flew in/ *into the sky.'

Also, Huang (1978) notes that stative verbs can occur with post-verbal *zài* (see the list in (59)). Notice that stative verbs would be incompatible with a BECOME interpretation of *zài*, contrary to what Tai's analysis predicts. Examples are given in (60) and (61).

(59) Stative compound verbs (Huang 1978:239):
duǒcáng 'hide', *jūzhù* 'reside', *shēnghuó* 'live', *shēngcún* 'exist', *shēngzhǎng* 'grow', *tíngliú* 'stay', *yǐncáng* 'hide'

(60) Lǐsì jūzhù zài Guǎngdōng.
Lisi reside be-located Canton
'Lisi resides in Canton.'

(61) Liǔ shù shēngzhǎng zài hé biān.
willow tree grow be-located river side
'The willow tree grows by the river.'

The verbs that seem to have different readings for pre- and post-verbal *zài* locatives (e.g., (56) and (57)) are those that express motion with an inherent culmination point, or motion with inherent direction. These include the following:[18]

(62) *bàn-dǎo* 'stumble', *diē-dǎo* 'fall', *jiàng-luò* 'descend, drop'

Suppose such verbs have an inherent BECOME meaning; then the post-verbal position is an argument position that realizes the PLACE predicate for BECOME [AT <PLACE>], and this is position for the *zài* locative phrase. The pre-verbal locative modifiers occupy the position regularly occupied by adjuncts in Mandarin, so pre-verbal locatives are adjuncts, describing the location where the entire event takes place.

Thus, I conclude that *zài* does not have the BECOME meaning, whatever position it occupies in the clause. This conclusion would be evidence against a constructional account of aspect shift like Hoekstra's (1992), which can not account for why verbs like *fēi* 'fly' do not also get a result-location reading (see (58b)), if a post-verbal

[18]Speakers who accept (57a) might treat *tiào* as belonging to the 'stumble' class, with the meaning of 'making a leap'. Those who do not accept (57a) might treat *tiào* as a pure manner-of-motion verb.

locative phrase is associated with the construction meaning 'X become located at Y', similar to (56).

It might be argued that in examples like (58b), the post-verbal locative phrases that do not give path-meanings are adjuncts, rather than being within the VP.[19] This cannot be correct, however, because Mandarin in general does not allow adjunction to the right, as (63) shows:

(63) a. Lǐsì [$_{AdvP}$ chī-le wǎn-fàn zhīhòu] dǎ-diàn-huà gěi Wángwǔ.
Lisi eat-PERF dinner after phone to Wangwu.
'Lisi phoned Wangwu after having dinner.'

b.*Lǐsì dǎ-diàn-huà gěi Wángwǔ [$_{AdvP}$ chī-le wǎn-fàn zhīhòu].
Lisi phone to Wangwu eat-PERF dinner after
'Lisi phoned Wangwu after having dinner.'

Therefore, it is not the syntactic position of the locative that derives the path reading, but rather the type of verb that is involved. As such, the Mandarin examples discussed here further support our position that the verb is the locus of meaning variation in such cases.

Aspect shift in Mandarin Chinese

In Mandarin, the verbal alternation between State and Achievement readings is observed (cf. the Finnish and English data in (21) and (22), excerpts repeated below as (65)).

(64) a. Lǐsì wèishěnme guì zài nà-er? [State/Achievement]
Lisi why kneel be-located there
'Why did Lisi kneel there?'

[19]Compare a similar line of argument, based on the adjunct/complement distinction for Dutch, in Hoekstra and Mulder (1990).

b. Lǐsì zài dì shàng guì-le liǎng ge zhōng-tóu. [State]
Lisi be-located ground top kneel-PERF two CL hour
'Lisi knelt on/ *onto the ground for two hours.'

c. Lǐsì tū-rán-jiān guì zài dì shàng. [Achievement]
Lisi suddenly kneel be-located ground top
'Lisi suddenly knelt down on the ground.'

(65) a. He crouched behind a lilac bush. [State/Achievement]

b. Tuovi istu-i. [State/Achievement]
Tuovi sit-PAST-3SG
'Tuovi sat.'

Other posture verbs showing similar patterns include:

(66) *pā* 'crouch', *tǎng* 'lie', *zhàn* 'stand', *zùo* 'sit'

Mandarin also has resultative constructions (cf. English and Finnish equivalents in (47)).[20]

(67) Lǐsì mā-gān-le zhuōzi.
Lisi wipe-dry-PERF table
'Lisi wiped the table dry.'

So, there is evidence of aspectual shifts from Activities to Accomplishments, and from States to Achievements.

[20]There are various syntactic forms of the resultative; the example in (67) is one that most closely resembles the Finnish/English versions.

Exceptions to aspect shift

Mandarin manner-of-motion verbs appear to be exceptions to the aspectual shifts observed elsewhere in the language (see (64) and (67)). As is evident from (58) above, these verbs do not yield result-location meanings with the locative *zài*. They must combine with verbs or locative phrases that have inherent direction to give result-location readings (68).

(68) a. niǎo-er fēi jìn wū lǐ.
bird fly enter house inside
'The bird flew into the house.'

b. niǎo-er fēi dào hǎi biān.
bird fly reach sea side
'The bird flew to the seaside.'

In this respect, Mandarin is similar to French manner-of-motion verbs of the *danser* 'dance' class, which use a verb with inherent direction (see (69a)), or path prepositions (69b), to give result-location readings:

(69) a. Nous revînmes au petit trot dans le court crépuscule d'hiver.
'We jogged back in the short winter twilight.'
(lit.) 'We came back "with short step" in the short twilight of winter.'
(Vinay and Darbelnet 1995:104)

b. La souris a dansé jusqu'au garage.
'The mouse danced up to the garage.'

However, the same manner-of-motion verbs in Mandarin allow resultative predication, as (70) shows. So, in this case, these verbs allow aspect shift.

(70) a. niǎo-er fēi-lèi-le.
bird fly-tired-PERF
'The bird flew and as a result it got tired.'

b. Lǐsì pǎo-fán-le.
Lisi run-bored-PERF
'Lisi ran and as a result he got bored.'

Yet why is it that the same class of verbs allows aspect shift for resultative predications, but not for result-location predications? Japanese and Italian also raise this question. Italian allows resultative constructions in pragmatically strengthened contexts — for example, when the adjectival phrase is intensified (Napoli 1992). And while Japanese manner-of-motion verbs must combine with a verb of inherently directed motion (like *iku* 'go') in order to take goal phrases (Matsumoto 1996a, Levin and Rappaport Hovav 1995), it has resultative constructions (see Li (1993)). In these three languages, aspect shift is allowed for resultatives, but not for locative predication.

(71) a. Italian:

Ho stirato la camicia piatta piatta.
(I)have ironed the shirt flat flat
'I ironed the shirt very flat.'

b. Japanese:

John-ga odori-aki-ta.
John-NOM dance-bored-PAST
'John danced and as a result he got bored.'

One plausible explanation is that languages clearly have other resources besides aspect shift to produce result-location readings with manner-of-motion verbs: for example, directional pre-/post-positions and verbs with inherent paths. With resultative predication, there is less freedom: resultatives require a verb denoting the causing event, and an adjectival predicate denoting the result-state. But the notion of

change involved is neither realized morphologically nor syntactically. So while result-location meanings may be compositionally built up with, say, directional prepositions, result-state interpretations lack an equivalent 'change-of-state preposition'. So, if a language allows aspect shift at all, we would expect to find evidence of this in resultative predication, since aspect shift involves the verb adding to its meaning the notion of change, which is what the interpretation of resultatives involve. With locative predication, though, we would expect more variation: some languages show verbal aspect shift here, while others do not. The claim here is that if a language allows verbal aspect shift, it would allow aspect shift in the following implicational order: 1. resultatives > 2. result-location > ...

Empirical support for this hypothesis will have to await future research. Nevertheless, I have shown here that for Mandarin, at least, the seeming lack of aspectual shift is not arbitrary, but can be established as involving a particular verb class.

3.5.3 Summary

I have argued that Finnish, English, and Mandarin aspect shift is located in the verb. Syntactic approaches using co-composition or constructions cannot capture the range of data these languages present. I also showed that aspect shift may be confined to certain verb classes in Mandarin.

3.6 Conclusion

In this chapter, I presented arguments in favor of a lexical approach to verbal-alternation. The fact that certain classes of verbs can occur in a range of syntactic contexts is derived from a semantic account, without appealing to intermediate syntactic structures. I argued that on the basis of the semantics developed for the Finnish

DLs, where DLs require the verb to provide an appropriate spatio-temporal diphasic structure, change of location readings with DL predication can be attributed to systematic verbal aspect shift. The result of an aspect shift from Activity to Accomplishment makes available the slots for resultant location or state predicates within the verb's predicate-argument structure template, and this is where we find DL and resultative predicates, respectively.

Chapter 4

The theory at work

This chapter provides additional support to the analyses developed in the previous two chapters. First, in section 4.1, I show that the diphasic model proposed in chapter 2 for DL interpretation also applies to a subset of the State Cases in Finnish. Second, in section 4.2, I look at the predicate argument structure of resultative constructions in Finnish, and discuss the implications for the analysis of event structures of resultatives.

4.1 Extension of analysis to Finnish State Cases

In chapter 2, I argued for a diphasic approach to the interpretation of DL Case in Finnish. I showed that when events can give temporal, or spatio-temporal mappings with a monotonic phase transition, the DLs can be interpreted in either the first, or the second, of two phases.

In this section, I will show that the analysis extends to another class of State predicates in Finnish. The State Cases (Essive, Elative,[1] Translative) and the Local

[1]Note: The Elative has both State and Local functions.

Cases in Finnish have the same co-occurrence restrictions. On one hand, the non-directional Local Cases pattern with the Essive State Case, predicating locations or states that hold only for the duration of the state or event denoted by the verb. On the other, the Elative, Translative, and the DL cases occur with similar classes of verbs. We will see that the Elative and Translative State predicates require a diphasic structure from the verbs they occur with.

4.1.1 The Essive

The Essive Case is described as expressing 'a (temporary) state or function, sometimes circumstances, conditions, or causes' (Karlsson 1987). The examples below show that Essive predicates hold for the duration of a state. In (2), the state of being ill is bounded by the durative adverbial 'three weeks'.

(1) Toini on sairaa-na.
Toini-NOM be ill-ESS
'Toini is ill.'

(2) Toini oli sairaa-na kolme viikko-a.
Toini-NOM be-PAST-3SG ill-ESS three week-PAR
'Toini was ill for three weeks.'

Compare this with Inessive locatives in Finnish. A locative with Inessive case-marking denotes the location where the event takes place (see (3)).

(3) Vieno kanto-i kirja-a kaupungi-ssa.
Vieno carry-PAST-3SG book-PAR city-INE
'Vieno was carrying a/the book (around) in the city.' *or*
'Vieno carried a/the book in the city.' (*habitual reading*)

In contrast, when a locative with DL Case occurs with the same verb *kantaa* 'carry', we get a change of location reading (4).

(4) Vieno kanto-i kirja-a Lontoo-seen.
Vieno carry-PAST-3SG book-PAR London-ILL
'Vieno was carrying a/the book to (lit. 'into') London.'

The example in (5) (from Karlsson (1987)) shows the Essive co-occurring with the Inessive locative.

(5) Heikki on Jämsä-ssä lääkäri-nä.
Heikki-NOM be Jämsä-INE doctor-ESS
'Heikki is (working as) a doctor in Jämsä.'

I propose that both the Essive and the non-directional Local Cases predicate states and locations, respectively, that hold only for the duration of the state or event denoted by the verb.

4.1.2 The Translative

The Translative Case usually expresses 'a state, property, function or position into which something/someone enters, or the end point of a movement or change' (Karlsson 1987). Verbs of change of state take Translative arguments:

(6) Toini tul-i sairaa-ksi.
Toini-NOM become-PAST-3SG ill-TRA
'Toini became ill.'

(7) Rupea-n ahkera-ksi.
begin-1SG industrious-TRA
'I will become industrious.'

(8) Hän muuttu-i (touka-sta) perhose-ksi.
s/he change-PAST-3SG caterpillar-ELA butterfly-TRA
'S/he changed (from a caterpillar) into a butterfly.'

(9) Serkku-ni valmistu-i opettaja-ksi. (Vähämäki 1994)
cousin-POSS-1SG graduate-PAST-3SG teacher-TRA
'My cousin graduated to become a teacher.'

The verbs of change of state that take Translative arguments include:

(10) *hajota* 'decompose', *kehittyä* 'develop', *kiteytyä* 'crystallize', *koitua* 'result in', *kääntää* 'translate', *muodostua* 'form', *muuttua* 'change', *osoittautua* 'to prove itself/turn out to be', *ruveta* 'become', *ryhtyä* 'become', *tulla* 'become', *valmistua* 'to bring (studies) to completion', *yhdistyä* 'combine'

The Translative also occurs with (transitive) causative verbs (11), where the Translative Case is suffixed to the noun that denotes the outcome of the change (12).

(11) *kehittää* 'develop', *liittää* 'unite', *muuntaa* 'transform',

(12) Taikuri muutt-i perho-sen touka-ksi.
magician change-PAST-3SG butterfly-ACC caterpillar-TRA
'The magician changed a/the butterfly into a caterpillar.'

In addition, Translative predicates occur in the resultative construction, depicting the resultant state.

(13) Ravist-i-n mato-n puhtaa-ksi.
shake-PAST-1SG carpet-ACC clean-TRA
'I shook a/the carpet clean.'

(14) Maanviljelijä ampu-i ketu-n kuoliaa-ksi.
farmer-NOM shoot-PAST-3SG fox-ACC dead-TRA
'A/The farmer shot a/the fox dead.'

(15) Tuli poltt-i talo-n tuhka-ksi. (adapted from Penttilä (1963))
fire burn-PAST house-ACC ashes-TRA
'Fire burnt the house to ashes.'

Based on these distributions, it is tempting to conclude that the Translative Case encodes a meaning of change. What is more, it might even be assumed that the Translative Case in Finnish overtly signals how the adjectival predicate compositionally derives the change of state interpretation in resultative constructions. A compositional analysis of the resultative construction in languages like English has proven elusive. There is no overt morphology to indicate how the construction is interpreted as a causation event that results in a change of state. In (16), for example, the event of shaking the carpet causes the carpet to become clean.

(16) I shook the carpet clean.

Dowty (1979) deals with resultative constructions (termed 'factitives' in Dowty's work) by using a translation rule that would introduce the causative relationship when a transitive verb combines with an adjective, and another rule for an intransitive verb combining with an adjective (see Dowty 1979:220ff). In syntactic approaches like Pustejovsky 1991 and 1995, for example, resultatives are treated in the same way as verbs occurring with prepositional phrases. Both phenomena formally reduce to having the complement carry information that will take the verb as argument and shift its event type. In our current approach, the Activity meaning of the verb undergoes aspect shift to give an Accomplishment interpretation.

But in Finnish, it might seem that the Translative case-suffix could be precisely the morpheme that overtly indicates the change of state interpretation (e.g., [BECOME (CLEAN)] in (13)). Things are more complex, however. The Translative Case also occurs with verbs that do not denote change, such as *jäädä* 'remain' (17).

(17) Toukka jä-i touka-ksi.
caterpillar remain-PAST-3SG caterpillar-TRA
'A/The caterpillar remained a caterpillar.'

Also, a Translative predicate can occur with verbs like *jättää* 'leave', where instead of encoding the result of change of state, it encodes the state that is being maintained (18).

(18) Jät-i-n työ-n keskeneräise-ksi. (Penttilä 1963)
leave-PAST-1SG work-ACC unfinished-TRA
'I left the work unfinished.'

(19) Lasi oli tyhjä. Jäti-n lasi-n tyhjä-ksi.
glass-NOM be-PAST-3SG empty leave-PAST-1P glass-ACC empty-TRA
'The glass was empty. I left it empty.'

Contrast this use of the Translative predicate in (19), which encodes a 'maintained' state, with the ill-formed context that forces the sentence to be interpreted as resultative predication in (20).

(20) Lasi oli täysi. #Jäti-n lasi-n tyhjä-ksi.
glass-NOM be-PAST-3SG full leave-PAST-1P glass-ACC empty-TRA
'The glass was full. I left it empty (i.e., the result of my leaving the glass was that it became empty).'

Also, compare (20) with the proper use of the Translative in the well-formed resultative constructions above (13)–(15).

The additional data suggest that the Translative should not be associated with a BECOME meaning, since it does not depict any change in the above cases (17–19). Rather, the Translative predicate patterns the same way as the Illative and Allative predicates, in holding true in the second of two phases. (21) and (22) show the DL predicates occurring with the same verbs.

(21) Neva-n suu jä-i Täyssinä-n rauha-ssa venäläis-i-lle.
Neva-GEN mouth remain-PAST-3SG Täyssinä-GEN treaty-INE Russian-PL-ALL
'In the Treaty of Täyssinä the mouth of the Neva went to the Russians.' *or*
'In the Treaty of Täyssinä the mouth of the Neva remained with the Russians (i.e., there was no change of hands).'

(22) Tuovi jätt-i lasi-n pöydä-lle
Tuovi leave-PAST-3P glass-ACC table-ALL
'Tuovi left a/the glass on (lit. 'onto') the table.'

Note also that Translative and Illative predicates co-occur in resultative constructions (23).[2]

(23) Maanviljelijä ampu-i ketu-n metsä-än kuoliaa-ksi.
farmer-NOM shoot-PAST-3SG fox-ACC forest-ILL dead-TRA
'A/The farmer shot a/the fox dead, and the fox remained in a/the forest after the shooting.'

Recall that *jäädä* 'remain' occurs with DL predicates, which contrasts with *pysyä* 'stay', a verb that does not presuppose any prior change of state, and does not occur with DL predicates (see (24)).

(24) Neva-n suu pysy-i Täyssinä-n rauha-ssa venäläis-i-llä/
Neva-GEN mouth stay-PAST-3SG Täyssinä-GEN treaty-INE Russian-PL-ADE
*venäläis-i-lle.
Russian-PL-ALL
'In the Treaty of Täyssinä the mouth of the Neva stayed in the possession of the Russians.' (There was no change of hands.)

A similar contrast is found with the state predicates. *Pysyä* 'stay' takes Essive predicates, while *jäädä* 'remain' takes Translative.

[2]The theoretical significance of this co-occurence of the Translative and Illative predicates will be discussed in section 4.2.

(25) a. Kivi pysy-i vanha-na-poika-na.
Kivi stay-PAST-3SG old-ESS-boy-ESS
'Kivi stayed a bachelor.'

b. Kivi jä-i vanha-ksi-poja-ksi.
Kivi remain-PAST-3SG old-TRA-boy-TRA
'Kivi remained a bachelor.'

To understand better the difference between the two verbs *jäädä* and *pysyä*, consider examples (26a) and (26b) below. In a neutral context, both examples can be used to describe a situation where nothing happens to the caterpillar, and so it remains in the same state. However, given a situation where, for example, a very skillful magician executes multiple transformations on a caterpillar, changing it into a butterfly, back to a caterpillar, then into a rabbit, and back to a caterpillar, then only (26a) (with *jäädä*) is a felicitous description of the final state of the caterpillar.

(26) a. Toukka jä-i touka-ksi.
caterpillar remain-PAST-3SG caterpillar-TRA
'A/The caterpillar remained a caterpillar.'

b. Toukka pysy-i toukka-na.
caterpillar stay-PAST-3SG caterpillar-ESS
(lit.) 'A/The caterpillar stayed a caterpillar.'

In addition, the idiomatic way to express 'becoming a widow' in Finnish is to use *jäädä*, rather than, say, the verb *tulla* 'become' (see (27a)). In fact, (27a) is ambiguous between this 'coming into state' meaning and an 'unchanged state' reading. With *pysyä* 'stay', no 'become' interpretation is present (see (27b)).

(27) a. Kuningatar jä-i leske-ksi.
queen remain-PAST-3SG widow-TRA
'The queen became/remained a widow.'

b. Kuningatar pysy-i leske-nä.
queen stay-PAST-3SG widow-ESS
'The queen stayed a widow.'

What (26) and (27) show is that *pysyä* 'stay' implies a continuous state, but *jäädä* 'remain' does not. This is reflected in the State predicates that these verbs subcategorize for. The Essive occurs only with *pysyä*, and the Translative only with *jäädä*. A Translative predicate is incompatible with *pysyä* because the verb does not possess any presupposition about the existence of a prior state, that is, the verb does not have a diphasic aspectual/event structure.

That it is the lexical semantics of the verb that determines the selection of the Translative/Essive predicate, rather than the Translative predicate inducing a meaning of prior change, is independently confirmed by the following cases. Example (28) shows *jäädä* being used to describe a situation where money is left over, which implies that prior to this state of affairs, there was spending going on.

(28) Raha-a jä-i/ *pysy-i viisi markka-a.
money-PAR remain-PAST-3SG stay-PAST-3SG five mark-PAR
'Five marks were left of the money.'

In (29), only *jäädä* can be used to mean not being promoted to a higher grade or class. Thus there is the implied notion that there should have been a change:

(29) Vieno jä-i luoka-lle/ *pysy-i luoka-lla.
Vieno remain-PAST-3SG class-ALL stay-PAST-3SG class-ADE
'Vieno was left on the class (i.e., was not promoted to the next grade).'

The word for 'remainder' is formed from the verb *jäädä*, not *pysyä* (see (30)). Given that 'remainder' is the thing left after a change of some sort, the fact that its stem is *jäädä* supports our proposal that the verb has a diphasic event structure, capable of depicting a posterior state following a change.

(30) a. jäänn-ös
'remainder'

b.*pysynn-ös

Diphasic model for interpreting Translatives

Based on the distributions of the Translatives shown above, I conclude that the Translative predicate can be analyzed in the same way as the Illative and Allative predicates. They all operate on a diphasic structure provided by the temporal trace of the event denoted by the verb, crucially requiring, therefore, that the verb's lexical semantics can provide such a structure.

The diphasic structure is easily motivated for verbs denoting changes of state, like 'become' and 'change'. It is inherent in the meaning of these verbs that they denote a change from say, a state ∼p to a state p. Regardless of whether the change is instantaneous, or takes place over a certain time interval, the meaning of 'become' entails that there is a monotonic development from one state to an (opposing) state. This is true for 'change' as well. Since these verbs have anterior and posterior entailments, the temporal trace we want to use would be that of the aspectual property of the verb (31):

(31) $t_x = \tau(A_x)$

For the example in (6), repeated here as (32), let p be the state of being ill, and ∼p the state of not being ill. The ordering of phases for becoming ill is ∼p≺p (see (33)):

(32) Toini tul-i sairaa-ksi.
Toini-NOM become-PAST-3SG ill-TRA
'Toini became ill.'

(33) Order of phases for 'becoming ill':

The truth condition for 'ill-TRANSLATIVE(Toini)' is evaluated at p, where p is defined as a phase that holds for the times when Toini is ill (see (34)):

(34) $p(t_x)=1$ iff:
$\exists A_x[t_x=\tau(A_x) \wedge \text{Ill}(\text{Toini},t_x)]$

The interpretation of 'Toini became ill-TRANSLATIVE', abstracting away from tense, is given in (35):

(35) a. Toini became ill-TRANSLATIVE.

b. $\exists e(\text{CHANGE-OF-STATE}(\text{Toini},e))$ and
(i) I is an interval which is an ordering of the range of $(\tau(A))$, and contains one phase change $(\sim p \prec p)$ with respect to the state of Toini being ill at some time; and
(ii) $\exists t \in I\ \forall(x) \in I((x \prec t) \rightarrow \neg\text{Ill}(\text{Toini},x)) \wedge$
$\exists t' \in I\ \forall(y) \in I((t' \prec y) \rightarrow \text{Ill}(\text{Toini},y))$

Condition (ii) in (35) says that at one point in time, x, which is early enough, it should be the case that Toini is not ill, and at a point in time, y, which is late enough, it should be the case that Toini is ill. But the exact transition point is left vague in this model. This vagueness captures the idea that becoming ill might or might not be an instantaneous event.[3]

With verbs like 'leave' (36), the analysis is similar to the one proposed for 'forgetting' events with DL predication discussed in chapter 2.

[3]Recall that vagueness is also exploited in the case of transition points for objects like bridges.

(36) Jäti-n lasi-n tyhjä-ksi.
leave-PAST-1P glass-ACC empty-TRA
'I left a/the glass empty.'

'Leaving a glass empty' implies that prior to this state of affairs, there was potential for acting on the glass, but after leaving the glass alone, its state of emptiness is maintained. The Translative predicate gets an interpretation in the *second* of two phases, and in this case, it is well-defined by the posterior entailment property of 'leave'. The truth condition for 'Toini left the glass empty-TRANSLATIVE', again abstracting away from tense, is given in (37).

(37) a. Toini left the glass empty-TRANSLATIVE.

b. $\exists$e(Leave(Toini,glass,e)) and
(i) I is an interval, which is an ordering of the range of τ(A), and contains one phase change ($\sim$p$\prec$p) with respect to the potential change of state of the glass; and
(ii) $\exists$t$\in$I (Empty(glass,t) $\wedge$ $\forall$t$'\in$I(t$\prec$t$' \rightarrow$ Empty(glass,t)))

As with 'forget', 'leave' does not presuppose anything about the prior state of the glass, and so the prior state is left undefined in (37). What (37ii) says is that given a time t within the admissible interval when we know the glass is empty, we know that for all times following t, the glass is (still) empty.

The analysis provided here ensures that the Translative predicate does not conflict with verbs like 'leave' and 'remain'; nevertheless, the predicate is still interpretable as denoting the resultant state with verbs like 'become' and 'change', because the predicate holds for the interval of time in the second phase, after the event of change of state.

Aspect shift again

Returning to the problem of compositionality and the resultative construction, this treatment of the Translative brings it in line with the argument for verbal aspect shift with DL predication. Consider example (38):

(38) Ravist-i-n mato-n puhtaa-ksi.
shake-PAST-1SG carpet-ACC clean-TRA
'I shook a/the carpet clean.'

Given our analysis that Translatives require a diphasic structure wherein they can be properly interpreted, 'shake' with an Activity meaning in 'shaking a carpet', has to undergo an aspect shift to an Accomplishment in order to provide the appropriate diphasic structure.

Recall that Translatives can also occur with verbs that are inherently Accomplishments (e.g., *jättää* 'leave'), and with State verbs (e.g., *jäädä* 'remain'). This is a complication for syntactic frameworks like Pustejovsky's, who argues that the resultative complement (in this case, the Translative predicate) alters the event structure of the verb, changing Processes into Transitions at the level of the verb phrase. But in this view, the function of changing Processes to Transitions cannot be uniformly applied to all the contexts in which the Translative predicate occurs. The Translative predicate occurs with verbs denoting processes, but also with verbs that are inherently transitional, or stative verbs. We can make better sense of the data by looking at the similarity across the verb classes that Translatives occur in. Given our view of diphasic event structures, all these verbs can be given diphasic interpretations. What the opposition of phases really is depends on the class of verbs; but the unifying factor behind it all is that the Translative predicate is compatible with the diphasic event structure inherent in these verbs. In the case of manner Activity verbs like 'shake', diphasic event structures are possible because these verbs allow systematic aspect shift to become Accomplishments.

4.1.3 The Elative

The Elative Case has a dual function. In its State use, it is the converse of the Translative, holding true in the first of two phases. In the examples below, the Elative predicate depicts the state prior to change.

(39) Hän muuttu-i touka-sta perhose-ksi.
s/he change-PAST-3SG caterpillar-ELA butterfly-TRA
'S/he changed from a caterpillar into a butterfly.'

(40) Häne-t alenne-ttiin upseeri-sta sotamiehe-ksi. (Penttilä 1963)
s/he-ACC demote-PASS-PAST officer-ELA soldier-TRA
'S/He was demoted from officer to soldier.'

So the Elative State predicate has the same interpretation as its DL counterparts, the Elative and Ablative. In short, Elative predicates get their interpretation in the *first* of two phases.

The Elative can also occur in an 'existential sentence type' with the verb *tulla* (Vähämäki 1994):

(41) Minu-sta tule-e matematiikan opettaja.
I-ELA become-FUT mathematics teacher
'I will become a teacher of mathematics.'
(lit. 'Of me will become a teacher of mathematics.')

(42) Liisa-sta tule-e laulaja.
Liisa-ELA become-FUT singer
'Liisa will become a singer.'

According to Vähämäki (1994), the difference between this use of the Elative in (41, 42) and that of the Translative (see (43)) is that the Elative construction represents a lasting, essential change, while the Translative construction indicates change without such connotation.

(43) Serkku-ni tul-i opettaja-ksi.
cousin-POSS-1SG become-PAST-3SG teacher-TRA
'My cousin became a teacher.'

Notice also that *tulla* cannot occur with both Elative and Translative complements (44). In particular, contrast (44b) with the well-formed example in (39), involving the verb *muuttua* 'change'.

(44) a.*Liisa-sta tul-i opettaja-ksi.
Liisa-ELA become-PAST-3SG teacher-TRA

b.*Se tul-i touka-sta perhose-ksi.
it become-PAST-3SG caterpillar-ELA butterfly-TRA
'It became a butterfly out of a caterpillar.'

So *tulla* is different from *muuttua* in argument structure. Both verbs have diphasic structures, depicting a change from one state to an opposing state. But *tulla* is a two-place predicate (see (44b)), while *muuttua* can take up to three arguments (39). The data in (41)–(42) versus (43) indicate that *tulla* focuses on one of the two phases, but not both.

Diphasic model for interpreting Elatives

The Elative State predicate is analyzed the same way as the Translative, but the truth condition of the predicate is evaluated in the first of two phases. Let us use (45) as illustration:

(45) Toini muuttu-i touka-sta perhose-ksi.
Toini change-PAST-3SG caterpillar-ELA butterfly-TRA
'Toini changed from a caterpillar into a butterfly.'

The temporal trace we want to use would be that of the aspectual property of the verb (46):

(46) $t_x=\tau(A_x)$

The order of phases for the change expressed in (46) involves being a caterpillar in the first phase p, and not being a caterpillar in the second phase ∼p.

(47) Order of phases for 'changing from a caterpillar':

The truth condition for 'caterpillar-ELATIVE(Toini)' is evaluated at p, where p is defined as the phase that holds for the times when Toini is a caterpillar (48):

(48) $p(t_x)=1$ iff:
$\exists A_x[t_x=\tau(A_x) \wedge \text{caterpillar}(\text{Toini},t_x)]$

The interpretation of 'Toini changed caterpillar-ELATIVE', abstracting away from tense, is given in (49):

(49) a. Toini changed caterpillar-ELATIVE.

b. $\exists e(\text{CHANGE-OF-STATE}(\text{Toini},e))$ and
(i) *I* is an interval which is an ordering of the range of $(\tau(A))$, and contains one phase change $(p \prec \sim p)$ with respect to the state of Toini being a caterpillar at some time; and
(ii) $\exists t \in I\ \forall(x) \in I((x \prec t) \rightarrow \text{caterpillar}(\text{Toini},x)) \wedge$
$\exists t' \in I\ \forall(y) \in I((t' \prec y) \rightarrow \neg\text{caterpillar}(\text{Toini},y))$

Condition (ii) in (49) says that at one point in time, x, which is early enough, it should be the case that Toini is a caterpillar, and at a point in time, y, which is late enough, it should be the case that Toini is not a caterpillar. Again, the exact transition point is left vague in this model.[4]

[4]However, the transition point cannot be too vague in the full context of sentence (45). We will need to ensure that Toini's changing from a caterpillar to not being a caterpillar in fact coincides

4.1.4 Summary

We have seen that the Local and State Cases in Finnish have systematically similar distributions. This relation between the State and Local Cases in fact finds support from the historical development of the Local Cases in Finnish. Inessive and Adessive come from local suffixes (*-s-* 'in', *-l-* 'at', respectively) combining with Essive *-na*, and the Elative and Ablative from the combination with the Separative *-ta* (Hakulinen 1961, Leino 1990).

I provided an analysis of the State Cases by extending the diphasic model for DL interpretation to this new set of data. This provides further support for the diphasic model, showing that it is not just for the DL Cases in Finnish that we motivate a different approach to the analysis of directional locatives and prepositions.

4.2 Finnish resultatives and argument structure

4.2.1 Secondary predicates: resultatives vs depictives

In this section, I discuss resultative and depictive constructions (Halliday 1967, Simpson 1983, Rothstein 1985, Levin 1988), and show how Finnish uses a morphological distinction to tease apart the semantic distinction between the two constructions. I will start with the well-known data from English. Resultatives with transitive verbs are given in (50), and intransitive verbs in (51). Depictives are divided into depictive predication of the Subject (52) or the Object NP (53).

(50) a. Calvin hammered the copper bowl flat.

with Toini's changing from not being a butterfly to being one. Our real-world knowledge tells us that there cannot be an intermediate stage during the metamorphosis where Toini is, say, both a caterpillar and a butterfly. To ensure this, we can invoke a meaning postulate here that says an entity cannot be both a butterfly and a caterpillar at the same time.

b. Hobbes wiped the ledge dry.

c. Calvin nailed every window shut.

d. Hobbes kicked Calvin black and blue.

e. Calvin knocked Hobbes unconscious.

(51) a. Calvin jumped himself into a trance.

b. Calvin yelled his throat sore.

c. Hobbes ran his paws sore.

d. Hobbes laughed himself sick.

(52) a. The saxophonist performed the piece drunk.

b. The tourists arrived tired.

(53) a. The bear ate the porridge cold.

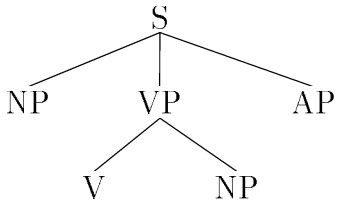
b. The chef cooked the greens fresh.

c. The student sold the book used.

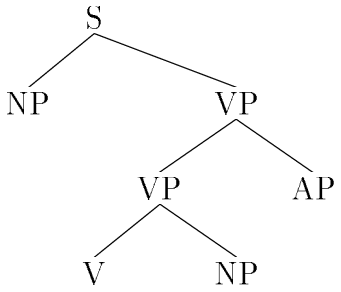
Halliday (1967) describes these two types of secondary predication as attributive constructions. The depictive element is 'an attribute which characterizes the attribuant in relation to the process, but as a concomitant, not a result, of the process' (Halliday 1967:63). The resultative element is an attribute which results from the process.

Rothstein (1985) posits different syntactic structures for Subject-oriented depictive, the Object-oriented depictive, and the resultative, as illustrated in in (54) – (56), respectively.

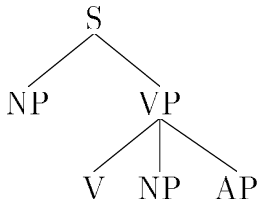
(54) Subject-oriented depictive:



(55) Object-oriented depictive:



(56) Resultative:



There are however some problems with Rothstein's structural account of the differences between these constructions. Andrews (1982) shows that both Subject-oriented depictives and resultatives have the Verb, Object NP, and the secondary predicate together as a unit, using constituency tests such as VP-preposing, *though* movement, and Wh-clefting of VP. Depictive and resultative pairs are given in the examples below.

(57) a. Little John said he would eat the meat singing, and eat the meat singing he did.

b. Little John said he would roast the meat black, and roast the meat black he did.

(58) a. Eat the meat singing though Little John did, nobody thought he was crazy.

b. Roast the meat black though Little John did, nobody thought he was crazy.

(59) a. What Little John did was eat the meat singing.

b. What Little John did was roast the meat black.

These tests show that both (Subject-oriented) depictive and resultative predicates form a constituent with the Verb and its Object NP, and thus Rothstein's structure for the Subject-oriented depictive in (54) cannot be correct.

Levin and Rappaport Hovav (1995) provide additional VP constituency tests such as the *do so*-substitution and VP-preposing (this time treating the verb and the Object NP as a constituent, independent of the secondary predicate) to show that resultative phrases are attached at the same bar-level as subcategorized PPs. The examples in (60) and (61) are from Levin and Rappaport Hovav (1995:49).

(60) a.*Jason put the book on the table, and Bill did so on the floor.

b.*Bill fastened the shutters open, and May did so shut.

c.*The joggers ran the pavement thin, and the runners did so smooth.

(61) a.*Jason said he would put the book on the table, and put the book he did on the table.

b.*Bill said that he would fasten the shutters open, and fasten them he did open.

c.*The joggers thought that they would run the pavement thin, and run the pavement they did thin.

Depictive phrases behave somewhat differently. When depictives are predicated of the Object NP (see (62)), *do so*-substitution and VP-preposing of the Verb and Object NP produce the same effects as for resultatives (cf. (60) and (61)): the sentences are unacceptable.

(62) a.*Fred ate the meat raw, but I did so cooked. (Simpson 1983:412)

b.*The trainer ate the peanuts salted and the elephants did so unsalted.

c.*The apprentice thought he should serve the gazpacho lukewarm, and serve the gazpacho he did lukewarm.

But when depictives are predicated of the Subject NP, *do so*-substitution and VP-preposing works — a different result from the resultative (Levin and Rappaport Hovav 1995). Examples from Levin and Rappaport Hovav (1995:49)) are given in (63):

(63) a. Jason wiped the table tired [or better: dead tired] and May did so wide awake.

b. Jason said that he would even wipe the table tired, and wipe the table he did tired.

This shows that the Subject-oriented depictive predicates are less closely related to the Verb and Object NP, even though at a higher phrasal level, all three categories still form a single constituent, as Andrews' (1982) tests in (57) – (59)) indicate.

Levin and Rappaport Hovav (1995) claim that the observed difference between the resultatives in (60, 61) and the depictives in (63) suggests that 'the state denoted by the resultative [phrase] is part of the core eventuality described in the VP', just like

subcategorized PPs. This, however, does not account for why the same constituency tests indicate that Object-oriented depictives in (62) behave the same as resultatives. The structural similarity suggests that the difference between Object-oriented depictives and resultatives cannot be captured in Rothstein's (1985) model, since the structure in (55) for Object-oriented depictives wrongly predicts that the Verb and Object NP form a completely separate constituent from the depictive predicate.

Instead, I claim that the difference between resultatives and Object-oriented depictives is semantic. (The tests above show that the Subject-oriented depictive is structurally different.) Observe that in some cases, the same sentence gives ambiguous readings in English. The sentences in (64) (from Rapoport (1993:166)) are ambiguous between a resultative reading, and Object-oriented depictive reading.

(64) a. She cooked the fish dry.

b. She ate her knuckles raw.

c. I boiled the lobsters sick.

This supports the claim that there is no one-to-one correspondence between the syntactic structure and the semantic interpretation. Based on these considerations, Rapoport (1993) suggests that some information about the lexical representation of the verb must be available for both interpretations to exist.

The semantic differences between depictives and resultatives described above can be characterized as follows:

(65) (i) The depictive predicate characterizes the state of one of the verbal arguments at the time of the action/process denoted by the verb.

(ii) The resultative predicate characterizes the final state of the semantically unrestricted NP,[5] which results from the action/process described by the verb.

Rapoport (1993) states that verbs heading resultatives must be a verb of process or activity, and must necessarily entail a contact with or effect on its object. Notice that the same verb can head both resultative and depictive constructions. But depictives can be headed by non-process verbs, and by verbs that do not necessarily affect their objects, in addition to verbs that cause a change in the state or location of their Objects.

The Finnish equivalent of the *do so*-substitution test shows that Object-oriented depictives and resultatives treat the Verb, Object NP, and secondary predicate as a unit, just as in English. An example of the Finnish *do so*-substitution is given in (66):

(66) Sointu kiillott-i hope-i-ta keittiö-ssä ja niin teki Vieno-kin
Sointu polish-PAST-3SG silver-PL-PAR kitchen-INE and so did Vieno-also
olohuonee-ssa.
cellar-INE
'Sointu polished silver in the kitchen, and Vieno did so in the cellar.'

Subject-oriented depictives can be separated from the Verb and Object NP, just as for English:

(67) Sointu siivos-i talo-n humala-ssa ja niin teki Vieno-kin selvä-nä.
Sointu clean-PAST-3SG house drunk-ESS and so did Vieno-also sober-ESS
'Sointu cleaned the house drunk and Vieno did so sober.'

[5]The 'unrestricted' feature (see Bresnan and Zaenen (1990)) allows Objects of active transitive verbs, and Subjects of passive and unaccusative verbs to be arguments of the predicate. Rapoport (1993) and Levin and Rappaport Hovav (1995) refer to the Object NP as the argument of the predicate, but this will only hold for active sentences.

(68) shows that subcategorized PPs, resultatives, and Object-oriented depictives give the same (bad) results in the substitution test:

(68) a.*Sointu heitt-i pallo-n kori-in ja niin teki Vieno-kin
Sointu throw-PAST-3SG ball-ACC basket-ILL and so did Vieno-also
laatikko-on.
box-ILL
'Sointu threw a/the ball into a/the basket, and Vieno did so into a/the box.'

b.*Sointu pyyhki pöydän puhtaa-ksi ja niin teki Vieno-kin
Sointu wipe-PAST-3SG table-ACC clean-TRA and so did Vieno-also
kuiva-ksi.
dry-TRA
'Sointu wiped a/the table clean and Vieno did so dry.'

c.*Kouluttaja sö-i maapähkinä-t suolattu-i-na ja niin teki
trainer eat-PAST-3SG peanut-PL salted-PL-ESS and so did
elefantti-kin suolattom-i-na.
elephant-also unsalted-PL-ESS
'The trainer ate peanuts salted and the elephant did so unsalted.'

Given that the difference between depictives and resultatives is semantic, the semantic difference is reflected morphologically in the case marking on the secondary predicate. In depictive predication, the state predicate appears with the Essive Case; in resultative predication, it appears with the Translative Case. Further examples of Essives in depictive predication are given in (69), and Translatives in resultative predication in (70) (from Penttilä (1963)).

(69) a. Hän kuol-i vanha-na.
S/he die-PAST-3SG old-ESS
'S/he died old.'

b. Rakennus palo-i vakuuttamattoma-na.
building burn-PAST-3SG uninsured-ESS
'The building burned down uninsured.'

c. Keitto nauti-taan kuuma-na.
soup enjoy-PASS-PRESENT hot-ESS
'The soup is to be eaten (lit. 'enjoyed') hot.'

(70) a. Jalka hierot-tiin tervee-ksi.
leg massage-PASS-PAST healthy-TRA
'The leg was massaged healthy.'

b. Puu-t hakat-tiin pien-i-ksi.
wood-PL chop-PASS-PAST small-PL-TRA
'The wood was chopped into small pieces.'

The interpretations we assigned to the Essive and the Translative in section 4.1 predict their different distributions. Essives hold for the duration of the event, and this is precisely what the depictive predicate is supposed to do (see (65)). Translatives require a diphasic structure from the verb's temporal structure, and diphasic structures are characteristic of resultative predications, which comprise a causing activity and a resultant change of state (Dowty 1979, Levin and Rappaport Hovav 1995, Parsons 1990, Pustejovsky 1992, 1995, Van Valin 1993). The Translative predicate depicts the final state of the entity that undergoes the change of state, which is the role of the resultative predicate (see (65)).

4.2.2 Resultatives and DLs combined

I have argued that the Illative and Allative are the DL predicates that depict the location of an Object after the culmination of an event. This predicts that verbs participating in resultative constructions (i.e., denoting Accomplishments) should be able to take DL predicates, given the appropriate contexts.

Consider DL predication with the verb *ampua* 'shoot' in (71):

(71) Metsästäjä ampu-i karhu-n metsä-än.
hunter shoot-PAST-3SG bear-ACC forest-ILL
Reading A: 'A/the hunter shot a/the bear in (lit. 'into') a/the forest.'
Reading B: 'A/the hunter shot a/the bear into a/the forest (i.e. the bear was ejected/propelled into the forest).'

On reading A, the shooting of the bear 'into the forest' means that the bear was hit by a bullet, and it remained in the forest after the shooting. It does not imply that the bear was propelled into the forest by the shooting, or that the bear ran into the forest when it was being shot. The propulsion reading in B is possible, because *ampua* 'shoot' can also encode a path meaning (akin to 'ejecting a missile from a weapon'). Reading A is the relevant one for our discussion here.

Ampua 'shoot' can take a resultant state predicate *kuoliaaksi* 'dead' (see (72)). In (73), notice that the verb takes both a result state predicate and a result location predicate *metsään* 'into the forest'.

(72) Metsästäjä ampu-i karhu-n kuoliaa-ksi.
hunter shoot-PAST-3SG bear-ACC dead-TRA
'A/The hunter shot a/the bear dead.'

(73) Metsästäjä ampu-i karhu-n metsä-än kuoliaa-ksi.
hunter shoot-PAST-3SG bear-ACC forest-ILL dead-TRA
'A/The hunter shot a/the bear dead, and the bear remained in a/the forest after the shooting.' (Note: no propulsion interpretation.)

In contrast, it has been noted that resultatives in English cannot occur with directional phrases (Goldberg 1991, Levin and Rappaport Hovav 1992, 1995, Rappaport Hovav and Levin 1995, Tenny 1994):

(74) a.*Sam tickled Chris silly off her chair. (Goldberg 1991)

b.*The hunter shot the bear dead into the forest.

In the above examples, the directional phrases occurring with the verbs *tickle* and *shoot* give a caused motion reading. In (74a), the intended interpretation is that tickling causes Chris to become silly and to fall off the chair, and in (74b), the shooting propels or forces the bear into the forest, and causes it to become dead. However, this is not what the Finnish DL in (73) depicts. The DL predication in (73) does not give a caused motion reading.

What explains the difference? Various types of constraints on the co-occurence of resultative and DL predicates have been posited for English. They are all based on the perceived semantic contributions of the DL and resultative predicates to the event structure denoted by the verb.

According to Rappaport Hovav and Levin (1995), Accomplishments and Achievements specify an achieved state (see (75)), and the Accomplishment semantic template associated with resultative constructions cannot be augmented further to include another achieved state or location.

(75) a. [x BECOME STATE] (Achievement)

b. [[x ACT] CAUSE [y BECOME STATE]] (Accomplishment)

In addition, Rappaport Hovav and Levin (1995) note that verbs which are inherently Achievements (e.g., *arrive*) or Accomplishments (e.g., *break*) also do not allow further template augmentation, as the examples in (76) (from Rappaport Hovav and Levin (1995)) show.

(76) a.*The travellers arrived dishevelled.[6]

(meaning: The arrival caused the travellers to be dishevelled.)

[6]Note that (76a) is fine on a depictive reading.

b.*Kelly broke the dishes off the table.

(meaning: Kelly broke the dishes and as a result they went off the table.)

In Goldberg (1991), resultatives are seen as coding a metaphorical change of location. Goldberg proposes a 'Unique Path' constraint that applies to literal and metaphorical paths: 'If an argument X refers to a physical object, then more than one distinct path cannot be predicated of X within a single clause' (Goldberg 1991:368). The Unique Path constraint rules out the co-occurrence of resultatives with directional phrases, since in Goldberg's account, both the resultative and the directional preposition introduce their own distinct paths (Goldberg 1991:369).

In a similar vein, Tenny (1994:79) posits a 'Single Delimiting Constraint', where 'the event described by the verb may only have one measuring-out and be delimited only once.' By 'measuring-out', Tenny means 'the role played by the argument in marking the temporal terminus of the event', and 'delimitedness' refers to 'the property of an event's having a distinct, definite and inherent endpoint in time.' Given that resultative predicates and directional locatives can delimit the event denoted by a verb, they cannot both occur given this constraint.

I take these observations as showing that given one event, denoted by one verb, there is only a finite number of predicate-argument positions that can saturate the event template. For the discussion below, I will assume Goldberg's Unique Path constraint. But the restriction on the co-occurrence of resultatives and directional phrases may be part of a larger phenomenon. In other empirical domains,[7] the factors

[7]The various phenomena include:

(i) No more than one instrumental phrase with a single verb:
*John escaped from prison *with dynamite with a machine gun.* (Bresnan 1982)

(ii) No more than one *by*-phrase in the passive:
*She was admired *by him by the President.* (Bresnan 1982)

(iii) No more than one distinct source-goal path:
*John ran to Bill into the palace. (Gruber 1965)

determining the polyadicity of argument structures have been attributed to the biuniqueness condition on functional assignments or the finiteness of predicate argument structures (Bresnan 1982).

I showed that in English, DL predicates require spatio-temporal interpretations, so the proper use of DLs in examples like (74) would require some form of spatial interpretation (hence a caused-motion reading). This requirement goes against the observation that there can only be one Unique Path for a particular object (Goldberg's generalization), and the idea that Accomplishments cannot be augmented to take on another achieved state (Rappaport Hovav and Levin's generalization), thus explaining the ungrammaticality of the sentences in (74).

The Unique Path constraint holds in Finnish as well. (77a) and (77b) show that a single path either going down or up the chimney, is possible. However, when the two paths occur in the same event (denoted by one verb), the Unique Path constraint rules out the example (see (77c)).

(77) a. Joulupukki men-i savupiipu-sta alas.
Santa Claus go-PAST-3SG chimney-ELA down
'Santa Claus went down a/the chimney.'

b. Joulupukki men-i ylös savupiipu-sta.
Santa Claus go-PAST-3SG up chimney-ELA
'Santa Claus went up a/the chimney.'

c.*Joulupukki men-i ylös savupiipu-sta alas.
Santa Claus go-PAST-3SG up chimney-ELA down
'Santa Claus went up a/the chimney down.'

A second example is given in (78). (78c) shows that DLs and resultatives cannot co-occur:

(78) a. Vieno potkais-i matkalauku-n ulos talo-sta.
Vieno kick-PAST-3SG suitcase-ACC out house-ELA
'Vieno kicked a/the suitcase out of the house.'

b. Vieno potkais-i matkalauku-n auki.
Vieno kick-PAST-3SG suitcase-ACC open
'Vieno kicked a/the suitcase open.'

c.*Vieno potkai-i matkalauku-n ulos talo-sta auki.
Vieno kick-PAST suitcase-ACC out house-ELA open
'Vieno kicked a/the suitcase out of the house open.'

But I have also argued that the Finnish DL predicates differ from English DLs. The Finnish DLs do not require change of location meanings from the verbs; they merely require a diphasic event-structure. Accomplishment and Achievement verbs are inherently diphasic, and the occurrence of DLs with such verbs is predicted to be acceptable (see (79) and (81) below). In (79a) and (79b), the DL predicates further specify the achieved state (denoted by the verb), without introducing an additional path meaning. Compare the similar case in English (80), where resultative phrases occurring with verbs like *melt* and *freeze* are considered to provide further specification of the achieved state (see Levin and Rappaport Hovav (1995), Rappaport Hovav and Levin (1995)).

(79) a. Karhu kuol-i metsä-än.
bear die-PAST-3SG forest-ILL
'A/the bear died into a/the forest.'

b. Juna saapu-i asema-lle
train arrive-PAST-3SG station-ALL
'A/the train arrived at (lit. onto) a/the station.'

(80) a. The ice melted into a puddle.

b. The swallow froze to death.

In (81c), the Ablative predicate denotes the location of the vase prior to the breaking event ('break' is an Accomplishment verb). This reading holds in a context where the broken pieces remain on the shelf after the breaking event (see (81b)), thus showing that any path interpretation is an implicature that is defeasible.

(81) a. Kissa rikko-i maljako-n hylly-ltä.
cat break-PAST-3SG vase-ACC shelf-ABL(ative)
'A/the cat broke a/the vase off a/the shelf.'

b. Hylly-ltä oli rikot-tu maljakko. Palase-t
shelf-ABL be-PAST-3SG break-PASTPCP.PASS vase piece-PLU
oli-vat hylly-llä haja-lla-an.
be-PAST-3PLU shelf-ADE scattered-ADE-POSS
'Off a/the shelf had been broken a vase. The pieces were scattered on the shelf.'

Resultative constructions are also Accomplishments, and again, DLs are predicted to occur in such contexts (see (73) above). But these cases do not violate Goldberg's Unique Path constraint, since the Finnish DL predicates are not interpreted as having path meanings here.

Therefore, Finnish is consistent with Rappaport Hovav and Levin's (1995) claim that Achievements and Accomplishments will not allow further augmentation with achieved location. The cases in (73), (79), and (81), which on the surface seem to be counterexamples, turn out to support the generalization, given that the DL predicates do not require spatial structures (read: change of location) from the verbs they occur with. However, this result is obtained only if the diphasic structure for DL interpretation argued for earlier is upheld.

4.3 Conclusion

In the above discussion, I showed how the semantic analysis of DLs developed in this dissertation can be put to work in other argument structure phenomena in Finnish. The analysis extends to another class of Semantic Case in Finnish — the State Cases — and thus supports diphasic, ordered structures in another category of predicates. The semantic analysis of Finnish DLs as not denoting Paths, and allowing temporal domains for their interpretation (i.e., spatial/spatio-temporal domains are not necessary), also explains the distribution of DL predicates with resultative constructions, accounting for the apparent differences in the argument structures of English and Finnish in secondary predication.

Chapter 5

Conclusion

The main idea pursued in this work is that directional locatives have a semantics more abstract than the path meanings commonly attributed to them. I argued that they denote ordered structures, and are interpretable in domains that are diphasic. The empirical basis for this claim comes from DL predication in non-motion contexts. If DLs refer to paths, as has been claimed in previous work on prepositional meanings, then this change-of-location interpretation makes DL modifiers incompatible with non-motion events, and static objects.

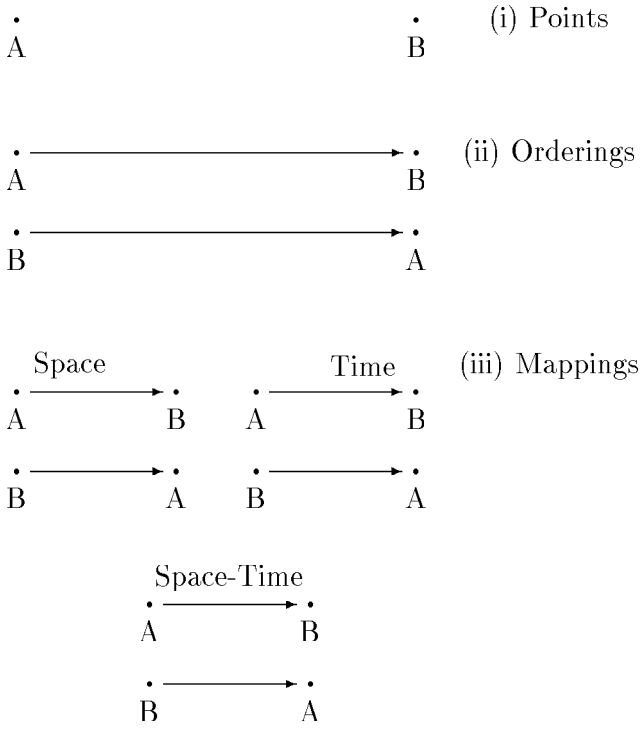
Both English and Finnish DLs can modify static objects. In addition, I showed that Finnish DLs appear as complements of aspectual verbs, verbs with posterior/anterior entailment properties, and more generally, verbs that are inherently Achievements or Accomplishments. All these occurrences are expected and regular, given that the event structures of these classes of verbs are diphasic, and DLs can be properly interpreted in the temporal domain. The reason why English DLs generally do not occur with this same class of verbs is due to the language restricting DL interpretation to only spatial or spatio-temporal domains.

The analysis advanced here derives explanations for argument structure differences across languages. I showed that the interaction between the semantics of DLs

and verbs of motion involves lexical aspect shift. This approach correctly predicts typological differences in the argument structures of languages like French, Mandarin Chinese, Finnish, and English. In addition, the explanation of how DL predication differs between English and Finnish is used to explain the differences in secondary predication in the two languages.

Here, I summarize the basic intuitions behind the steps in the semantic analysis, using the schema in (1) below. In the semantic model, we need to establish two distinct points (level (i)). We assume that these points can be ordered (level (ii)). Orderings can be found in the domains of space, time, or even space-time (level (iii)). Crucially, I locate the basic meaning of DLs at level (ii), the level of orderings. Level (iii) inherits all the information from the higher levels, and gives spatial, temporal, or spatio-temporal interpretations of DLs. The difference between previous approaches and the current analysis is that previously, the interpretations of DLs have been focused on level (iii).

(1) Ontology of the semantic model:



The results of this dissertation have immediate implications for the following current areas of research, and for future work.

One, we posit a single meaning for DLs (as denoting ordered structures), and allow for their interpretations in three domains — spatial, temporal, or spatio-temporal — based on the type of objects or events the DLs occur with. In other frameworks, where the meaning of DLs are located at level (iii), there must be *at least* two different meanings for DLs — temporal and spatial — if the Finnish facts are taken into account.[1] However, having different meanings is problematic, considering the data below.

[1]This assumes that spatio-temporal meaning is derived from the path meaning, for example, in the framework of Verkuyl and Zwarts (1992).

In examples (2) – (4), we are conjoining two different types of verbs, but retaining one DL predicate. These sentences are acceptable in Finnish, although their equivalents in English are clearly bad, since verbs like *forget*, *find*, and *remain* do not take DL complements.

(2) Sointu laitto-i ja Vieno unoht-i kaku-n uuni-in.
Sointu put-PAST-3SG and Vieno forget-PAST-3SG cake-ACC oven-ILL
(lit.) 'Sointu put and Vieno forgot the cake into the oven.'

(3) Sointu löys-i ja Vieno ott-i kaku-n uuni-sta.
Sointu find-PAST-3SG and Vieno take-PAST-3SG cake-ACC oven-ELA
(lit.) 'Sointu found and Vieno took the cake out of the oven.'

(4) Sointu men-i ja Vieno jä-i talo-on.
Sointu go-PAST-3SG and Vieno remained-PAST-3SG house-ILL
(lit.) 'Sointu went and Vieno remained into the house.'

Traditional ambiguity tests using conjunction show that only constituents that are similar in categorial structure and sense can be conjoined, and undergo conjunction reduction (e.g., Zwicky and Sadock (1975)). If DLs have two distinct meanings, one spatial, for the occurrence with motion verbs like 'put'/'go', and the other temporal, for the occurrence with 'forget'/'remain', then the conjunction reduction in the above examples should actually be impossible. But this is not the case.

Two, in having DLs derive temporal or spatial interpretations from the events or objects they modify, the temporal and spatial readings of DLs are on an equal footing — neither one is derived from the other. This view differs from the common assumption that temporal relationships are derived from spatial ones.[2] This work demonstrates that, from a synchronic perspective, both temporal and spatial meanings are central to the interpretation of the DL case morphemes.

[2]This is attested in diachronic analyses, however (e.g., Traugott (1975)).

Three, I have shown that with object modification, DL interpretation does not need to invoke the notion of fictive motion. It would be interesting to see how far this idea can be extended, for example, to the use of DLs with stative verbs of perception, or sensory verbs. Talmy (1996) discusses a category of sensory paths as depicting fictive motion, and gives verbs like *see*, *smell*, *hear* as illustration:

(5) a. The enemy can see us from where they're positioned.

b. ?The enemy can see us from where we're standing.

(6) a. I can hear/smell him all the way from where I'm standing.

b. I can hear/smell him all the way from where he's standing.

Fictive motion in such cases involves the conceptualization of two entities, the Experiencer and the Experienced, and of 'something intangible that moves in a straight path between the two entities in one direction or the other' (i.e., the sensory path is bidirectional, as the (a) and (b) alternatives show) (Talmy 1996:224ff).

In Finnish, the same sensory verbs also take DL predicates ((8)–(10) are from Hakulinen (1961)):

(7) Nä-i-n heidä-t huonee-seen selvä-sti.
see-PAST-1P they-ACC room-ILL clearly
(lit.) 'I saw them into the room clearly.'
Reading A: 'I was in the room, they were outside, I saw them clearly.' *or*
Reading B: ?'They were in the room, I was outside, I saw them clearly.'[3]

[3]Not everyone accepts the second interpretation, and this may be related to what Talmy observes as a 'bias' towards the 'Experiencer as Source' for English *see*, as the example in (5b) shows. However, the data with 'hear' and 'smell' show that it is possible for sensory perception to be bidirectional, compatible with both 'into' and 'from' complements.

(8) He näk-i-vät sinne pello-lle, mitä tie-llä tapahtu-i.
they see-PAST-3PL there-ILL field-ALL what road-ADE happen-PAST
'They saw on (lit. 'onto') the field what happened on the road.'

(9) Isä kuul-i huonee-see-nsa keskustelu-mme.
father hear-PAST room-ILL-POSS-3SG conversation-POSS-1PL
'(Our) father overheard our conversation in (lit. 'into') his room.'

(10) Haistaa makkara-n pussi-in ja lämpöise-n leivä-n uuni-in. (Proverb)
smell sausage-ACC sack-ILL and warm-ACC bread-ACC oven-ILL
'(One that) smells the sausage (even as it is) in (lit. 'into') the sack and the warm bread (even as it is) in (lit. 'into') the oven.'

Whether diphasic structures for such cases (and others that involve DL predication) can be motivated without invoking fictive motion is one line of inquiry to pursue in future research. It is possible to think that the depiction of sensory perception actually involves presenting a static view of how two entities are located spatially. For example, in the case of seeing (7, 8), the Experiencer and the thing experienced are separated physically by a boundary (e.g., the wall between the room and the outside; the boundary between the field and the road). The locations of these two entities constitute the two distinct points that would be amenable to an interpretation in the diphasic semantic model (see (1), level (i)). A further investigation of Subject-/Object-orientation of DLs in the above examples (see also Nam (1995a)) is needed to explain the bidirectional effect in sensory perception observed by Talmy (1996).

Finally, in incorporating an examination of the lexical semantics of verb classes into the semantic analysis, this research shows how model-theoretic semantics and lexical semantics can be fruitfully linked to give a unified analysis of DL predication. These two areas of semantics research need not be kept apart, and should not be.

Appendix A

Data and Corpora

FINNISH

Finnish Grammars

Hakulinen, Lauri. 1961. *Suomen kielen rakenne ja kehitys*, 2nd edition. Helsinki: Otava. [The Structure and Development of the Finnish Language]

Karlsson, Fred. 1987. *Finnish Grammar*, 2nd edition. Porvoo: Werner Söderström Osakeyhtiö.

Penttilä, Aarni. 1963. *Suomen Kielioppi*, 2nd edition. Porvoo: Werner Söderström Osakeyhtiö. [Finnish Grammar]

Apart from grammars, the lists of Finnish verbs were culled from the following sources:

Flint, Aili, 1980, *Semantic Structure in the Finnish Lexicon: Verbs of Possibility and Sufficiency*, Helsinki: Suomalaisen Kirjallisuuden Seura.

Holman, Eugene, 1984, *Handbook of Finnish Verbs*, Vaasa: Suomalaisen Kirjallisuuden Seura.

ENGLISH

I searched some electronic sources for relevant English examples. I thank Brett Kessler and Christine Poulin for doing the main searches on the Project Gutenberg Etext.

The Complete Moby Shakespeare (Electronic source)

CSLI

The London-Lund Corpus

The Electronic Text Center, University of Virginia, Publicly-accessible texts

Wells, H. G., *The Crystal Egg*

Burroughs, Edgar Rice, *The Mad King*

OED = The Oxford English Dictionary, 2nd edition.

Project Gutenberg Etext

Brown, W. W., *Clotelle*

The King James Bible

MacKay, Charles, *Extraordinary Popular Delusions, volume 3*

Montgomery, L. M., *Anne of Avonlea*

Webster = Merriam Webster 3rd International Dictionary

FRENCH

The Oxford-Hachette French Dictionary

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