The Space of Case

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The Space of Case

Een wetenschappelijke proeve op het gebied van de Letteren

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"The ability to create language systems through categorization, analogy, [. . .] semantic generalization, and pragmatic inferencing derives from the innate neurocognitive capacities of human beings. These are largely domain-general capacities that happen to be used to create language."

(Bybee, 2008, 110)

"This is not to say that *every* aspect of syntax should be explainable in semantic terms. [. . .] The point of the Grammatical Constraint is only to attempt to minimize the differences of syntactic and semantic structure."

(Jackendoff, 1983, 14; emphasis in original)

"The whole point of having a case system, or any morphological system for that matter, is to provide brief signals for broad categories that will be sufficient for communication most of the time."

(Blake, 1994, 169)

"All else being equal, cross-linguistic agreement in semantic categorization suggests relative uniformity in the way people readily conceptualize the domain, while disagreement suggests that the domain is more open to alternative conceptualizations, and so more in need of language-specific learning."

(Gentner & Bowerman, 2009, 468)

"It's the ECONOMY, stupid."

(Bill Clinton, *campaign slogan* 1992; emphasis SL)

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Considering the importance of starting and end points in my research, it's ironic that I don't know where to start or end in thanking people. I will try to keep it as professional as possible, but the borders are fuzzy, as always, in Linguistics, or at least in my thinking. For on the one hand, if I discuss my broad assumptions and methodology with Dirk in Café Jos, it helps me to see things more clearly (and maybe there has been some comparable use in explaining the difference between *Lingo* and Linguistics to my *voetzaal* friends too). On the other hand, a considerable part of my working day consisted of doing coffee-related things with Geertje, which did not always translate into great linguistic insights directly. This is where I start: I am grateful to all the members of the Centre for Language Studies in Nijmegen for making it such a friendly and stimulating place to work, and I thank Arto Anttila, Hans-Martin Gärtner, and Seppo Kittilä, and the people of Stanford University, the Zentrum für Allgemeine Sprachwissenschaft in Berlin, and the University of Helsinki for the pleasant and fruitful research stays.

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Conventions

Italics are used to refer to language forms and for emphasis. 'Single quotes' are used to refer to meanings. "Double quotes" are used for quotations, ALL CAPS are used for generalized, or rather, idealized meanings that do not really exist. For example, the semantics of Dutch *op* 'on' differs from English *on* 'on', but both are instances of ON, whatever the latter may denote exactly. For readability, some of these concepts are Capitalized only. These are mostly semantic roles and directionality distinctions. SMALL CAPS are used for linguistic categories in glosses and optimality theoretic constraints. The speaker is referred to by *she* and the hearer by *he*. The distinction between a language specific case and a set of cases by the same name from different languages should be clear from context. With respect to this last remark, a word of caution is in order. Cases are often named on the basis of only one of their uses and their actual functions may differ considerably between languages. Cases are to an important extent defined by the paradigm they occur in, which is again something that differs between languages. This thesis makes use of the WALS classification system for languages. Finally, all computations are made with R 2.4.1 (R Development Core Team, 2005).

Abbreviations

1,2,3	first, second, third person *or* noun classes
I, II, III	noun classes
A	agent *or* subject of transitive clause *or* prominent subject

a	low-prominent subject of transitive clause
AB	abessive case
ABL	ablative case
ABS	absolutive case
ACC	accusative case
AD	adessive case
ADEL	adelative case
ALL	allative case
ANIM	animate
ANT	anterior
ANTIC	anticausative
AP	antipassive
C	control
CAUS	causative
CL	clitic
CLASS:	classifier:*class*
COM	comitative case
CON	construct case
COND	conditional
CONV	converb
CONT	contact
DAT	dative case
DECL	declarative
DEF	definite
DEM	demonstrative
DIR	directive case
DIST	distal
DOM	differential object marking
DP	determiner phrase
DSM	differential subject marking
EL	elative case
ERG	ergative case
ES	essive case
EVID	evidential
FAC	factive
FEM	feminine
FIN	finite
FOC	focus
FUT	future
GEN	genitive case

GENOM	nominalized genitive case
GF	grammatical function
HORT	hortative
ILL	illative case
IMP	imperative
IMPF	imperfective
IMPS	impersonal
INCOMPL	incompletive
IN(ES)	inessive case
IND	indicative
INEL	inelative case
INF	infinitive
INSTR	instrumental case
LAT	lative case
LOC	locative case
MASC	masculine
MOT	motative case
N	noun
N	neuter
NOM	nominative case
MSD	*Masdar*, deverbalizer
NEG	negation
NON	non-
O	object of transitive clause
OBLIG	obligative
P	adposition *or* patient *or* prominent object
p	non-prominent object
PART	partitive case
PAST	past tense
PAT	patient marker
PERF	perfective
PERS	person
PL	plural
POSS	possessive case
POST	postessive case
POT	potential
PP	adpositional phrase
PRES	present tense
PROS	prosecutive case
PROX	proximal

PRT	particle
PTC	participle
Q	question
REAL	realis aspect/mood
REF	referent case
REL	relative
RECPAST	recent past
RELN	relator noun
REMP	remote past
REP	reported speech
RESPRO	resumptive pronoun
S	subject
SG	singular
SUB	subordinate *or* subessive
SUPEREL	superelative case
SUPER(ES)	superessive case
SUPERL	superlative case
TAM	tense, aspect, mood marker
TERM	terminative case
TOP	topic
TRANSL	translative case
UW	unwitnessed
V	verb
VIS	visual
VP	verb phrase
X	*any part of speech category*
XP	*phrase headed by any part of speech*

Abstract

Case is the result of a grammaticalization process in which frequently used words develop more general meanings and more economical forms. Since general meanings apply more often and economical forms are preferably used, frequency works as a flywheel.

As will be shown in Chapter 2, case expresses the most general and most frequently used meanings, *viz.* semantic roles. Semantic roles are generalizations about event participants necessary for communication. The semantics of an event participant in a particular event is much richer but cannot efficiently be communicated as such for all individual participants. By categorizing arguments into semantic roles, the speaker can use more economical means of expression, namely the forms corresponding to semantic roles. Using the semantics of the predicate, the hearer can unpack this information again. For example, the Agent of *to hit* is a 'hitter' and the Agent of *to walk* is a 'walker'. Structural case can be seen as a high-level generalization about argument functions. It is used to discriminate between the semantic roles that are most predictable for a particular predicate and therefore do not need to be identified by a semantic role.

The importance of frequency for the use and development of case also explains its spatial use, which will be the topic of Chapter 3. Spatial meaning can be decomposed into a configuration dimension, concerning the relative position in space between two objects, and a dimension of directionality that expresses the development of this configuration in time. Directionality necessarily consists of three basic distinctions. Place directionality is the absence of a change in configuration; Goal directionality is a change into some configuration; Source directionality is a change out of some configuration. All other directionality distinctions can be shown to be derived from this basic set. This analysis correctly predicts (as will be shown) an implicational scale of directionality distinctions in which derived meanings are only expected to be expressed by spatial case if the more basic distinctions

are first.

In contrast to the directionality dimension, the configuration domain is much more complex, organized by various principles that lead to a larger set of language particular configuration distinctions. As a result, the distinctions of configuration are less frequently used than those of directionality and therefore less likely case candidates. This prediction is also right, as I will show by a study on the growth of spatial case inventories, a comparison between spatial case and spatial adpositions, a semantic analysis of the morphosyntactic parts of spatial adpositional constructions, and, finally, by a study of the case forms of spatial adpositions in Finnish and Hungarian.

Chapter 4 will show how differential case marking, which is relatively well-known for the structural use of case, similarly applies to the spatial domain. The study of the optional use of spatial case will be used to account for the phenomenon in general. I propose that, in principle, all types of differential case marking can be explained by predictability. The use of case can be judged unnecessary if its meaning contribution is predictable, because of which case marking is omitted. This economical use is restricted by other rules of grammar that can be shown to be the result of fossilization, a process in which the outcomes of optimization processes become independent constraints.

Finally, the extended uses of spatial case will be discussed in Chapter 5; more specifically its use as a marker of structural arguments. Being the result of a grammaticalization process, spatial case is a profitable construction to exploit for other purposes too. In most accounts, the structural use of spatial case is explained in terms of syntactic markedness only. However, I argue that the choice of spatial case in the argument domain is semantically motivated. By forcing a predicate argument with a human referent into a spatial case construction, a compromise is reached in which the argument has to give up some properties that are especially incompatible with spatial meaning. By using a spatial case on an argument, the speaker suspends animacy inferences like volitionality and sentience.

Thus, I propose a functionally motivated account of spatial case that starts at its very origin and straightforwardly extends to its metaphorical use.

Chapter 1

Introduction

In this chapter the concept of spatial case will be introduced. I will argue for the relevance of its study for a better understanding of morphological case and spatial meaning.

1.1 The Space of Case

Spatial case is a suffix that expresses spatial meaning. A suffix is a morpheme that is attached to words and cannot be used independently in a sentence; a morpheme is the smallest unit in language with meaning, and spatial meaning, at least in this definition, concerns the position of things with respect to other things.

To make matters more concrete consider the following example from Hungarian.

Hungarian
(1) A könyv-et az asztal-ra tesz-em.
     the book-ACC the table-SUPERL put-1SG
     'I put the book on the table.'

Both nouns in (1) are case marked. The suffix *-(e)t* on *könyv* 'book' is the accusative case. The accusative case is a structural case that marks the direct object of the verb. Most English speakers are probably familiar with structural case from languages like German and Latin. The suffix *-ra* is a spatial case, the *superlative*. It is translated with the English preposition *on(to)* and expresses the final position of the book with respect to the table.

Through the use of case marking it is clear that in (1) the book is put on the table and not, for example, under it or, the other way around, the table being placed on the book.

Spatial case is like structural case in that both are suffixes. At the same time, spatial case is similar to spatial adpositions in that both express spatial meaning. The similarity between spatial case and structural case on the one hand, and between spatial case and spatial adpositions on the other is not a coincidence. Spatial adpositions and structural case are the neighbors of spatial case on a case cline (see Bybee, 1985; C. Lehmann, 1985; Svorou, 1993; Hopper & Traugott, 2003):

(2)   The case cline:
        Noun/Verb ≺ (Spatial) adposition ≺ Spatial case ≺ Structural case

On the one hand, the cline illustrates the diachronic relation between its different categories. The categories on the right often develop from their neighbors to the left. From this perspective, the cline is a *grammaticalization cline* showing an increasing degree of grammaticalization. On the other hand, it illustrates synchronic differences like a decreasing size of type members in a category (e.g. there are more different nouns than there are different cases), an increasing token frequency of these types in a corpus (the mean frequency of occurrence of adpositions is higher then the mean frequency of occurrence of verbs), and a decreasing lexical specificity (a noun has a more specific meaning than a case). Though the case cline is motivated by diachronic research, mostly synchronic implications will be discussed.

A brief introduction to morphological case and the way in which it is approached in this study will be given below. But before we start, why a thesis on spatial case? I think *case* is one of the most interesting constructions human language has developed. It is the result of a combination of more general cognitive principles like categorization and economy and of purely linguistic ones like argument linking, agreement, and paradigm pressure. *Spatial meaning* is one of the most important and basic concepts in life. We need some understanding of the space around us in order to be able to think in terms of, for example, possession. By studying spatial case, I do not have to choose between the two phenomena.

The most frequent use of case is to express syntactic relationships. This is called the *structural use* and is illustrated in (3). Syntactic relationships are mostly relations between a verb and its arguments. The accusative case marker *-(a)t* in the Hungarian sentence in (3) tells us that *házak* 'houses'

is the object of *építetek* 'they were building' and hence the thing that is being built. The marker is really the same as the *-(e)t* marker in the first example. The binding vowel is determined by the phonological properties of the noun the suffix attaches to, a process called *vowel harmony* (cf. also the two different plural markers *-(e)k* and *-(a)k* in (3)).

Hungarian (Ackerman & Moore, 2001, 1)

(3)   *Az új   telepes-ek ház-ak-at   épít-et-tek.*
        the new settlers-PL house-PL-ACC build-PAST-3PL
        'The new settlers were building houses.'

    The frequency of the structural use of case does not follow from a predisposition of case but from the need to mark syntactic relationships in virtually every clause. In fact, morphological case is only one strategy to mark the syntactic argument organization. Many languages use structural position, word order, agreement, and semantic properties like animacy instead of or in addition to case. As de Hoop and Lamers (2006) show, these different principles can be viewed as a set of violable and potentially conflicting constraints that are all active at the same time in an incremental process of interpretation. De Hoop and Lamers (2006) reanalyze the results of an experiment by Lamers (2001) that measures the time course of brain activity (so-called *event related brain potentials, ERPs*) while interpreting transitive sentences in Dutch like those illustrated in (4). They found evidence for a preference to interpret the first constituent as the subject. Later on in the interpretation process, however, this preference can be overruled by (animacy) selection preferences of the verb and the case form of the second, pronominal argument.

Dutch (de Hoop & Lamers, 2006, 280)

(4)   a.   *De oude vrouw in de straat verzorgde   hem.*
            the old   woman in the street took.care.of him
            'The old woman in the street took care of him.'
    b.   *Het oude park in de straat verzorgde   de vrouw.*
            the old   park in the street took.care.of the woman
            'The old woman in the street took care of the park.'
    c.   *De oude vrouw in de straat verzorgde   hij.*
            the old   woman in the street took.care.of 3SG.NOM
            'He took care of the old woman.'

In (4-a) the three strategies (word order, selectional restrictions, and case)

point to the same interpretation. The first constituent is preferably interpreted as the subject, it refers to a human and therefore matches the selection criteria of the verb, and the second constituent is an accusative case form, indicating objecthood. In (4-b) *het oude park* 'the old park' is interpreted as the subject because of word order preferences. Upon encountering the verb, however, subjects have to switch to an object-initial interpretation because the verb *verzorgen* 'take care of' selects for a human subject. The switch in interpretation is measured as a significant ERP effect at the verb (*viz.* as early and late positivities in comparison with the first sentence). In (4-c) not the selectional restrictions of the verb, but the nominative case form of the second argument causes a jump in interpretation. The same ERP effect is found for (4-c) but this time at the pronoun.

Note that knowing the subject from the object does not yet tell us who did what to whom. That is, syntactic function cannot be directly linked to semantic functions. The question which semantic argument ends up as which syntactic argument and, though often neglected, the question which syntactic argument should be interpreted as which semantic argument, is known as the *linking problem* (see Ackerman & Moore, 2001). Typically, the acting argument becomes the subject and the argument that is being acted on the object. But in principle, we can choose which of the two semantic arguments will be expressed as the syntactic subject. For example, if we want to topicalize the houses in the English translation in (3), we can say *The houses were built by the new settlers.* In this sentence, the former object became subject. Also, we find variation for the object position. In ditransitive constructions in English, for example, it is possible to use a double object construction (5-a) or a prepositional dative construction (5-b) (see, among others, Bresnan, Cueni, Nikitina, & Baayen, 2007).

(5) a. *Susan gave toys to children.*
     b. *Susan gave the children toys.*

Note that, at least in some theories, the Theme *toys* is a direct object in (5-a) only, the Recipient *the children* being the direct object in (5-b). As Bresnan et al. (2007) show, the choice between the two options is determined by various interacting constraints, one of which, most offensively for the idea of a direct link between semantics and syntax, is the difference in length between the object candidates. The smaller a constituent is, the more likely it is to be placed directly adjacent to the verb to become the direct object (in English at least). *Spray-load alternations* are another example of variation in object selection. For the same event, one can say both *clear the table*

and *clear the dishes* (Sweep, 2009), or *spray the paint onto the wall* and *spray the wall with the paint* (Dowty, 1991).

Because there is no direct mapping from semantic to syntactic relationships, structural case is often said to be meaningless. Next, a fundamental boundary is drawn between the structural and the semantic use that, as was illustrated in the first example with spatial case, does have meaning. Structural case then becomes an abstract output criterion of language without any extra-linguistic motivation (and semantic case often ignored).

I think the distinction between structural and semantic case is a gradual one. As I will argue in Chapter 2, both types of case are the result of the same grammaticalization process in which meanings become more general and more frequently used, and their forms of expression more economical. Case expresses the most general and most frequent meanings, *viz.* semantic roles. Semantic roles are generalizations about event participants necessary for communication. The semantics of an argument in a particular event is much richer but cannot efficiently be communicated as such for all individual participants. By categorizing arguments into semantic roles, the speaker can use more economical means of expression, namely the forms corresponding to semantic roles. From the semantics of the predicate, the hearer can tell the precise argument function. For example, the Agent of *to hit* is a 'hitter', the Agent of *to walk* is a 'walker'. Syntactic functions like subject and object are high-level generalizations about argument functions. They are the most predictable semantic roles of a particular predicate. Because they are so predictable, their argument function can be derived entirely from the predicate semantics. These roles do not need their own form for identification, they only need to be kept apart by structural case. Note that in this view, construction alternations like in (5) are indeed expected for ditransitive predicates. The Recipient and Theme role are equally pervasive in the argument structure of these predicates.

Only if a semantic role is used frequently enough its marker can develop into a case marker. For the spatial domain, this predicts that the most frequent aspects of spatial meaning will be expressed by spatial case first. As I will argue in Chapter 3, this most frequent aspect concerns *directionality*, the change of relative position over time. With respect to the Hungarian example in (1) above, before the putting, the book was not on the table, but it was afterwards. I will show that this change of position comes in three basic flavors only, namely Place, Goal, and Source. That is, no change, a positive change, and a negative change. All other directionality meanings are derived from this basic set.

In some languages, it is possible to omit case markers. Such *differential*

case marking is relatively well-known for structural case. However, as I will show in Chapter 4, it similarly applies to the spatial domain (thus stressing the similarity between the two uses). I will show how this differential use of case follows from the very same principles that I have used to explain its development and normal use.

Being the end result of a grammaticalization process, case is an economical expression with a general meaning. This makes it a profitable and easy candidate for other than spatial uses. In Chapter 5, I discuss the use of spatial case to mark Agents. I argue that the choice of spatial case in the argument domain is semantically motivated. The combination of a spatial form with a human semantic role results in a compromise between spatial and Agent meaning.

1.2   Basic Assumptions

The basic assumptions that form the background to my study are summarized in the mottos of this thesis. Probably, they need some further explanation.

I believe that language is a system that is adapted to our cognitive makeup, not the other way around (cf. also, for example Christiansen & Chater, 2008). Language is part of a more general organization. That is, it is not an independent module with its own rules, but is embedded in general cognitive principles. In this broad perspective, I try to ground the principles I use with the lowest amount of theory-internal motivations as possible. Such a view is, among many others, expressed by Bybee (2008, 110), who reduces the creation of language systems through categorization, semantic generalization, and pragmatic inferencing to "the innate neurocognitive capacities of human beings."

In addition to neurocognitive principles, the communicative function of language plays a major role in its development. Language is the result of our need to communicate (although this is the wrong way to talk about it from an evolutionary perspective). Hence, studies of language should always take into account both the production and interpretation of language. How something is said exactly is not only determined by the intentions of the speaker, it is also motivated by the way in which the hearer will probably interpret the utterance. This point of view is formalized in a bidirectional optimality theoretic framework (bidirectional OT; Blutner, de Hoop, & Hendriks, 2006). However, "[t]his is not to say that *every* aspect of syntax should be explainable in semantic terms" (Jackendoff, 1983,

14). There may be rules of syntax that cannot be explained by functional principles and have to be postulated as belonging to the language system. Nevertheless, the goal is to motivate syntactic structure by communicative and neurocognitive principles as much as possible, thereby reducing the set of postulated rules as much as possible.

Morphological case is a nice example of the compromise between speakers' and hearers' requirements of language. According to Blake (1994, 169), "[t]he whole point of having a case system, or any morphological system for that matter, is to provide brief signals for broad categories that will be sufficient for communication most of the time." As such, it satisfies ECONOMY, which states that speakers want utterances to be as short as possible to waste as little energy as possible. This principle is extremely important in languages. At the same time, case is used to satisfy an opposing desire to mark functions and meanings that could otherwise not be derived by the hearer. If communication is to succeed, the speaker has to take the hearer into consideration. The speaker has to use case, thereby violating the ultimate satisfaction of ECONOMY, because the hearer might not get the right interpretation otherwise.

I have chosen a typological approach to study spatial case. Given my goal of embedding language principles in a broader cognitive frame, the comparison of languages is necessary. A spatial case paradigm of a given language, or any language construction for that matter, is always partly the result of arbitrary choices and dependent on the coincidental other existing linguistic strategies. Only by comparing different languages, the general principles that determine the possibilities to choose from in the first place become clear. This is called the *Typological Prevalence hypothesis* by Gentner and Bowerman (2009, 468), which they define as follows. "All else being equal, cross-linguistic agreement in semantic categorization suggests relative uniformity in the way people readily conceptualize the domain, while disagreement suggests that the domain is more open to alternative conceptualizations, and so more in need of language-specific learning." Thus, by studying the use of spatial case in different languages, I try to find out how people conceptualize space and which principles are active in the case domain.

Chapter 2

About Case

I argue that case is the result of a diachronic economy process in which frequent words develop more economical forms and become semantically more general. Thus, case is not an abstract prerequisite of the syntax of language, as most explicitly proposed by generative grammar, but the product of a general economy principle. Case markers express semantic roles, which are defined as language-particular medium-level generalizations about argument functions. Semantic roles are used to efficiently communicate the argument structure. Structural case can be seen as a high-level generalization. It is used to discriminate between the semantic roles that are most predictable for a particular predicate.

2.1   Introduction

This chapter is about the space of case in the linguistic system. Morphological case is the result of a grammaticalization process that leads to more general meanings and more economical forms. Case forms compete with each other and with other linguistic constructions for further generalization. The title 'The space of case' can thus be taken pretty literally, in terms of the space a case occupies on a semantic map of argument functions.

Much work on case focused on its structural use only and hence does not give a representative picture. In this study, I start with its semantic use and reconcile both uses in one account. Both the structural and the

semantic use of case can be shown to follow from a generalization principle that is necessary for efficient communication. Also, most theories see case as a product of syntax only. I think language crucially has a communicative function, and case is also a service of the speaker to the hearer. My proposal is couched in a bidirectional optimality theoretic framework (Blutner et al., 2006) that formalizes this idea. In this framework, both the hearer's and the speaker's perspective are taken into account.

In Section 2.2, it is argued that case is the ultimate result of a diachronic economy process in which frequent words develop more economical forms. Eventually, these forms become so short that they lose their syntactic independence and need to be suffixed to another word.

In Section 2.3, the same principles that cause the development of case markers will be used to account for their meaning. Case expresses semantic roles, which are language-particular generalizations about argument functions. The precise semantics of the argument is retrievable from the verb semantics. The communication of argument functions by means of semantic roles is represented by a distance minimization procedure on semantic maps.

In Section 2.4, the structural use of case will be discussed. Transitive predicates have two prominent semantic roles that are virtually always used. Structural case is used to discriminate between these arguments. Just like with the more semantic use of case, the precise semantics of the arguments can be determined by the verb.

In Section 2.5, the use of case is modeled in semi-bidirectional OT. I will show how the functional motivations behind the development of case straightforwardly explain its use. Also, I will show how the structural use of case follows from the fossilization procedure of optimization processes.

Finally, I will argue in Section 2.6 that the often assumed dichotomy between the structural and the semantic use of case is a gradual difference only.

2.2   The Form of Case

This section will show how Economy leads to the development of case markers in a grammaticalization process.

We try to do what we need to do with the least effort possible. If not for everything, at least it holds for human language usage. Zipf (1965) calls this the *Principle of Least Effort* and illustrates it for the lexicon (see Hogeweg, 2009, for other constraints that are active in the organization of the lexicon).

From the perspective of the speaker, it is maximally economical to refer to all meanings with one word only. In this way she does not have to keep up a large vocabulary nor does she have to select the right item from this vocabulary to refer to a specific meaning. From the perspective of the hearer, on the other hand, it is maximally economical to have a specific word for every meaning. In this way, he does not have to find out which of all possible meanings of a certain form the speaker intended, as there is only one meaning for each form. Zipf (1965) calls the first tendency the *Force of Unification*, the second the *Force of Diversification*. In this thesis, these forces are referred to with the OT constraints ECONOMY and IDENTIFY. Clearly, the two constraints work in opposite directions.

For Zipf, a (what has become known as a) zipfian curve illustrates the compromise between the two constraints. A zipfian curve shows the inverse proportional relation between the frequency of a word and its rank in a numerically sorted list:

(1) $freq_i = C/rank_i$ (in which C is some constant)

According to this formula, the second most frequent word has half of the frequency C of the most frequent one, the third most frequent word has one third of this frequency, etc. Figure 2.1 shows this relation for all words in Melville's *Moby Dick*.[1] Indeed the plot of the logarithm of the frequency of word types (*log frequency*) against the logarithm of their rank (*log word rank*) almost follows a straight line, which is what the formula above would predict. Zipf explains the pattern as follows:

> On the one hand, [ECONOMY] will act in the direction of *decreasing* the *number* of different words to 1, while *increasing* the frequency of that one word to 100%. Conversely, [IDENTIFY] will act in the opposite direction of *increasing* the *number* of different words while decreasing their average *frequency* of occurrence toward 1. (Zipf, 1965, 22-23; emphasis in original)

This means that words with a more general meaning apply to more meanings and, because of ECONOMY, can and will be used more often than the specific words for the specific meanings that are covered by the more general words. Although this idea in itself sounds very plausible, not everybody agrees that it also explains Zipf's law. For example, Jäger and van Rooij (2007) show that this is better viewed as a consequence of

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[1]Data from Baayen (2008).
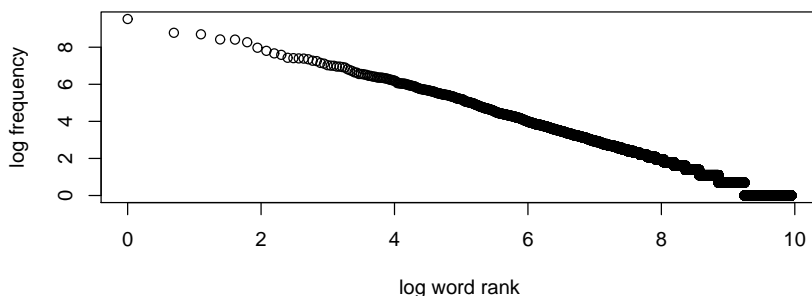
Figure 2.1: Zipf's law: rank-frequency distribution of words in *Moby Dick*

the fact that the probability of the usage of a word is positively correlated to its frequency in the preceding discourse. In any event, words differ with respect to their frequency of use and words with a more general meaning are expected to be used more often than words with a more specific meaning.

Zipf allows for meaning extension by proposing an optional expansion of the meanings a frequent word has. If a word is frequent, apparently it does a good job and therefore it is more likely to be used for other meanings than a word that is not that frequent. Thus, if a frequent word has a general meaning its meaning will get even more general and its frequency will go up even further.

In this process of increased usage, not only the meaning of the word is predicted to change, but also its form. Shortening the form of words a speaker uses very often reduces the average amount of effort she has to put in articulating her utterances. The more frequent a word is, the more beneficial it is to reduce its form. As a result, highly frequent items should consist of less material (Zipf, 1965, 59). This prediction is borne out. It is illustrated in Figure 2.2 in which the logarithm of the length (*log word length*) of the words in *Moby Dick* is plotted against their log rank.[2] The variation in length for infrequent words is bigger than for frequent words (not all infrequent words are long). On average, however, the mean length of a word clearly increases as its frequency of use decreases. Thus, frequency

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[2]All words longer than 20 characters were excluded as these were mostly hyphenated combinations.
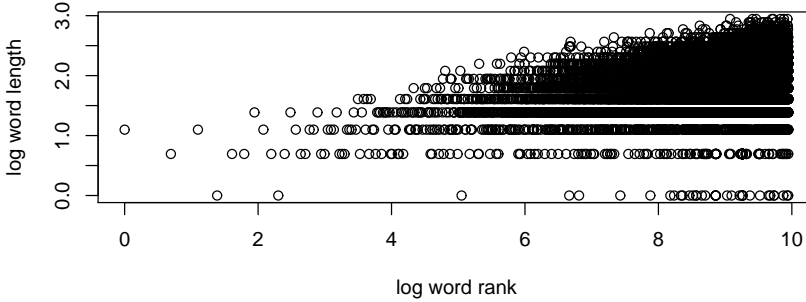
Figure 2.2: Rank-length distribution of words in *Moby Dick*

works as a flywheel: "greater frequency makes for greater ease which makes for greater frequency and so on." (Zipf, 1965, 62).

Instead of frequent words becoming shorter, it could in principle also be the case that infrequent words become longer. Nettle (2002, 23-24) gives an interesting explanation why there is only a shortening process at work and not one of word lengthening. He explains this in terms of variation in language acquisition. Normally, there is random variation in language acquisition. Language learners occasionally may learn a word wrongly. If this variation is random it will cancel itself out. As a result, language will not change because of random variation only. Only when variation is directionally skewed, languages are expected to change in that direction, and diverge over time (Nettle, 2002, 25). Variation in word forms is indeed directionally skewed. Words can be expressed correctly or wrongly, clearly and slowly or sloppily and quickly. Speakers do not generally invent extra phonetic material and add it to words. However, a final consonant may easily be omitted and unstressed vowels left out. In other words, each word has a realization continuum from the perfect realization to, in cases of contextual redundancy, zero. Thus, language learners are faced with a skewed range of variation. Accidentally, language learners may think that a phonologically reduced instance really is the target form. However, they will never think the target form is longer than it really is. Therefore, if a form changes, it can only become shorter.

This idea can be used to explain why mostly frequent words become

shorter. When a word, because of the particular context it appears in, has a high real-time predictability, the hearer will be able to identify the word in question on the basis of less acoustic information (see Ernestus, Baayen, & Schreuder, 2002; Givón, 1976, 171, on pronouns). In these cases, the speaker does not have to, and therefore will not, articulate all of the phonological details of a word. This will more often be the case for general, frequent words than for specific, infrequent words, since the former are more predictable than the latter. Whenever some specific word is predictable, its more general cover term will be predictable too. Now, because of the more frequent use of the phonologically reduced form of predictable, more frequent words, language learners may more often think that this phonologically reduced form is really the target form. Thus, phonological reduction takes place as a result of predictability. Similarly, Haspelmath (2008, 206) argues that frequency only indirectly causes economical coding: it is predictability that directly causes phonological reduction and it is frequency that causes predictability.

In addition, ECONOMY can be motivated by the *production bottleneck* (see Levinson, 2000a, 2000b). Pre-articulation processes run faster than the articulation process itself (R. E. Anderson, 1982; Wheeldon & Levelt, 1995, 327) and comprehension can handle increased speech rates without any problems (Mehler et al., 1993). Because of this bottleneck, linguistic coding is costly: It slows down the communication process. By saving some costly morphemes, the speaker can speed up the communication process.

In sum, frequency causes a more general meaning, which leads to higher predictability, which allows phonological reduction (which is more profitable for frequent forms), which causes the learning of a shorter form, which makes it more profitable to use. It could also be the case that the causal relation at the outset is from a more general meaning to higher frequency. In this version too, once the process is running, it is autocatalytic, that is, high frequency eventually causes higher frequency via a number of intermediate steps. There is an important difference between the two options though. If frequency causes a more general meaning, the meaning of a frequent item is expected to become more general over time, whereas if a more general meaning causes a higher frequency of use, the meaning is not expected to change any further as it is outside the frequency loop. Since frequent words seem to develop to more general functions in the course of their lives (Blake, 1994; Barðdal, 2009; Harris & Campbell, 1995), I opt for the version in which the meaning is part of the repeating process.

Thus, highly frequent items are (or become) shorter and more grammaticalized and therefore they are more economical than less frequent items (see

Haspelmath, 2008; Heine, Claudi, & Hünnemeyer, 1991; Zeevat, 2007; Bybee, Perkins, & Pagliuca, 1994; Zipf, 1965). An expression can be said to be economical in comparison with another expression if it is shorter (fewer words, fewer syllables, fewer segments) or otherwise requires less articulatory effort (Haspelmath, 2008; Kiparsky, 2004).

Now, what does this have to do with case? Morphological case, just like for example agreement markers, is the ultimate result of this process. Because of semantic and morphophonemic changes that result from economy (e.g. semantic bleaching and vowel harmony), word boundaries can become opaque (Harris & Campbell, 1995, 89). These processes are most likely to apply to the boundaries of the most frequent words, as explained above. Because of its frequent use, a lexical item can get worn-out to such a degree that it can no longer live as an independent word. It then becomes a case suffix that is dependent on the noun it is attached to. Eventually, the (predecessor of a) case suffix and a noun are so closely connected that they are analyzed as one word. Differently from Harris and Campbell (1995), I think this state of mutualism between the case suffix and its bearer is thus the result of the new status of the frequent item, not the cause.

This process is more likely to apply to postpositions than to prepositions, as Hawkins and Cutler (1988) show. For computational processing reasons, both in production and comprehension, people like to know the argument before its function. The effect of the suffix cannot be determined without knowing the stem it combines with (Hawkins & Cutler, 1988, 307). As a result, cases are mostly suffixes rather than prefixes.

To demonstrate the supposed frequency of cases, I extracted the first 20,000 words of four different Finnish newspapers from the online Finnish CSC newspaper corpus:[3] *Demari* 2000 (D), a newspaper of the Social Democrats; *Karjalainen* 1998 (K) and *Aamulehti* 1999 (A), two fairly high standard, big newspapers, the latter especially for the region of Tampere, and *Helsingin Sanomat AE* 1995 (H), generally considered the highest quality newspaper. By using four different newspapers, we can informally check for dispersion (see Gries, 2009): If the findings are consistent between different corpora, we can be more confident about our conclusions as we can eliminate the possibility of a quirk of a particular corpus.

The proportion of words on which case is used are given in Table 2.1. The distinction between structural and semantic cases will only become relevant (and be discussed) below. It should be noted that in all four

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[3]www.csc.fi, consulted on February 26, 2009. The number of words is motivated by a technical restriction of the web interface of the CSC.

newspapers some case form is used on nearly 60% of the words. For technical reasons punctuation marks have been counted as words and the use of cases on adpositions has been neglected. The actual proportion could be shown to be even larger had this been corrected. On the basis of these numbers, we can safely say that case is an extremely frequently used strategy.

	Corpus			
	A	D	K	H
Structural case	.43 (8630)	.44 (8754)	.42 (8395)	.44 (8774)
Semantic case	.15 (2996)	.15 (2988)	.16 (3122)	.14 (2762)
No case	.42 (8374)	.41 (8258)	.42 (8483)	.42 (8464)

Table 2.1: Proportion of case used on words in Finnish

Figure 2.3 shows how frequency relates to grammaticalization. The horizontal axis represents the case cline introduced in the previous chapter, a *grammaticalization cline* showing an increasing degree of grammaticalization that eventually leads to case markers. Members on the right are the grammaticalized versions of their neighbors to the left. This cline is really a continuum without hard boundaries between the syntactic categories. The white bars indicate the log number of types within each class; the black bars indicate the log ratio of tokens per type, that is, the average frequency of use of each type. It was decided to plot the log number in order to reduce the plotting range that would otherwise run from a number of types of around 3000 (for nouns and verbs) to 3 (for structural case) and from a type/token ratio of around 3000 (for structural case) to around 3 (for nouns and verbs; cf. Table 2.2).

The number of types within each class decreases along the cline. That is, the classes of nouns and verbs are open, there are much fewer adpositions, only a few spatial or semantic cases, and two or three structural cases. In contrast, the token frequency increases along the cline. Semantically very specific, lexical classes (like nouns, generally) consist of many different types with a low token frequency; semantically less specific, grammaticalized classes (like spatial adpositions) consist of fewer types with a higher token frequency.

The counts on which Figure 2.3 is based are given in Table 2.2. As one can see, the numbers between the different corpora are similar enough to warrant the general claim about a relation between frequency and grammaticalization.
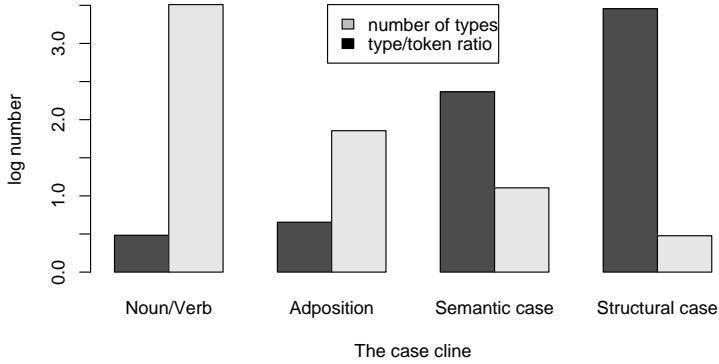
Figure 2.3: Relation between log number and degree of grammaticalization

Corpus	Count	Nouns/ Verbs	Adpositions	Semantic case	Structural case
A	number of types	3306	76	13	3
	ratio	3.0	4.7	229.6	2844.3
D	number of types	3010	69	13	3.0
	ratio	3.1	4.8	229.0	2898.0
K	number of types	3379	76	13	3
	ratio	3.0	4.2	239.4	2776.3
H	number of types	3243	66	12	3
	ratio	3.1	4.5	229.7	2886.3

Table 2.2: Case cline counts (number of types and type/token ratio)

The results clearly support the hypothesis of the role of frequency in the development of case. Case forms a closed class of extremely frequent types. Because of this frequency, case markers are more susceptible to ECONOMY, as explained above.

Since case forms a closed class and since case markers generally are in complementary distribution (exceptions to such mutual exclusion are cases

in languages that allow *case stacking*, see Plank, 1995), cases can be listed in a case paradigm. In fact, a (case) paradigm is nothing but the list of some set of grammatical morphemes that can be affixed to content words. In Table 2.3, the Latin case paradigm for feminine nouns ending in *-a* (the first declension; Mansveld & Waleson, 1970) is given. As most people will know, there are other declensions in Latin with other case forms for the same case functions. This is indeed typical for paradigms. They often come in different declensions, or distinguish between different word classes.[4]

Case name	Singular	Plural
Nominative	mensa	mensae
Genitive	mensae	mensārum
Dative	mensae	mensīs
Accusative	mensam	mensās
Ablative	mensā	mensīs

Table 2.3: Latin case paradigm

With its five cases (six, if you count vocative as a separate case), Latin is fairly typical for a case language. In the language sample of Iggesen (2005), only 23 languages are reported with a two-member case system, 30 have three to five cases, 84 have six or more. These numbers are to some extent dependent on geographical distribution. Languages in the Pacific and Eurasia have on average significantly more cases than can be expected by chance distribution of inventory sizes over region, languages in Africa have less. In the Americas, the observed inventory sizes are as expected (cf. Appendix C; see Bickel, 2008, on how to compute these expectations).

In this section we saw that frequency causes the generalization and extension of the meaning of an item, resulting in increased predictability that causes its form to wear out. Eventually, the frequent item loses its syntactic autonomy and becomes a suffix in a case paradigm. This does not yet provide a sufficient definition of case. For one, it is unclear at which point some linguistic element has lost enough of its syntactic autonomy or

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[4]Carstairs (1983) shows how the number of declensions is kept to a logical minimum given the set of inflectional morphemes. That is, Latin words do not randomly select one of the possible nominative markers from the different declensions and then independently select from the set of genitive markers, but rather the different case markers come in pre-given sets. All words that have a nominative case marker from a certain declension will have the accusative case marker from that same declension. Thus, paradigms are regular and predictable and, therefore, usable and learnable.

acquired enough functions to be called a case marker. Unfortunately, we will never be able to answer this question. As mentioned above, the boundaries on the case cline are fuzzy. Indeed, as Haspelmath (2007) notes, what exactly is a case may be a matter of taste of the linguist. In any event, the constructions I analyze as spatial case in this thesis are among the most grammaticalized constructions of language. To distinguish case from agreement, I will follow Blake (1994) in saying that case is a marker of dependent nouns for the type of relationships they bear to their heads. Otherwise, agreement is similar to case as being a relational marker that is the result of a diachronic economy process.

What is still missing in the characterization of case most significantly is a specification of the meaning of case. So, what are these frequent functions that need to be expressed so often that they wear down their markers? This will be the topic of the next section.

2.3 The Meaning of Case

In the previous section I have discussed the form of case, arguing for the importance of Economy. In this section, we will have a closer look at the use of case and the role of semantic generalization, which was only mentioned in general terms previously. One could say, like Zipf, that semantic generalization is a kind of speaker's economy too as it reduces the size of the lexicon (cf. also Stiebels, 2002, 27). Alternatively, the use of more general lexical items can be thought to reduce the search time for the expression of a given meaning. Note that these two options are perfectly compatible.

Generalization is a very general cognitive principle. To make sense of the world, we impose categorizations on its infinite variation in objects, and segmentations on its ongoing activity. The more general the category, the more often it can be used, and the more often something is used, the more likely it is to develop a case marker. It will be argued that case is used as a marker for *semantic roles*, language-specific generalizations about the functions participants have in a communicated event.

According to Rosch (1978), humans, like probably most other living beings, categorize stimuli. In this way, humans can deal with the infinitely many meanings in the world using finite cognitive resources (cf. also the *systemic constraints on language* of Talmy, 2000, 244). The more fine-grained the categories, the more informative the categorization system. On the other hand, the more coarse-grained, the better the infinite differences are reduced to usable proportions. The principle of categorization is a general

cognitive function that plays an important role in language. For example, it is known from phonology, where gradually changing sounds are categorized as belonging to different phoneme categories (see, for example, Liberman, Harris, Hoffman, & Griffith, 1957; McMurray, Aslin, Tanenhaus, Spivey, & Subik, 2008). In the lexicon, the infinite variation in objects is reduced to a manageable amount of (typically) nouns (see Zipf, 1965). Similarly, verbs (mostly) are generalizations about *events*, imposed segmentations of ever-changing ongoing activity (see Kurby & Zacks, 2007; Zacks et al., 2001; Zacks & Tversky, 2001). These events necessarily differ as they concern different points in time (under the assumptions that we only have one time line and that we cannot step in the same river twice).

Languages differ with respect to the quality and quantity of distinctions they make. In fact, a language is a particular ordering and categorization of a fuzzy world that is agreed upon by the community of its speakers (plus a set of rules of grammar and pragmatics, of course). Clearly, culture is inextricably bound up with language in this process of categorization. But of course, we all live in the same world and many notions (i.e., categorizations of objects or activities) are shared between languages. At a slightly more abstract level, even more correspondences are expected (Rosch, 1978). For example, the precise semantics and pragmatics of HIT may differ between languages dependent on, among many other things, the number of contrastive predicates, but the semantic argument structure, i.e. the list of events participants, will generally contain a hitter and a hittee.

Argument structure can be represented in standard predicate logic as in (2), in which the first argument is the hitter, the second one the hittee.

(2) $Hit(x, y)$

Instead, however, I will use a neo-Davidsonian representation in which these core arguments, as well as adverbials like instruments and locations, are related to the event argument e by *event modifiers*: two-place predicates denoting thematic relations (Davidson, 2001; Parsons, 1994). These event modifiers are again generalizations, as I will explain below. Like in Parsons' work, the representation in (3) is not meant as the semantic structure of *hit*. Instead, it is a *logical form* (see E. Williams, 1981). In my account, a logical form is the representation by a speaker of a particular event (and should not be confused with LF in generative grammar in which it is the result of syntactic processing). A logical form consists of only those ingredients that the speaker finds worthwhile to communicate. These ingredients are coincidental, and may differ between events, speakers, speech settings,

and languages. Thus, a logical form, as illustrated in (3), represents an individual construal of a particular event for communication. The thematic relations are language-specific *semantic roles* into which the arguments are categorized.

(3) $Hit(e)\&Agent(e,x)\&Patient(e,y)\&Loc(e,z)\&Ins(e,w)$

Event modifiers can be freely added, formally by the predicate conjunction operation MOD (see Maienborn, 2001). This operator takes a modifier and an expression to be modified and yields a conjunction of predicates.

(4)   MOD: $\lambda Q\lambda P\lambda x[P(x)\&Q(x)]$

Thus, instead of taking x and y to be special and defining ingredients of the predicate, they are (arguments of) event modifiers in this view. This illustrates the principal equivalence of all arguments at this point. Arguments at a logical form are those things in the world that are judged relevant by a speaker for the expression of a certain event. Again, this selection may differ between languages, among speakers of the same language, and within the same speaker between situations. At a low level of generalization, the relation between the participants and the event are situation and predicate specific ('hitter', 'thing used to hit with'), at a more generalized level, they are categorized in semantic roles, a notion that I will explain now.

Fillmore (1968) proposes a generalization about the relationships between individual predicates and arguments in terms of *case roles*, in subsequent work mostly called *thematic* or *semantic roles*. These semantic roles can be seen as medium-level generalizations about semantic predicate arguments. As explained above, the meaning and argument structure of a certain predicate are low-level generalizations about situations and events in the world (see Rosch, 1978; Kurby & Zacks, 2007; Zacks et al., 2001). For example, transitive verbs like *break* and *kill* generally have a 'breaker' and 'killer', and a 'breakee' and 'killee'. At the medium level, we can characterize these as an argument that is voluntarily instigating and performing the action denoted by the verb, and an argument undergoing it and being changed by it. The semantic role that is often used for the former is *Agent*, whereas *Patient* is generally used for the latter. Other semantic roles are, for example, *Instrument* (a thing that is used to achieve something), *Theme* (a thing that undergoes an action without being changed by it), and *Beneficiary* (person for whom some action is performed). High-level generalizations lead to notions like *subject* and *object*, and will be discussed in Section 2.4.

Semantic roles are generalizations about event participants necessary for communication. The semantics of an argument in a particular event is much richer but cannot efficiently be communicated as such for all individual participants. By categorizing arguments into semantic roles, the speaker can use more economical means of expression, namely the forms corresponding to semantic roles. From the semantics of the predicate, the hearer can tell the precise argument function. For example, the Agent of *to hit* is a hitter, the Agent of *to walk* is a walker. Such a distinction between a rich conceptual and language-ready logical level has previously been proposed by Levelt (1989); Bierwisch and Schreuder (1992); Wunderlich (1997), and Jackendoff (1983). Differently from most of these accounts (but like E. Williams, 1981 and Parsons, 1994), however, in my proposal all arguments are optional and verbs do not come with a strict argument structure. A logical form does not consist of obligatory ingredients, but only of those that a speaker wants to convey.

Attractive as they may sound, it is notoriously difficult and a matter of ongoing debate to determine which generalizations should be made and how these generalizations should be defined and labeled. Because of this, most linguists agree that semantic roles are a problematic concept (Butt, 2006, 31). The problem is the, in my view, wrong assumption that semantic roles are universal concepts. Instead, Langacker (1991, 284) argues that a definite list is neither necessary nor achievable. Semantic roles are generalizations and languages can differ in the degree they abstract away from the unique semantic properties each verb defines for its participants (for a similar view, see Croft, 1991). I too think semantic roles should not be any more problematic than the notion of words in the lexicon. There is no universal set of semantic roles simply because semantic roles are language specific generalizations about arguments, just like the lexicon is a set of language specific generalizations about individual objects and events. As said above, the higher the level of generalization, the more commonalities we can expect between the categories of different languages. The set of general principles that are useful and applied at this level of categorization is restricted. As a result, which semantic roles are discerned and which argument functions they include will be comparable between languages. This maybe explains the quest for a universal list of semantic roles. However, the results of this categorization do vary between languages and the failure to establish this list can be seen as evidence for the view of semantic roles as language-particular generalizations. Such a view is well-established with respect to the lexicon and I think it should be used for other grammatical phenomena such as semantic roles and morphological case.

A semantic role is nothing but a set of argument functions that share a particular construction or exhibit similar grammatical behavior. For example, we could discern the role of Opponent in the prepositional domain in Dutch (see Lestrade & de Swart, to appear), as illustrated in (5).

Dutch

(5)   *Wij spelen vanavond tegen   F.C. Bal op het dak 4.*
        we   play   tonight   against F.C. Bal op het dak 4
        'Tonight, we are playing against F.C. Bal op het dak 4.'

The preposition *tegen* 'against' in Dutch expresses, among other roles, the role of Opponent. Even though this role does not seem to play a role outside of the prepositional domain in the grammar of Dutch, it is a generalization about the event participants in (6) nevertheless, which could accordingly be analyzed as Opponents.

Dutch

(6)   a.   *F.C. Bal op het dak 4 verhindert ons te scoren.*
              F.C. Bal op het dak 4 prevents   us   to score
              'F.C. Bal op het dak 4 prevents us from scoring.'
        b.   *F.C. Bal op het dak 4 loopt ons in de   weg.*
              F.C. Bal op het dak 4 walks us   in the way
              'F.C. Bal op het dak 4 is walking in our way.'
        c.   *F.C. Bal op het dak 4 schopt onze spits   omver.*
              F.C. Bal op het dak 4 kicks   our   striker over
              'F.C. Bal op het dak 4 knocks down our striker.'

Probably not everyone will accept the presence of the Opponent role in Dutch. To do so, one might wish to see some additional relevant grammatical consequences. However, such criteria for the status of semantic role are debatable. If some language distinguishes a role in an interestingly enough manner, that is, by a case marker generally, we are probably more willing to recognize it in another language. For example, just like for the Opponent role, the only relevant instance of the Comitative in Dutch seems to be a prepositional construction *(samen) met* '(together) with'. But because of the existence of Comitative case markers in many languages of the world, the identification of this role is probably less controversial.

Now, how does the expression of a semantic role by a case marker come about? At the low level of event segmentation, the set of all event-particular arguments ('hitters of inanimates', 'thinkers of complex thoughts', 'invol-

untary helpers in table making events', etc.) constitute a multidimensional semantic map (see Haspelmath, 2003). The dimensions of this map consist of all factors that are relevant in that language in the distinction of semantic roles. For example, if animacy is a factor, 'readers of books' is maximally distinguished from 'books that are read' on this dimension; if volitionality is a factor, 'hitters of men' are generally maximally different from 'men that are hit' here. These two dimensions differ but they are not necessarily at right angles. It is impossible for a language to label every specific argument function on this map (see Rosch, 1978). In principle, semantic roles originate as nothing but (again language-particular) focus points on this map, i.e., argument functions that are more frequently used. A particular argument function borrows the form of its nearest focus point, thereby increasing the frequency of use of this form and extending its meaning. This choice for a focus point for a particular argument function can be formalized as a distance minimalization procedure on an ordered field, as proposed for the color domain by Jäger and van Rooij (2007). By choosing the nearest focus point for the expression of a particular argument function, the speaker minimizes the distance between the intended meaning and the resulting interpretation. All other forms would lead to an interpretation that is more distant from the intended one.

As a result of this procedure, the map is divided into contiguous categories of semantic roles. The focus points at the centers become the prototypical instances of their own semantic-role category. As in the color example of Jäger and van Rooij (2007), languages differ in the number of (semantic role) categories they distinguish. The distribution of labor changes in a more or less predictable way with the addition of new categories. Differently from the example Jäger and van Rooij (2007) use, however, the underlying field of semantic roles need not be inherently organized along a fixed set of dimensions for all languages. The number and type of dimensions on the argument map are themselves language-particular categorization criteria, such as animacy, volitionality, control, instigation, abstractness, etc. The question what exactly the different language-particular dimensions and distributions are, is uninteresting from the general perspective developed here, *viz.* the view of semantic roles as a generalization about argument functions that can be formalized using a distance minimalization procedure.

Crucially different from the procedure described in Jäger and van Rooij (2007), the eventual interpretation of the marker is *not* the focus point, but the more specific interpretation of this semantic role given the predicate with which it is used. That is, the hearer only uses the semantic role as a starting point for interpretation. By using the predicate semantics the

hearer can enrich the semantics proper of the semantic role to arrive at (an interpretation close to) the original argument function. This follows from the interaction of the constraints $\textsc{Faith}_L$ and $\textsc{Add}_W$, as will be shown now.

The set of semantic roles to choose from and the structure of the semantic map in the first place are language particular. That is, the general principle of a distance minimization procedure to choose a specific semantic role for an argument function leads to language specific outcomes depending on the organization of the map. The need to be faithful to this language particular organization is expressed by the constraint $\textsc{Faith}_L$. This constraint basically summarizes the rules of a language that should be followed. In its application to semantic maps, $\textsc{Faith}_L$ dictates the speaker to choose the form of the nearest focus point available in the language to express some argument function. That is, it dictates to follow the distance minimization procedure and not to cross borders on the map. Note that the very same principle applies to the use of content words for low-level generalizations (and therefore should not be controversial). If you want to refer to a 'man' you use the word *man*, not *boy* or, even worse, *girl*. If your language, like English, distinguishes between 'nephews' and 'cousins' you have to use the equivalents to *nephew* and *cousin*. If not, like Dutch, you can use (the equivalent to) *neef* for both.

$\textsc{Faith}_L$ is a self-evident but crucial speaker's constraint, also present in the work of Grice, that guides the choice among semantic role expressions for argument functions. At the same time, $\textsc{Faith}_L$ tells the hearer to interpret the utterance accordingly (in this use, it is more like the original constraint $\textsc{FaithInt}$, proposed by Zeevat, 2000, which tells the hearer to make use of all available morphosyntactic information). The interpretation range of a semantic role is similarly given by the distance minimization procedure. By the combination of the information from the semantic role and the semantics of the predicate, the hearer can determine the actual argument function. The integration of this, and possibly other, information is called for by $\textsc{Add}_W$. This constraint requires the hearer to enrich the semantics proper of the utterance with world knowledge. For example, as explained above, the Agent of 'to hit' is a hitter. $\textsc{Add}_W$ ensures that the hearer will indeed make this inference (and stay within the boundaries set by $\textsc{Faith}_L$).

The way in which the semantic map of argument structure is cut up into different semantic roles is of course dependent on the number of cases/semantic roles (see Jäger & van Rooij, 2007). Indeed, Butt (2007) argues that a case paradigm is a complex system of semantic contrasts. Case forms jostle with each other to occupy a particular semantic space. New case markers may enter the system to reinforce existing semantic contrasts, introduce new

ones, or fill vacancies that emerge by, for example, case syncretism. Interestingly, the same source marker may thus end up expressing different case functions in different languages depending on how it slots into the system of semantic contrasts (see Zeevat, 2007, for a simulation of this process). This jostling and system dependent function make perfect sense if case forms compete for space on a semantic map.

The more frequently something is expressed, the more suitable its expression is for a case marker. Wunderlich and Lakämper (2001, 378) claim that the potential number of semantic cases is in principle unlimited, as the number of semantic roles in principle is too. However, I do not think that the number of semantic roles, and therefore the number of cases, is unlimited. Increasing the number of semantic roles necessarily decreases their scope on the map and therefore decreases of their usage frequency. Only when semantic roles are general and frequent enough, can they develop case markers (cf. Section 2.2). The higher the level of a generalization, the more frequently it can be used, and the more suitable it is for case. At the same time however, the higher the level of semantic generalization, the less likely it is that languages find it appropriate to make this generalization, because too much information is lost. The interaction between these competing motivations results in case systems of varying size, on average 6-7 (see Iggesen, 2005, and the discussion in the previous section). Only the most frequently used semantic roles are expected to develop case markers. Prime examples of functions that meet these requirements are Agents and Patients, Beneficiaries, Comitatives, Instruments, and spatial meaning. As I will show in Chapter 3, we can zoom in even further on spatial meaning. Some spatial meaning aspects are necessarily more frequent than others which again leads to a difference in grammaticalization.

In short, a semantic role is a language-specific medium-level generalization of argument functions. Because they are general, they are frequently used and expressed by more grammatical means. If a semantic role is frequent enough, its marker will develop into a case marker. Because of the level of generalization, semantic roles are expected to be comparable between languages. Still, the exact semantics of roles may differ depending on the case paradigm they appear in.

Although all semantic roles at a logical form are equal in being event modifiers, their frequency of selection differs. Some event modifiers are virtually always judged relevant for communication in two similar situations to which the same event predicate applies. Notably, if there is such a thing as a Patient in an event it will generally be part of the logical form of the event. This importance of the Patient is understandable as transitive verbs

are defined on the basis of the effect they have on their Patient. For example, the verb *to break* denotes the transition from an undamaged to a broken status of its Patient. Indeed, as Marantz (1984) shows, more than any other role the Patient determines the interpretation of the verb, as illustrated in (7) (cf. also E. Williams, 1981):

(Marantz, 1984, 25)

(7)   a.   *throw a baseball*
        b.   *throw a party*

A person throwing a baseball is performing a very different action than a person throwing a party. According to Marantz (1984), almost every simple transitive verb in English expresses a wide range of predicates, the actual interpretation depending on the direct object. As will be shown in Section 2.4, those semantic roles that are virtually always selected by a predicate are expressed by *structural case*, which is an even further grammaticalized version of case.

    First, however, note that this defining importance of Patients is not sufficient for them to become obligatorily expressed. Often, also Instruments meet this requirement. For example, it is the comb that makes a combing event and it is a rake that makes a raking event. Still, these modifiers are hardly ever explicitly mentioned. One could say that these are so important for the meaning that they became lexicalized (*to comb* is 'to make hair look tidy *using a comb*'), but then it should not be possible to say something like (8), in which no comb is used.

Dutch

(8)   *Lotte kamt   haar haar met een vork.*
       Lotte combs her   hair with a   fork
       'Lotte is combing her hair with a fork.'

    Also, important as they may be, Patients are not obligatory. Consider the following example.

Dutch

(9)   *Mozes heeft gegeten.*
       Mozes has   eaten
       'Mozes has eaten.'

An eating event necessarily includes food that is eaten. As (9) shows how-

ever, it is not necessary to make it part of the expression or logical form.

Also in (10), the Patient is left out. Out of the context, this sentence may sound odd. However in the context of a bear roaming around the countryside killing sheep and other farm animals night after night, it is perfectly grammatical (see de Swart, 2007, Section 2.1.3, for more examples of transitive verbs without object arguments).

(de Swart, 2007, 15, after Goldberg 1995)
(10)   *Last night the bear killed again.*

Similarly to this omission of Patients, it is possible to leave out the other most pervasive event modifier, the Agent. Passive constructions without oblique Agents, as in (11), are well-known examples of this.

(11)   *The house was built.*

Another example is (13), in which only the Patient modifier is expressed of an event in which someone (the Agent) is cooking potatoes (the Patient) (cf. also Wunderlich, 1997).

Dutch
(12)   *De aardappels koken.*
          the potatoes   cook.3PL
          'The potatoes are boiling.'

The optionality of arguments is also assumed in constructionist approaches. The object of study in construction grammar are *constructions*, learned pairings of form with semantic or discourse function (Goldberg, 2006, 5). In this type of approach, verbs do not come with a predetermined argument structure. Instead, verbs occur in constructions. This is illustrated in the following examples in which verbs that generally are considered intransitive combine with a direct object (see de Swart, 2007, for further discussion).

(Goldberg, 2006, 6)
(13)   a.   *He sneezed his tooth right across town*
          b.   *She smiled herself an upgrade*

Thus, frequent as they may be, it is possible to leave out Agent and Patient modifiers in the expression of transitive events. Better put, it is possible to construe a transitive event without an Agent or Patient modifier.

In fact, the very reason for Parsons (1994) to analyze core arguments as event modifiers is that they are omissible like this. For me, representing the argument structure in this way shows that all modifiers in principle are equivalent in the sense that they are optional event modifiers. They do differ, however, in two important and probably related respects. First, as mentioned above, their frequency of occurrence differs as some modifiers are more pervasive than others. Second, as Primus (2010) notes, semantic roles differ in animacy which has important consequences for their structural use because of the inherent prominence of animates (cf. Section 2.4 and the contributions in de Swart, Lamers, & Lestrade, 2008). Animates are more likely to become topic than inanimates and therefore animate roles are more often used in topic position than inanimate ones.

In conclusion, the meaning of case is a semantic role, a generalization about relations between events and event participants. The meaning of an utterance can be represented as a logical form, a formula with only those ingredients a speaker wishes to communicate. In the particular event at hand, the arguments have a very specific meaning, an *argument function*. For communication, however, a *semantic role* is used. If semantic roles are general and frequent enough, their markers will develop into case markers. The choice and interpretation of these case markers is guided by the constraints FAITH_L and ADD_W. As the term "medium-level generalizations" already suggests, we can still go up one level of generalization. This brings us to the realm of structural case and the next section.

2.4 The Structural Use of Case

When taking into consideration the set of predicates that have two pervasive event modifiers like *hit, see, help,* and *read*, a final (circular) generalization can be made. For all these transitive predicates, there are two prominent event modifiers that are virtually always selected. Without making appeal to any of their theoretical connotations yet, I call these prominent participants the *subject* and *object*. Subject and object are the highest semantic generalizations, therefore the most frequently used functions, and therefore the most eligible case candidates. Structural case is used to mark the subject and object. That is, if a language has case, it will generally use it at least structurally. As Blake (1994) notes, this indeed seems to be the case (for exceptions, see Iggesen, 2005).

2.4.1 On Subject and Object

The pervasiveness of two arguments in transitive constructions could be explained by the need to know the cause and result of an event to understand it. According to Zacks (Kurby & Zacks, 2007; Zacks et al., 2001; Zacks & Tversky, 2001), we perceive continuous action in the dynamic world as consisting of a string of discrete events. Segmentation simplifies an extended interval of time to a single chunk of information. This spontaneous segmentation is related to core functions of cognitive control and memory encoding (Kurby & Zacks, 2007, 72). Predicting and anticipating enables one to encode structure from the continuous perceptual stream, to understand what an actor will do next, and to select one's own future actions.[5] As is the case with objects (Rosch, 1978), if done well, event segmentation saves processing resources and improves comprehension. Event boundaries are established at points at which the prediction of the next activity becomes more difficult or fails. Indeed, Zacks and Tversky (2001, 8) show that if subjects do not understand the purpose of some activity, they tend to divide the stream of behavior into smaller units. For example, someone who does not know that potatoes are edible will segment a *cooking potatoes* event into the subevents *washing potatoes, peeling potatoes, boiling potatoes*, and *putting potatoes on a plate*. Note that the principle of event segmentation is very similar to that of word segmentation which will probably be more familiar (Saffran, Newport, & Aslin, 1996) to linguists. For example, in the continuous speech signal /spi:tʃsɪgnl/ the transition probability between /ʃ/ and /s/ is the lowest. This helps in the recognition of the words *speech* and *signal*. Saffran et al. (1996) show that this use of the transition probability between two subsequent phonological elements can even be applied to word segmentation in artificial languages. Apparently, the same cognitive principle is at work in different domains.

The principle of event segmentation could explain the frequent selection at a logical form of Agents and Patients. As will be discussed in more detail below, in prototypical transitive sentences, the Agent instigates an event that ends with some change in the Patient. Similarly, for verbs of emotion and perception, the Stimulus and the Perceiver are generally represented at a logical form since a perception event begins with a Stimulus and ends at its Perceiver. Thus, subject and object make an event complete, a saying that is used in their informal definition too. For Patient

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[5]The segmentation of activities is corroborated with evidence from reading-time, neurophysiological (fMRI) and oculomotor (pupil diameter) experiments which will not be discussed here.

arguments, the frequency of selection can in addition be explained by its defining importance for the predicate, as explained in the previous section. Moreover, for all argument functions that concern human performers, animacy is an important factor. We simply like to talk about animates (see Dahl, 2008), so if there is a human or animate participant in an event, it is probably represented linguistically too.

In the previous section, we have seen that the exact semantics of a semantic role can be filled by the predicate semantics (the Agent of 'to hit' being a hitter, etc.). The same holds for the subject and object in a transitive construction. Consider the German examples in (14).

German

(14) a. *Der Mann schlug den Jungen.*
          the man hit   the boy
          'The man hit the boy.'
      b. *Der Mann sah den Jungen.*
          the man   saw the boy.
          'The man saw the boy.'

The semantic functions of the arguments can be described at various levels of generalization. At a low-level in (14-a), the man is a hitter (or even more specifically, a hitter of boys) and the boy is a hittee (by a man). In (14-b) the man is a seeer and the boy someone who is seen. At a medium level, the man is an Agent and a Perceiver, and the boy a Patient and Theme/Stimulus, respectively. At the highest level, the man is a subject and the boy is an object in both sentences. Just like we know that the Agent of 'to hit' is a hitter, we know that the subject of 'to hit' is a hitter and its object a hittee (and similarly for 'to see').

But if there are two prominent arguments, how do we know which predicate argument is the subject and which is the object? In principle, the mapping between syntactic and semantic functions in (14) could have been the other way around, the interpretation being that the boy is the Agent and the man the Patient. This mapping follows from the *argument selection principle* in (15), proposed by Dowty (1991). Given a predicate with two predicate arguments, the selection principle will tell which argument will become the subject and which will become the object.

(15) The argument selection principle (Dowty, 1991, 576)
      In predicates with grammatical subject and object, the argument
      for which the predicate entails the greatest number of Proto-Agent

properties will be lexicalized as the subject, the argument having the greatest number of Proto-Patient properties will be lexicalized as the direct object of the predicate.

This principle requires that in predicates with two syntactic arguments, the argument that resembles a Proto-Agent the most becomes the subject and the argument with the greatest number of Proto-Patient properties will be lexicalized as the direct object of the predicate (Dowty, 1991). Note that, in terms of the semantic map of argument functions that was proposed in Section 2.3, this procedure is really a distance minimization procedure in which there are two focus points only.

Dowty's preliminary list of semantically independent proto-properties, which can accordingly be understood as the dimensions of the map, are listed in (16) and (17):

(16)   Proto-Agent properties (Dowty, 1991)
        a.   volitional involvement in the event or state
        b.   sentience (and/or perception)
        c.   causing an event or change of state in another participant
        d.   movement (relative to the position of another participant)
        e.   (independent existence)

(17)   Proto-Patient properties (Dowty, 1991)
        a.   undergoes change of state
        b.   incremental theme
        c.   causally affected by another participant
        d.   stationary relative to movement of another participant
        e.   (no independent existence)

The idea of a prototype definition of semantic roles is used in different frameworks and developed further in later work. The multifactorial definition in terms of prototypes and the argument selection principle are mostly maintained, the difference is in the list of properties and the number of proto-roles that can be characterized with it. For example, Primus (1999, 48) proposes more primitive predicates to define the properties with, such as CONTROL, CAUSE, MOVE, and EXPERIENCE. She redefines proto-properties as corresponding pairs (e.g. cause versus being caused, control versus being controlled, etc.; Primus, 2003, 379-380) and she argues that Proto-Agents and Proto-Patients are thematically dependent (Primus, 1999, 52). That is, to have control implies that there is something controlled. Thus, Primus proposes the application of a lexical decomposition

approach to entailed argument properties. In these approaches, the lexical meaning of an entry consists of a complex internal structure composed of primitive functions (see Bierwisch & Schreuder, 1992; Wunderlich, 1997; Jackendoff, 1983; Ramchand, 2002; Kiparsky, 2001).

Just as Primus did, Grimm (2005, 20-22) defines a single set of Proto-Agent properties and the Proto-Patient is defined by the lack of these properties. He too decomposes the properties proposed by Dowty into more basic notions but argues that CAUSE and CONTROL are complex notions themselves. His list of properties is given in (18).

Proto-Agent properties (Grimm, 2005)

(18)   a.   volition: Volition is assigned to any argument wherein the participant intends, i.e., consciously plans, to bring about the event designated by the predicate.

        b.   sentient: Sentient concerns conscious involvement in the action or state. It is entailed by, among others, emotional, psychological and cognition predicates.

        c.   motion: Motion is entailed just in case the argument is required to be in motion.

        d.   instigation: Any argument effecting the event designated by the predicate is entailed in the instigation property.

        e.   persistence: An entity which is unchanged by the event or state is said to persist.

The final property concerns both *existential* persistence, the essence remaining the same during the course of the event/state, and *qualitative* persistence, persistence in all particulars. Furthermore, it can be divided according to whether it is entailed at the beginning of the event or at the end.

Very similar to the multidimensional semantic map I propose, Grimm (2005) proposes to view these primitives as atoms that can be logically combined to form a lattice. For example, a predicate can entail none of the above properties for an argument ($\{\emptyset\}$); one property only ($\{motion\}$, $\{sentient\}$), or a combination of properties ($\{motion, instigation, sentient\}$). In these combinations, volition entails sentience. The "maximal agent" occupies the top region in this lattice, that is, it includes all Proto-Agent properties; the "maximal patient" occupies the bottom region.

Both Primus and Grimm allow for other proto-roles than the two Dowty proposes by a combination of properties. Primus (1998, 1999) adds a Proto-Recipient which is thematically in between the Proto-Agent and Proto-

Patient as it is caused by the Agent (Proto-Patient property) to become in possession (Proto-Agent property) of something. Similarly, Grimm (2005) characterizes different case markers as regions on his agentivity lattice.

The original idea of proto-arguments and the elaborations discussed above are integrated into my proposal. In my view, Dowty really describes a generalized distance minimalization procedure for two semantic roles that makes use of the ordering dimensions animacy, volitionality, affectedness, and motion. In addition to the Proto-Recipient that Primus adds, and like Grimm, I allow for additional proto-arguments. What is different from all three proposals, however, are the proto-types of semantic roles and the dimensions along which they are characterized are language-particular choices in my account, not universals. But of course, given the high level of generalization, many commonalities in the ordering dimensions are expected between languages.

As an aside, I do not think it is necessary to assume specific semantic primitives by which semantic roles are decomposed. That is, unlike linguists, normal speakers probably do not have a notion of, for example, volitionality by which they actively classify arguments. In my view, such semantic primitives are the result of semantic analysis but not cognitive or linguistic entities. I prefer an account in which semantic primitives are emergent phenomena, like in connectionistic approaches (Smolensky & Legendre, 2006). Connectionism is inspired by the view of the human brain as a neural network that works by massive parallel distributed processing. In connectionism, meaning is also decomposed. But instead of using semantic primitives, this is done into neural activation patterns, represented by vector representations. Higher level, abstract, symbolic structures are the result of the reanalysis of this lower-level connectionist architecture. Mental representations are not mapped to individual neurons but realized as activation patterns of combinations of neurons. In this perspective, the overlap between different neurological representations of argument functions accounts for the emergence of semantic roles. Entries are expected to overlap at the very low symbolic level at which all entries are ultimately decomposed, because of the distributed architecture. The amount of overlap determines the neurological similarity and hence the semantic distance between two argument functions on the map. In this way, the semantic map of argument functions is translatable in neurocognitive or connectionistic terms without making use of semantic primitives.

Before we continue, a few more words on the notions of *subject* and *object* are in place. Even though the first term was used loosely in the above, it is far from clear what a subject is exactly. Chafe (1976) distinguishes

between three types of subject: the psychological subject (the discourse topic), the grammatical or syntactic subject (the version discussed above), and the logical subject (in terms of semantic role, the Agent basically). They are illustrated in (19).

(Chafe, 1976)
(19) a. *Betty peeled the onions.* (psychological, grammatical, logical: Betty)
      b. *The onions were peeled by Betty.* (logical: Betty; psychological, grammatical: onions)
      c. *The onions, Betty peeled.* (psychological: onions; grammatical, logical: Betty)

Li and Thompson (1976) show that syntactic subjects are less important than often thought and that topics are at least as basic to grammar as subjects. The details of the discussion of the characteristics that distinguish subjects from topics need not concern us here. The general idea is that there is a close (selectional) relationship between verb and subject, but not between verb and topic. Whereas in subject-prominent languages, the basic structure of the sentence is best analyzed as subject–predicate; in topic prominent-languages, the basic structure of the sentence should be analyzed as topic–comment. Confusingly, in most languages familiar to us the subject and topic have merged and are no longer distinguishable in most sentence types. In fact, the grammatical or syntactic subject could be said to be the grammaticalized topic that has become part of the argument structure of the verb (Li & Thompson, 1976; W. Lehmann, 1976; Givón, 1976). For example, Givón (1976) argues that subject agreement developed via the grammaticalization of topic coreferential pronouns. This grammaticalization relation explains why topics and subjects share many properties (cf. also the contributions in van Bergen & de Hoop, 2009; especially Brunetti, 2009).

Because of the merging of topic and subject, what we think of as the subject partly concerns the topic really. According to Dahl (2008) we preferably talk about ourselves and our fellow men. That is, humans are often the topic of our utterances. Thus, in addition to predicate entailments that determine which argument becomes the subject, there is an independent desire for a human subject. At the same time, however, animacy is also entailed by most of the proto-properties mentioned above. Indeed, Comrie (1981, 107) proposes a multifactorial definition for the syntactic notion of subject that says that subjects prototypically represent the intersection of

Agent and topic. That is, a typical subject is both Agent and topic, but it need not be either of the two. Thus, semantic function only partly determines syntactic function in which topicality is an additional factor (cf. the discussion in Chapter 1).

At the core of the object marker, on the other hand, is probably the Patient role. Obviously, this is what the Proto-Patient properties of Dowty (1991) suggest. Because these properties are given up in the privative definitions of Primus (1999, 2003) and Grimm (2005), however, it is less clear which semantic role applies as the source marker for this function. The eligibility of the Patient marker follows from its close relationship with the verb, described above. According to Marantz (1984), more than any other role, the Patient role is necessary for the correct interpretation of the verb. From this, the generalization to syntactic dependence for general predictability follows relatively easily. Also, as will be discussed below, the Patient role is considered the prototypical instance of the object by Hopper and Thompson (1980). Because of this, the Patient marker is likely to extend its function to other meanings.

In sum, subject and object are the prominent arguments of a predicate that are virtually always selected and therefore expressed by the most grammatical means, structural case. Because of their high level of generalization, their meaning has to be derived from the verb semantics completely. Importantly, the discussion of subject and object in this section concerns the arguments of the transitive clause. The subject of an intransitive clause is something completely different, as will be shown now.

2.4.2   Structural Case

Structural case is used to distinguish the prominent semantic roles of a predicate.

According to Svorou (1993, 5), the more familiar a situation is, the less we need to elaborate on it linguistically. This observation, about the spatial domain originally, explains the use of structural case. Each semantic predicate has a set of one or two semantic roles that are virtually always selected at a logical form. Because they are so predictable, they do not need to be explicitly marked for their argument function, only to be distinguished from each other. This is the function of structural case. It no longer has a clear functional semantic core that explains its use, it only serves to distinguish the most predictable roles of a predicate (which can be done in several ways, as I will show). Importantly, this use follows from the same principles that motivate the use of case for the expression of semantic roles.

Case is an economical form to communicate the argument structure of a predicate. As explained in Section 2.3, less pervasive semantic roles need a rough identification of their function that can be further filled by the semantics of the predicate.

According to Dixon (1979, 102), clauses come in two basic kinds: clauses with two obligatory arguments and clauses with only one obligatory argument. Constructions with both a subject and object are called *transitive constructions*, constructions with a subject only are called *intransitive constructions*. Thus, we can discern three main argument functions, viz. the subject of an intransitive clause (S), the subject of a transitive clause (A), and the object of a transitive clause (O). A major classification of languages is based on the way these three relationships are aligned (cf. also Comrie, 1981, Chapter 6).[6] There are various ways in which languages could cover these argument functions with case, as illustrated in (20).

(20)   Possible alignments patterns
        a.   A = S = O
        b.   A ≠ S ≠ O
        c.   A ≠ S = O
        d.   A = S ≠ O
        e.   A = O ≠ S

Languages can treat the three functions all the same (20-a), which, depending on the case form used for non-argument functions, generally means that a case system is absent (see Iggesen, 2005).

A second option is to have a tripartite alignment as in (20-b), that is, to have a separate case for each of these functions. This strategy is chosen only rarely by languages in the world, which is understandable by the generalization principles described in Section 2.3. By definition, S is the only argument of a clause. The set of argument functions this single argument may have is in fact the same as the total set of semantic roles. Probably any semantic role can be used as an intransitive subject (see Malchukov & Narrog, 2009). Therefore, there is no use developing a special case marker for this grammatical function: it does not mean anything. Whatever the argument function of S, the use of structural case will not be very informative, as the verb semantics needs to specify its argument functions anyway.

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[6]According to Butt and King (2003) and Bickel and Nichols (2009) this is an oversimplification of case patterns and more syntactic functions and case phenomena should be taken into account for an alignment classification and a thorough understanding of the role of case.

Since it does not need its own marking for semantic reasons and since it cannot be confused with some other argument, the S may as well use the case form of either of the other two. In this way, a language only has to maintain two structural cases, which is more economical than maintaining three.

The same argumentation holds for the last option (20-e). Moreover, using the same case for A and O is not very helpful in highlighting the argument structure. Since this is the whole idea of structural case, this option is rather useless. Indeed, this strategy is extremely rare (Bickel & Nichols, 2009; Comrie, 2005; Stiebels, 2002).

Ergative and accusative languages choose different versions of the same idea to disambiguate between A and P. Ergative languages choose to mark S and O the same, marking A differently (20-c); accusative languages mark O differently and take S and A together (20-d).[7] As a result, A and O can be identified as A and O, and therefore distinguished from one another. Following Comrie (1981), de Hoop and Malchukov (2008, 2007) argue that DISTINGUISHABILITY and IDENTIFY are in fact the two main functions of case. The identifying strategy makes use of case morphology to encode specific semantic/pragmatic information about the nominal argument in question. The distinguishing strategy is a more specific strategy that is used for distinguishing between the two core arguments of a transitive clause (de Hoop & Malchukov, 2008). The two functions of case considerably overlap in the structural domain: If a transitive argument is identified, it can be distinguished from the other, and if it is distinguished, it can be identified. Note that, differently from S, it is possible to characterize A and O, however general this semantic characterization may be (cf. the proto-properties of Dowty, 1991, discussed in the previous section).

An example of an ergative languages is Yalarnnga given in (21).

Yalarnnga (Mallinson & Blake, 1981, 49)

(21)　　a.　*Kupi waya kunu-ŋka.*
　　　　　　fish　that　water-LOC
　　　　　　'That fish is in the water.'
　　　　b.　*Kupi-ŋku milŋa ṭaca-mu.*
　　　　　　fish-ERG　fly　bite-PAST
　　　　　　'The fish bit the fly.'

The intransitive subject (S) *kupi* 'fish' in (21-a) has the same zero form as

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[7]cf. Jäger (2007) for this same argumentation couched in a game-theoretic approach.

the object of the transitive clause *milŋa* 'fly' in (21-b). This is different from the subject of a transitive clause, which is marked with ergative case.

This ergative pattern is the opposite of the accusative one illustrated for Korean in (22). Here, the S and A share the same marker *-ka* which differs from the marker for the object of the transitive clause *-lul*.

Korean (Sohn, 1994, 235)
(22)   a.   *Nalssi-ka   coh-ta.*
            weather-NOM good-DECL
            'The weather is good.'
       b.   *Ku cha-ka   Yongho-lul   chi-ess-ta.*
            the car-NOM Yongho-ACC hit-PAST-DECL
            'The car hit Yongho.'

The difference between the accusative and ergative languages is schematically illustrated in Figure 2.4 (which is nothing but a summary of (20)).

$$
\begin{array}{c}
\text{nominative} \left\{ \begin{array}{c} \text{A} \\[1em] \text{S} \end{array} \right\} \text{ergative} \\[0.5em]
\text{accusative} \left\{ \text{O} \end{array} \right\} \text{absolutive}
\end{array}
$$
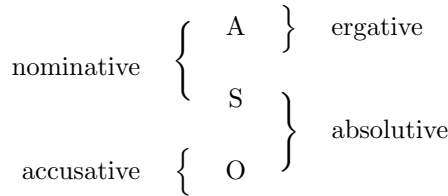
Figure 2.4: Case alignment

Thus, by grouping S together with one of the transitive argument functions to the exclusion of the other, ECONOMY is elegantly obeyed. But languages can be even more economical. For the purpose of distinguishing between A and O, marking only one argument already suffices. The other argument does not need its own case marking to encode it as such. What is very often called nominative or absolutive case is in fact the absence of case marking. This was already illustrated for the absolutive case above, and is illustrated for the nominative case in Hindi in (23).

Hindi (de Hoop & Malchukov, 2008)
(23)   *Raam-∅   ek   bakre-ko   bectaa hae*
        Ram-NOM one goat-ACC selling is

'Ram sells the goat.'

In (22), what is glossed as nominative is in fact a zero marker, just like the absolutive marker previously. I follow de Hoop and Malchukov (2008) in saying that the absence of morphological case marking is the absence of case.

As argued above, there is no need to case mark the S by its own form, neither from a distinguishing nor from an identifying perspective. Obviously, it will be most economical to have S share the zero form of the unmarked transitive argument. ECONOMY can explain the fact that languages preferably use one case only to distinguish between three different syntactic functions. The difference between ergative and accusative languages is that accusative languages choose to mark the object reserving the zero form for the intransitive subject and transitive subject, ergative languages choose to mark the subject argument of a transitive clause, reserving the zero form for the subject of an intransitive clause and the object.

According to Langacker (1991), however, the different case systems are the result of completely different motivations. Ergative systems have a motivation that is independent from the marking of grammatical role. Ergative alignment can also be found outside of the verbal argument domain for accusative languages. For example, the nominal domain in English can be analyzed as ergative as the following examples show:

(Langacker, 1991, 380)

(24)   a.   the chanting of the demonstrators
          b.   the chanting of the slogans
          c.   the chanting of the slogans by the demonstrators

Similarly to the modifiers in the "intransitive" constructions (24-a,b), the Theme modifier *slogans* in the "transitive" construction (24-c) is marked with *of*; the Agent modifier of this transitive construction, however, is differently marked, with *by*. Thus, languages may make use of both systems in different domains (English being an accusative language), which suggests functions of other than the marking of grammatical relations only. In fact, even within the domain of grammatical relations, some languages use both systems, using for example the ergative system for pronouns and the accusative system for full NPs.

According to Langacker (1991), the purpose of ergative alignment is really the marking of *conceptual autonomy*. The internal (Theme or Patient) argument is said to be conceptually more autonomous than the external

(Agent) argument because the semantic contribution of the latter is smaller. The accusative system is argued to have a different motivation, namely the marking of the *figure-ground organization*, or the profiling of the event. The figure is the participant that is singled out and that is profiled with respect to some ground, and can thus be seen as the topic of the event. (This latter point seems to be compatible with the blurring of the subject-topic distinction in many of the languages mentioned previously.) According to Langacker, absolutive and nominative mark the unmarked members in their respective systems (i.e. the conceptually autonomous and figure argument), and therefore have the unmarked, often zero, form.

To explain how the different motivations lead to different case systems, however, one needs to stipulate unmarked members in the opposition between internal and external arguments, and between figure and ground. Moreover, I do not think it is correct to say that the internal argument is semantically more autonomous than the external argument. I do think the idea of a distinction between semantic roles in terms of semantic autonomy is interesting. In fact, I have used it in the previous section to motivate the generalization of the Patient role to direct object. However, I argue for the exact opposite of Langacker's proposal. The Agent role can be said to be semantically more autonomous than the Patient as the first generally instigates, causes and performs the action to which the second is submitted. Instead, the interpretation in terms of argument function of the Patient role is much more closely related to the semantics of the predicate than the interpretation of the Agent (cf, E. Williams, 1981; Marantz, 1984; Kratzer, 1996). In that sense, the semantics of the Patient role, but not that of the Agent, is dependent on the semantics of the predicate. In a way then, the Agent role is more prominent, more independent, and therefore its semantics more difficult to override. The Patient role, on the other hand, is more dependent on the predicate semantics for its interpretation. It can be expected, therefore, to easily become a very general marker of dependency only. This is indeed the main task of the accusative in accusative languages. Accusative case often only says that the constituent it marks belongs to a V (or P), the expected semantic relation being dependent on this syntactic head. Note that this is not to deny the semantic core of the accusative case or Patient role, only to motivate its final generalization. In my proposal, the ergative case is expected to generalize beyond typical Agent meaning less easily. The counts of alignment systems in the sample of Comrie (2005) seem to support this view. In the pronominal domain, 61 languages have an accusative system versus 20 ergative systems, whereas for full noun phrases, 46 languages use accusative alignment and 32 have an ergative system.

2.4.3 The Reach of Transitivity

Semantically, transitivity can be characterized as an activity which is carried over or transferred from an Agent to a Patient (Hopper & Thompson, 1980, 251). Clearly, this characterization concerns the prototypical instance of a transitive construction only. For example, for the transitive construction *John read the book*, such a characterization is hard to maintain. At the end point of semantic generalizations, the motivation for generalizations becomes opaque. The commonality between breakers and thinkers is more difficult to perceive than the one between breakers and killers. It is to be expected, then, that the system of generalization eventually breaks down. This is precisely what we find. As Malchukov (2005) shows, the transitive construction is not used for all events in which two participants are involved. In terms of a semantic map, the further away from the transitive prototype, the more likely at least one of the arguments comes within the domain of another construction.

Though the previous sections may have suggested otherwise, transitivity is not a binary notion. Hopper and Thompson (1980) argue that transitivity is a gradable notion, which can be decomposed into a number of parameters (cf. Table 2.4). Clauses can be characterized as more or less transitive. The more high-transitive properties a clause has, the more transitive it is semantically, and the more likely it is to be in the form of a standard transitive construction. The defining properties of transitivity are discourse determined. Transitivity has to be understood as an activity that is transferred from an Agent to a Patient, and this can be done with various degrees of success. Although not all transitivity properties are equally unproblematic (*Affectedness*, for example, is notoriously difficult to define), the idea of transitivity as a gradable notion that is determined by a variety of (discourse) properties is firmly established.

According to Hopper and Thompson (1980), a highly transitive clause has two or more participants, and denotes an action event that is brought to an end in an instantaneous manner by a volitional Agent and that causes a change in an individuated Patient. This idea is perfectly compatible with the proto-properties proposal of Dowty. The higher in transitivity a clause is, the more its arguments resemble Proto-Patients and Proto-Agents.

Prototypical transitive clauses are expressed by standard transitive constructions in which the arguments are marked with structural case. The further away from the prototype, the more likely it is that a different construction is used. For example, in many languages, perception verbs are considered to be too far away from the prototype to be expressed by a stan-

	Parameter	high	low
A.	Participants	$\gg$2, A and O	1
B.	Kinesis	action	non-action
C.	Aspect	telic	atelic
D.	Punctuality	punctual	non-punctual
E.	Volitionality	volitional	non-volitional
F.	Affirmation	affirmative	negative
G.	Mode	realis	irrealis
H.	Agency of A	high	low
I.	Affectedness of O	totally affected	not affected
J.	Individuation of O	highly individuated	non-individuated

Table 2.4: Hopper and Thompson's transitivity parameters

dard transitive construction. In Hindi perception verbs are on the verge of a construction change. Consider the following example.

Hindi (Ackerman & Moore, 2001, 164)

(25)　　a.　*Tuṣaar-ne　caand　dek^haa.*
　　　　　　Tushar-ERG moon.NOM saw
　　　　　　'Tushar saw the moon.'
　　　　b.　*Tuṣaar-ko　caand　dek^haa.*
　　　　　　Tushar.DAT moon.NOM saw
　　　　　　'Tushar saw the moon.'

The difference between the two constructions lies in volitionality. The standard transitive construction in which the subject is marked with Ergative case has a volitional subject and can be translated as *Tushar looked at the moon*; the nonstandard construction has a non-volitional subject and can be translated as *Tushar saw the moon*. Being volitional is a Proto-Agent property in the sense of Dowty and increases transitivity in the sense of Hopper and Thompson. If the subject is volitional, it is closer to the prototype and therefore more likely to share its form with it. In terms of our semantic map of argument functions, in Hindi, the perceiver of a seeing event is about as close to the prototypical instance of the dative as to the prototypical instance of the ergative. Its volitionality pushes it over to one or the other side.

Perception verbs are only one example of many different verb types (see Levin, 1993), and Hindi is only one example of many different languages.

In a cross-linguistic study, Tsunoda (1985) proposes a hierarchy of verb types that predicts the distribution of transitive patterns in individual languages. Malchukov (2005) decomposes this hierarchy and recasts it in a two-dimensional semantic map. The purpose of the semantic map of Malchukov (2005) is to disentangle several semantic dimensions that were confused in the original hierarchy and to better account for the cross-linguistic data. The first dimension in this map concerns the degree of agenthood, the second the degree of patienthood. These degrees are determined by reference to yet another way to characterize the semantic complex of transitivity, namely the one by Givón (1985), given in (26).

(Givón, 1985, 90, emphasis in the original)

(26)   a.   *agent-related*: The prototypical transitive clause has a visible, salient, volitional, controlling *agent-clause* which initiates the event.

           b.   *patient-related*: The prototypical transitive clause has a visible, salient, non-volitional, non-controlling *patient-affect* which registers the bulk of the change associated with the event.

           c.   *verb-related*: The prototypical transitive clause has a *compact, perfective, realis* verb or verbal tense-aspect-modality.

The bigger the deviation from the prototypical transitive verb type, the less likely it is that a verb type allows a transitive pattern. More generally, the bigger the difference between two verb types, the less likely it is that they share the same case marking pattern. The idea of prototypical transitivity explains the pattern in Figure 2.5, in which different verb types are ordered with respect to their deviation from the prototypical transitive effective action on the basis of a typological comparison. For example, whereas the object undergoes some change in the effective action type, it does not in the pursuit type. Similarly, the subject of emotional predicates is less in control than the subject of a prototypical transitive event. The further away a verb type is from the prototypical transitive type, the closer its arguments are to other focus points and the less appropriate the transitive case frame. The two branches of the semantic map are to some extent independent, the upper one pertaining to object properties, the lower one to those of the subject. At the same time, the degree of patienthood partly depends on the degree of agenthood of the other argument. Whatever the exact degree of the angle at the crossing, the two branches are not in line and probably not at right angles.

    The hierarchy follows the standard semantic map logic (Haspelmath,

effective action $\Big\langle$
$$\begin{array}{l} \text{contact} \quad \text{———————} \quad \text{pursuit} \quad - \quad \text{(motion)} \\[1em] \text{perception/cognition} \quad - \quad \text{emotion} \quad - \quad \text{(sensation)} \end{array}$$
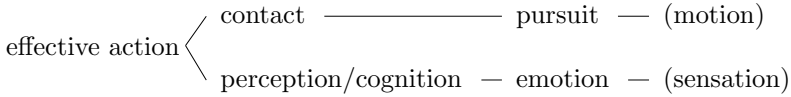
Table 2.5: Two-dimensional verb type hierarchy (Malchukov 2005, 81)

2003). If two verb types share a case frame, all intermediate verb types share this same case frame. This means that if a verb type on the hierarchy allows a transitive pattern, any verb type to its left should allow this too. In this hierarchy, it is only necessary that there be some members of a given class that allow a transitive pattern to predict that some members from a higher class will. That is, it is not necessary that all members of a verb type exhibit the same pattern.

In sum, the typological studies of Tsunoda (1985) and Malchukov (2005) support the idea of a semantic map of argument functions. Argument functions that are close to each other are expected to share the same form, those that are further apart are expected to have different forms. Given the characterization of Dowty (1991), the semantic cores of the object and subject marker seem to be Patient and Agent respectively.

In conclusion to this section, structural case is used to discriminate between the roles that are most predictable for a particular predicate. Because of their predictability, their argument function does not have to be identified by a semantic role marker, they only have to be kept apart. As such, structural case cannot be inherently characterized. It always concerns a semantic role in relation to its predicate. A selection principle, often in combination with topicality, determines which of the two roles becomes subject and which object. For economy reasons, it suffices to mark one of the prominent arguments only. Thus, what is called nominative in an accusative language and absolutive in an ergative language is the absence of case.

2.5 The Bidirectional Use of Case

In the previous sections the development of case with respect to its form and meaning and its extension to the structural use were discussed. This section will be more explicit on how the assignment of case works. The ideas of the previous sections will be formalized in a *semi-bidirectional optimality theoretic* account.

The fun of meaning is in sharing it. The speaker does not just want to establish an argument structure or express her thoughts for herself, she wants the hearer to understand what she means. An utterance is a meaning wrapped in an expression from which the original meaning should be derivable again. Together with strategies like word order, prominence and agreement, case is used to aid the hearer in getting the right interpretation. Note that this view of case is fundamentally different from the one in most other approaches, most notably Government and Binding/The Minimalist Program, in which abstract case is used as an output restriction. I think case, and language in general, for that matter, can only be understood in light of its communicative function. All language use is the result of the conflict between the needs of the speaker and those of the hearer. The optimization procedure between the speaker's wish to be economical and the requirement for the utterance to be intelligible can be formalized in bidirectional Optimality Theory (bidirectional OT; Blutner et al., 2006). In addition to the standard OT assumption that language rules are violable constraints (Prince & Smolensky, 1993/2004), bidirectional OT evaluates candidates on their communicative qualities. That is, both from a hearer and speaker perspective. Case, in this view, is a bidirectionally optimal solution for the expression of a meaning.

More specifically, I use the *semi*-bidirectional version of OT proposed by de Swart (2007, in prep.). In this version, the production of a sentence is constrained by its interpretation. The speaker checks if the optimal candidate from her speaker perspective will indeed lead to the right interpretation. If not, she resorts to a suboptimal form that she thinks will get the meaning across. This semi-bidirectional version in my view mostly describes the pragmatic principles behind language. As will be shown below, by a process of *fossilization*, the optimization process may become standardized and may develop into more specific rules of grammar. Thus, the rules of language are motivated by the way we use it, which is highly desirable for a theory of language in my view.

The constraints I propose are inspired by the work of Grice (1989) and Levinson (2000b). According to Grice (1989) speech participants are expected to observe a rough general principle that says that one should make a conversational contribution such as is required at the stage at which it occurs, by the accepted purpose or direction of the communication event. This principle is called the *cooperative principle*. Grice distinguishes four categories with certain more specific maxims that underly the cooperative principle (Grice, 1989, 26-27). The maxims basically tell the speaker to make true and relevant contributions that are intelligible but not too ex-

tensive.

In spite of his interest in conversation, Grice only spells out the cooperative principle for speakers. But arguably, similar maxims should hold for hearers. If not, the following example cannot be taken care of, as Levinson (1983, 146) argues:

(27)   *He turned on the switch and the motor started.*

The interpretation one generally gets is that the starting of the motor is caused by turning on the switch, which does not follow from any of the principles above. Therefore, Levinson (1983) proposes to add an independent *principle of informativeness*:

(28)   *The principle of informativeness* (Levinson, 1983, 146)
        Read as much into an utterance as is consistent with what you know about the world

In later work, Levinson (2000b) proposes simple heuristics, so-called *generalized conversational implicatures*, that are more explicit on the principle of informativeness. These heuristics can be seen as the hearer's equivalents to some of Grice's speaker maxims. The first heuristic says that what is not said, is not so; the second heuristic says that what is simply described is stereotypically exemplified, and the third says that what is said in an abnormal way is not normal.

The constraints I propose are heavily inspired by these ideas. They have been discussed in the previous sections already and are summarized again in (29).

(29)   a.   FAITH$_L$: interpret linguistic signs
        b.   ADD$_W$: use world knowledge to enrich an utterance
        c.   ECONOMY: be economical in expressing what you want to say

Note that a different interpretation of FAITH$_L$ is used here than in Section 2.3, in that only the hearer's interest is mentioned. In the remainder of this thesis, the fact that the speaker obeys the rules of her language is taken for granted.

Further note that similar constraints have been proposed in other work in OT. For example, in a lexical semantic study of *(a)round*, Zwarts (2004) uses FIT and STRENGTH. The first says that the interpretations should not conflict with the (linguistic) context, the second that stronger interpretations are better than weaker interpretations. Strong and weak interpretations are determined on the basis of inclusion. Strong interpre-

tations include weaker ones (cf. also Hogeweg, 2009). Although Zeevat (2000) proposes slightly more specific interpretation constraints, in all cases, the general idea is very much the same. The hearer needs to conform to some general principles for successful communication. Also the principle of ECONOMY is assumed in many (OT) studies, often in more specific formulations to specifically deal with the variation of concern. The intuitive motivation of it is shared by most linguists. We simply cannot express all semantic details, so choices have to be made. By exploiting the other two constraints, the speaker can save some costly morphemes and speed up the communication process. Thus, the workings of the constraints are closely intertwined. ECONOMY tells the speaker to use as few or as general words as possible given the other principles. ADD$_W$ states that the hearer should enrich the semantics proper of the utterance with any relevant piece of knowledge about the world or the discourse situation. However, this should never happen at the expense of what is being said explicitly, which is stated by FAITH$_L$.[8] As the hearer knows, anything the speaker says is in spite of ECONOMY and therefore relevant.

Finally, note that Gricean principles that ask for relevant and true contributions are not represented in these three constraints, nor formulated as independent ones. They are simply assumed to be satisfied at this point. These principles pertain to the input and therefore are of no relevance once some meaning is selected by the speaker.

In Optimality Theory, optimization processes are illustrated in tableaux. In Tableau 1, this is done for the Hungarian example in (30).

Hungarian

(30) a. *Az ember az asszony-t   lát-ott.*
         the man   the woman-ACC see-PAST.3SG
         'The man saw the woman.'
     b. *Az asszony-t   az ember lát-ott.*
         the woman-ACC the man   see-PAST.3SG
         'The woman, the man saw.'
     c. **Az ember az asszony lát-ott.*
         the man   the woman see-PAST.3SG
         'The man saw the woman.'

Accusative case marks the object, the subject remains unmarked. As the

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[8]As is always the case in linguistics, "never" is too strong. If a speaker obviously is confusing things (e.g. saying *by turning on the stitch*), a cooperative hearer will repair the confusion (i.e. interpreting 'by turning on the switch').

difference between (30-a) and (30-b) shows, word order in Hungarian is determined by discourse principles and does not inform about syntactic function. The topic of the sentence is placed sentence-initially, the (identificational) focus preverbally (see Kiss, 1998). Also, neither agreement nor prominence tell us anything about the argument structure in this example (both arguments refer to a third person human).

Constraints are ranked from left to right in a tableau. Optimality is determined on the basis of violation patterns, which are marked by asterisks. The candidate that best satisfies the ranked constraints becomes optimal. What is important is that to become bidirectionally optimal a candidate needs to lead back to the right interpretation again.

PROD:	'man saw woman'	FAITH$_L$	ADD$_W$	ECONOMY
☞	*az ember az asszony látott*			
☝	*az ember az asszony-t lát-ott*			*
INT:	*az ember az asszony látott*	FAITH$_L$	ADD$_W$	ECONOMY
☞	'man saw woman'			
☞	'woman saw man'			
INT:	*az ember az asszony-t látott*	FAITH$_L$	ADD$_W$	ECONOMY
☞	'man saw woman'			
	'woman saw man'	*		

Tableau 1: Optimization of Accusative Alignment

As illustrated in the evaluation of the form candidates, the use of case is a violation of ECONOMY, at least in comparison with the unmarked candidate. From the perspective of the speaker then, it is optimal not to use case at all, hence the (unidirectional) optimality of the first candidate indicated by the pointing finger symbol ("☞") at the production level. (FAITH$_L$ and ADD$_W$ do not apply at this level because they are concerned with interpretation not with production.) However, as the interpretation check of this candidate shows, it does not lead to the right interpretation again. Without the use of case, the hearer could not decide which of the two interpretations is meant. The case marked candidate, on the other hand, does lead back to the right interpretation. Therefore, the speaker knows that if she uses this form she will be understood by the hearer. Although the structural case that the second candidate makes use of is a violation of ECONOMY, it is necessary to use this form for communication. Any more elaborate form to express this meaning, either by using an additional subject marker or a

more elaborate object marker, would lead to an even more serious violation of ECONOMY. Thus, the second candidate becomes bidirectionally optimal, indicated with "☞". It is the best form candidate that will be interpreted as intended.

Three things should be noted here. Firstly, this model covers strategies like agreement and word order just as well, if it is used to encode argument structure. The interpretation of *John hit Bill* as 'Bill = Agent, John = Patient' would be a violation of FAITH$_L$, because in English word order determines subject and object.

Secondly there is no constraint saying something like "express syntactic function" or "express semantic role", which is often proposed in other OT work (e.g. de Hoop & Malchukov, 2007, 2008; Primus, 2010). The working of such constraints is captured by the interpretation check (but cf. Tableau 2 below). More specific constraints like "mark objects with accusative case" are absent. For me this follows from the very same principles that make the speaker use the word *woman* to refer to a woman. The fact that object markers are chosen for objects follows from the same procedures that make that, in English, *man* is chosen for 'man'. At this level of optimization, the constraints that link meaning to form are not relevant (but see Hogeweg, 2009, for a discussion of these constraints). There is no choice between a dative and an accusative case marker for the object role, just like there is no choice between the use of *woman* and *man* to express 'man'. The speaker simply uses everything she thinks is necessary for communication and omits anything she thinks she can do without.

Finally, note that the use of case is often redundant. In the second Hungarian example of this chapter, repeated in (31) for convenience, world knowledge already helps in telling the builder apart from the buildee. Still, accusative case is used, which therefore seems to be an unnecessary violation of *Economy*. However, redundancy is not a bad thing. In fact, it is the norm rather than the exception in natural language use (see Stiebels, 2002; van Lier, 2009).

Hungarian (Ackerman & Moore, 2001, 1)

(31) *Az új   telepes-ek ház-ak-at   épít-et-tek.*
       the new settlers-PL house-PL-ACC build-PAST-3PL
       'The new settlers were building houses.'

There are two explanations for this redundant use of accusative case. Both are essential for the understanding of language. First, redundancy is vital for successful communication across a noisy channel like speech. It is

possible that the hearer misses the object marker and therefore has to fall back on other cues.

Languages differ with respect to the degree they allow for, or make use of, redundancy. In some languages, like in Hungarian, the benefits of using case to ensure the correct reading outweigh the violation of ECONOMY. In others, if other cues are considered to be sufficient for this purpose, case is omitted because of ECONOMY. Economical as morphological case may be, if possible, the latter type of languages does not make use of it. This phenomenon is known as *Differential Case Marking* (DCM). DCM is generally only discussed for structural case. However, as will be discussed in Chapter 4, we find the same phenomenon for spatial case. For example, in Bukharian Uzbek, spatial case can be omitted from nouns that are inherently spatial as (32) shows.

Bukharian Uzbek (Aziz Djuraev, p.c.)

(32)   a.   *Siz bozor   borasizmi?*
                you market go
                'Will you go to the marketplace?'
         b.   *Siz bozor-ga   borasizmi?*
                you market-DAT go
                'Will you go to the marketplace?'

Because a marketplace prototypically has a spatial function, dative case that marks this function is omitted in (32-a).

Secondly, redundancy can be explained by the *fossilization* of optimization procedures, leading to the development of rules of grammar. Arguably, the process of checking the interpretation costs effort and time and therefore slows down the communication process. To speed things up the bidirectional optimization procedures may develop into a less costly unidirectional constraint that directly leads to a certain outcome. Instead of checking whether it is necessary to use case to mark the argument structure and to find out that this is necessary, the outcome for a given input can be put into a constraint. This process is called *fossilization* by Blutner (2007; cf. also Zwarts, Hogeweg, Lestrade, & Malchukov, 2009). The use of case marking in Hungarian is much more likely the result of the fossilization of the optimization procedure in Tableau 1 than its real-time result. This fossilization led to a rule of grammar that says that the object of the transitive clause should be assigned accusative case (MARKO). This does mean, of course, that the use of the accusative marker is no longer always strictly necessary for interpretation.

According to Geertje van Bergen (p.c.), the evaluation of an additional constraint also costs effort. She is more explicit about the process of fossilization or automatization of optimization procedures. Van Bergen proposes that the assessment between performing a check and developing a constraint depends on the likelihood of the result. If, for a certain class of arguments, the interpretation check results in the use of a marker in a large enough proportion of the cases, it becomes more economical to use the marker for all members of the class. However, if the interpretation check results in the *omission* of the marker in a large enough proportion of the cases, the check is more profitable than developing a constraint.

So, how does this work? It has to be the case that the use of a case marker costs more effort than the check of its necessity. Otherwise case would always be used. Adding a constraint to the model also costs effort as it has to be taken into consideration for each evaluation procedure. But apparently, the addition of a new constraint costs less effort than the interpretation check. Otherwise, fossilization would not take place. For the sake of convenience, let's say that using a marker costs three euro, using a check costs two, and using a constraint costs one euro. Now, in a class of arguments that actually need case marking in only 30% of the cases, the semi-bidirectional version on average is (the cost for the check plus the proportion of markers times the cost for a marker,) $2 + .3 * 3 = 2{,}9$ euro, whereas the fossilized version on average is (the cost for an extra constraint plus the one for the marker,) $1 + 3 = 4$ euro. For this class (given these arbitrary numbers of course), the interpretation check pays off. However, in a class of arguments that actually needs case marking in 80% of the cases, the semi-bidirectional version on average costs $(2 + .8 * 3 =)$ 4.4 euro, whereas the fossilized version on average still costs 4 euro. Now, the development of a new constraint becomes more profitable.

The fossilized version of the case assignment in the Hungarian example in (31) is represented in Tableau 2. There is no longer an interpretation check. The fossilized constraint MARKO overrules the more general constraints and determines the case marking of the object.

PROD:	'settlers built houses'	MARKO	FAITH$_L$	ADD$_W$	ECONOMY
	házak	*			
☞	*házak-at*				*

Tableau 2: Fossilized Optimization of Accusative Alignment

In this section the use of case was modeled in semi-bidirectional OT. I was shown how the functional motivations behind the development of case explain its use. It was also shown how the structural use of case follows from the fossilization procedure of optimization processes.

2.6   The Case Continuum

Most work on case makes a distinction between structural and nonstructural case (exceptions are studies working in the framework of Cognitive Grammar, see Langacker, 1991; Barðdal, 2001). Generally, this is stated as a fundamental dichotomy to continue studying the former only. As I have tried to show in the previous sections, the structural use of case follows from the very same principles as its nonstructural use and differs from it only in being the final result of generalization. The purpose of this section is to show that the difference between the two is in case *uses*, not in case *markers*. This is not simple word play but an important distinction, which, if not made, can be confusing (see Mel'čuk, 1986). One case form can have different uses depending on the construction it is in. Thus, the difference between the structural and nonstructural case is not so clear-cut as often presented.

Chomsky (1981) sees structural case as the result of a purely syntactic licensing requirement on noun phrases that lack inherent semantics; nonstructural case, on the contrary, comes with its own semantics. Woolford (2007b) proposes to make a further distinction within the non-structural cases between lexical and semantic or inherent case, as illustrated in Figure 2.5 (cf. also Butt & King, 2004). The difference between the two is that lexical cases are idiosyncratic, whereas semantic cases are predictable on the basis of their meaning.[9] Maling (2009, 73) argues that really a four-way distinction should be made, splitting structural case up into grammatical or syntactic case and configurational or true 'structural' case. The former expresses surface grammatical relations like 'subject of' and 'object of', the latter is assigned to particular syntactic positions.

I will bring back the number of different types to distinguish between semantic and structural use. Next, I will show that this distinction is rather a continuum of uses, as case markers can have both uses.

Semantic case transparently expresses semantic roles, as explained above. Lexical case can be seen as a vestige of semantic case in which all other uses

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[9]For the sake of consistency, I have replaced Woolford's *Inherent* by *Semantic* in Figure 2.5.
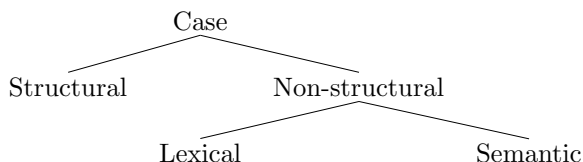
Figure 2.5: Types of case (Woolford, 2007)

have accommodated to a more general pattern. Thus, the assignment of lexical case was meaningful once, but its motivations are now opaque. The remaining instances are idiosyncratically assigned by some lexical head and no longer predictable in any way. Such lexical case can only survive in highly frequent *collostructions*, which are pairs of lexeme and grammatical construction (term by Stefanowitsch & Gries, 2003), as infrequent constructions cannot resist standardization (see Hopper & Traugott, 2003; Yip, Maling, & Jackendoff, 1987; Barðdal, 2009). For example, Barðdal (2009) shows how in Germanic languages high type frequency constructions gain in type frequency over time, attracting new and existing verbs at the cost of low type frequency constructions. Low type frequency constructions are expected to gradually disappear unless they are high in token frequency, in which case they might be preserved as idiosyncratic constructions (Barðdal, 2009, 13-14). Thus, only highly frequent constructions have the "mass" to behave idiosyncratically; less frequent members need to behave like others, otherwise they cannot be learned (cf. also Lestrade, 2010). Pullum and Scholz (2007) claim that it is because of memory limits that less frequent items have to behave regularly.

In the account of Maling (2009), structural case is tied to specific positions in a syntactic tree representation. As such, it expresses abstract configurational meaning. As an example of structural case, Vainikka (1993) argues that the genitive case in Finnish is the structural default case for the specifier position, be it the specifier of DP, PP, or VP, whereas partitive case is the structural default case for the complement position.

Maling (2009) distinguishes structural case from grammatical case that expresses grammatical relations instead of syntactic position. Grammatical case is assigned to grammatical roles like subject and object. Examples are most instances of nominative, accusative, and ergative case. What the category of grammatical case is exactly becomes most clear in theories of grammar in which there is no one-to-one mapping between grammatical case

and grammatical function (Yip et al., 1987; Zaenen, Maling, & Thráinsson, 1985; Maling, 2009). In these theories, grammatical cases are assigned along a hierarchy of grammatical functions, using a case tier. Nominative is assigned before accusative to the DP with the highest grammatical function (GF) that does not bear inherent lexical case already. Accusative case is assigned to all remaining unmarked DPs. The exact ordering of grammatical functions often differs between different authors. In all approaches, however, subject is higher than object. Grammatical case explains case alternations from accusative case to nominative case in passivization as illustrated in (33).

Icelandic (Maling, 2009).

(33)   a.   *Jón   gaf barninu   bókina.*
             Jon.NOM gave the.child.DAT the.book.ACC
             'John gave the child the book.'
       b.   *Barninu   var gefin bókin.*
             the.child.DAT was given the.book.NOM
             'The child was given the book.'

In both examples, the DP with the highest GF that is not already marked with lexical case already is marked with nominative case. Thus, nominative case is assigned to the subject, accusative case to the object in (33-a). In (33-b), the DP with the GF subject already bears inherent dative case. Therefore, nominative is assigned to the DP with the next highest GF, the object. Accusative case remains unused (Maling, 2009).

I think Maling's structural and grammatical case are of the same kind, which I call the *structural use*. It expresses information about syntactic dependency. In what Maling (2009) analyzes as grammatical case, the omission of accusative case is due to the presence of other arguments of which the grammatical function is already marked. Because all other semantic roles are clear, accusative case does not have to distinguish between the two prominent semantic roles and can be omitted. Contrary to Maling, I think nominative case is not *assigned* as a grammatical case, but is the *absence* of case (cf. Section 2.4). Because of economy, accusative case is only used when necessary to distinguish between the subject and object. If the distinction is already clear, it can be omitted.

Thus, we end up with two different uses of case only, the semantic use and a more generalized version, the structural use. The difference between the two is gradual, which will be shown.

Sometimes the semantic core that shows the origin of a structural case

marker is used. Similarly, sometimes case markers that normally have a semantic use are used structurally. This is why I posit that there is no cutoff point between structural and semantic case. Often, these meaning aspects will be overruled or neglected. In case alternations, however, they may surface again. In case alternations there is no other reason to use a different case than for semantic purposes. It is in such environments that ergative case may show its Agent and accusative case its Patient source meaning most clearly. Consider the alternation in (34).

Lezgian (Haspelmath, 1993, 292)

(34)   a.   *Zamira.di   get'e xana.*
             Zamira.ERG pot   break.AOR
             'Zamira broke the pot.'
       b.   *Zamira.di-waj get'e xana.*
             Zamira-ABL   pot   break.AOR
             'Zamira broke the pot accidentally/involuntarily.'

Ergative case is used for the true Agent in (34-a) but not for the involuntary one. In the same vein in (35), accusative case is only used for the true Patient.

Icelandic (Barðdal, 2001, 146)

(35)   a.   *Hann   klóraði   mig*
             he.NOM scratched I.ACC
             'He scratched me' (painfully, against my will)
       b.   *Hann   klóraði   mér*
             he.NOM scratched I.DAT
             'He scratched me' (because my back is itching)

Even though this is quite rare, structural case markers may still have a functional core semantics too.

Kracht (2003) shows for Finnish that the ablative in (36-a) is a semantic case, whereas it is used lexically in (36-b). In the first example, the ablative case denotes a Source meaning. In the second however, it has null semantics, the verb semantically selecting for a THING, not a Source. This is illustrated by the (im)possibility to replace *laivalta* with the spatial particle *alas* 'down' (in parentheses). The ablative case in (36-b) is idiosyncratically assigned by the verb.

Finnish (Kracht, 2003)

(36)   a.   *Hän menee laiva-l-ta   (alas).*
               he   walks ship-ABL   (down)
               'He is going/walking from the ship.'
       b.   *Tämä näyttää laiva-l-ta   (*alas).*
               this   resemble ship-ABL   (down)
               'This looks like/resembles a ship.'

In this respect, my proposal is very similar to that of Kracht (2003). Kracht (2003) uses (36) to argue for a difference between a *functional* and *nonfunctional* use of case markers. According to Kracht (2003), cases are *signs*, triples of an exponent (the case marker), a type (the case feature) and a meaning (the case function). The case feature and case function of a case sign are in competition. A case can be syntactically selected as a feature (by a verb) and without any meaning, or be self-licensing and with a function (cf. also Blake, 1994, 32). However, the categorical difference that Kracht (2003) makes between case functions and case types may not always be so clear.

Næss (2003, 269) defines structural cases as "a case category that has been generalized beyond its core semantic specification, to the point where its uses, or some of its uses, can be described in purely structural terms, without reference to the semantic properties of the arguments in question." Such a generalization is possible because structural cases encode unmarked combinations of the semantic features for volitionality, affectedness, and instigation. For example, ergative case encodes only control and no affectedness, accusative case encodes only affectedness and no control. Because only one of the features is specified, instances which do not exactly fit these specifications are more easily assessed as similar to them than to cases with more specific combinations. Languages may differ with respect to the extent to which deviations from the prototype must be encoded differently, that is, with a semantic case or another, more elaborate construction. Although I do not adopt her binary take on semantic features (there may be more and their evaluation may be gradual), I do agree with the general principle Næss (2003) proposes. This view is compatible with the ideas outlined in Section 2.4, where structural case is said to be a further grammaticalized and more general version of semantic case.

More specifically, Næss (2003, 262) argues that dative case in German (otherwise generally analyzed as a structural case) is assigned to the subject of certain experiencer verbs, and therefore in order to account for its distribution an appeal has to be made to semantic information. Even ad-

vocates of a fundamental distinction between the two types have to allow intermediate options. For example, Wunderlich and Lakämper (2001) allow "marked structural cases" to account for additional semantic conditions on structural case and "structural-plus-semantic" case to account for semantic cases that trigger agreement.[10]

Næss (2003, 262) uses the case alternation in (37) as another example:

Urdu (Butt & King, 2004, 34)

(37) a. *Anjum-ne   xat   lik^h-naa   hai.*
          Anjum-ERG letter-NOM write-INF is
          'Anjum wants to write a letter.'
      b. *Anjum-koxat lik^h-naa   hai.*
          Anjum-DAT   letter-NOM write-INF is
          'Anjum has to write a letter.'

If both ergative and dative case are analyzed as structural cases, the case alternation in (37) should not occur in the first place, and be without a meaning contrast if it did nevertheless. Allowing for structural cases to have some semantic contents, however, makes the occurrence of the alternation in (37) unproblematic and its explanation fairly easy. Ergative case has a core meaning of control, which is precisely what it expresses in (37-a).

Barðdal (2001, 108) shows that the distinction between structural and semantic case does not hold in Icelandic. In her corpus study, around 25% of the objects bears dative case, which is too big a proportion if accusative case is the structural default case. The use of dative is not only semantic, as the semantic roles it expresses are not always Experiencers and Perceivers. Moreover, an analysis of learning mistakes shows that it is not only alleged structural cases that are substituted for alleged semantic case, but also the other way around, which is unexpected if children only overgeneralize the use of structural case. Similarly, Forker (2010) notices the increase of grammatical functions for local cases in Tsezic languages and the absence of a clear-cut distinction between grammatical and semantic cases.

I distinguish two different uses of case that really are extremes on a cline, the semantic use and its generalized version, the structural use. The latter is claimed to be more frequent and general than the semantic use. The difference in frequency was already empirically validated in Section 2.2, although by approximation via the case markers that typically have these functions only. One way to test the meaning part of the claim is to look at

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[10]Note that Wunderlich and Lakämper (2001, 378) also view structural case as more economic than semantic case.

the number of *characterizing case bearers* of both uses in corpora. Again, this will only be done by looking at their typical case markers as a proxy. If a large amount of the token occurrences of a case is due to only a small set of noun types, these noun types can be said to characterize this case. If, however, there are many different types with similar frequencies that account for most of the token occurrences of a case, this case cannot so easily be characterized by its bearers.

Karlsson (1986) notes that from the point of view of the language system, paradigms are by definition full. However, from the point of view of individual words, paradigms can be defective (cf. also Kiparsky, 2004). Karlsson (1986) shows how the distribution of case token frequencies of a given noun is dependent on its semantics. For example, a proper name for a human being like *Martti* in Finnish appears 94% of the times in a nominative case, a personal pronoun like *hän* 'he/she' 59%. The second major case of proper names and personal pronouns is the genitive (respectively, 6% and 24%). However, instances of spatial case are virtually nonattested for *Martti* (one occurrence), and make up less than 10% of the occurrences of *hän*. These low numbers are in spite of the fact that spatial cases can be used for possession. In contrast, more than half of the token frequency of *alue* 'the region' is accounted for by spatial cases. Karlsson (1986, 23) concludes that the meaning components of a word largely predispose what forms of the words are likely to be used. Very similarly, Aristar (1996, 1997) argues for what he calls *case typing*. As is the case with verbs, cases have selectional restrictions for their arguments (see Lieber, 2006, for a similar claim on derivational morphology). For example, spatial cases prefer things, dative case prefers humans. Some languages prohibit a mismatch between the type requirements of the case and the semantic features of the argument.

If structural case really is less specific than spatial case, we expect structural case to have fewer characterizing nouns. Its total number of occurrences should be distributed more evenly over a larger set of nouns. Thus, the variation in the type of nouns a case combines with can be used as an approximation for the specificity of its meaning. The lower the amount of different types, the more specific; the bigger the amount, the less specific. I took a slightly different approach in answering this question than previously in the frequency counts of cases to circumvent the problem of data sparseness. Instead of selecting the first 20,000 words and looking at the relative proportion of the different cases within this set, I selected the first 20,000 instances of the different structural and spatial cases in the four Finnish newspaper corpora mentioned in Section 2.2 (*Demari*2000

(D), *Karjalainen* 1998 (K), *Aamulehti* 1999 (A), and *Helsingin Sanomat AE* 1995 (H)). Cases that did not reach a token frequency of 20,000 instances are marked with an asterisk.[11] Then, I counted the number of noun types that occurred in .5% or more of these instances. This threshold was arbitrarily chosen as a criterion for a case characterizing noun. The numbers in Table 2.6 show the number of noun types per 20,000 case tokens (*type*) and the number of types that individually make up for at least .5% of a given case' instances (*proto*).

	corpus							
	A		D		H		K	
Case	type	proto	type	proto	type	proto	type	proto
Nom	7026	9	7030	8	7169	4	7511	5
Gen	6477	7	5931	14	6665	4	6487	7
Part	6562	10	6396	11	6271	10	6598	10
Abl	5083	18	849*	(27)	670*	(32)	4693*	19
Ade	5175	22	2691*	(22)	2469*	(19)	5201	20
All	5487	19	1952*	(23)	1411*	(18)	5588	17
Ela	7050	6	4563*	(9)	3701*	(7)	7182	6
Ine	5078	16	3912*	(21)	2966*	(18)	5117	18
Ill	6404	13	4547*	(16)	3420*	(15)	6481	14

Table 2.6: Number of types and characterizing nouns per 20,000 case tokens in Finnish

Because it is easier to reach the .5% threshold if there are fewer tokens (which is the case for the less frequent cases in the smaller corpora), I put the number of characterizing types for these cases between parentheses. In the following discussion, only the combined *Karjalainen* 1998 (K) and *Aamulehti* 1999 (A) corpora will be considered, neglecting the relatively small deviation of the norm of Ablative case in the K corpus (see footnote 11).

The differences between the two uses of case are illustrated in Figure 2.6. The bold-faced horizontal lines represent the median, plus signs represent the means. The upper and lower boundary of the boxes represent the upper and lower quartile, the whiskers mark the most extreme observation that is still within a 1.5 interquartile range away from the box. The constrictions,

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[11]The actual token frequencies of these cases were D: Abl 1754, Ade 8779, All 4725, Ela 11699, Il 12730, In 14879; H: Abl 1379, Ad 6450, All 3258, El 7955, Ill 8614, In 8981; K: Abl 17873.
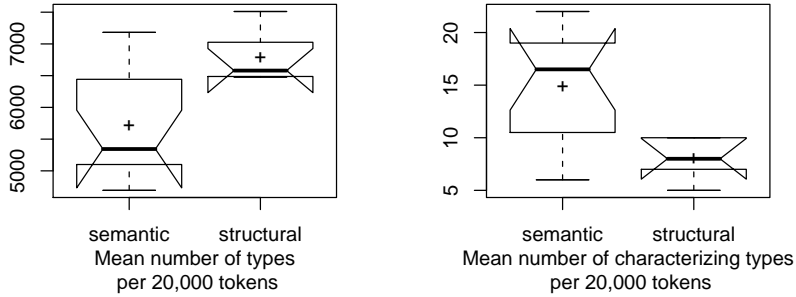
Figure 2.6: Selection behavior of structural and semantic case

finally, mark a confidence interval (±1.58 times the interquartile range divided by the square root of the number of observations). If the mean or median of one box plot is outside the range of this interval of the other, the difference between the two is probably significant (see Gries, 2008, 125).

As the figure suggests, the difference in selection behavior between structural and semantic case is indeed significant and structural case can be shown to be less selective than semantic case. The more different types per 20,000 tokens, the less selective they are. This ratio is higher for structural than for semantic case. The mean number of types for structural case (for these two corpora) is 6777, the mean number for semantic cases is 5712. This difference is significant (Wilcoxon rank sum test: W = 61, p-value = 0.01821). Alternatively, the bigger the proportion of token occurrences of a case that can be explained by a subset of types, the more this case is characterized by this subset. The mean number of *characterizing* types for structural cases is 8, the mean number for semantic cases is 15. This difference is also significant (Wilcoxon rank sum test: W = 13, p-value = 0.03471).

Now, consider again Table 2.6 and note the low number of characterizing types for elative case. For a semantic case this number is unexpected. However, Vainikka (1993) argues that elative case also has a structural use in Finnish. It is used with quantifiers, superlative adjectives, as the complement of adjectives and nouns and with some particles. Having a structural use too, elative case is expected to have fewer characterizing

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nouns than the other spatial cases and this is precisely what we find in Table 2.6.

In this section, I have argued that the difference between structural and semantic case should be discussed in terms of case uses. One case marker may have both structural and semantic uses. Typical structural case markers were shown to be less selective than markers that have a semantic use only.

2.7 Conclusion

In this chapter, I explained the development and use of case by very general principles. In my view, case is the natural result of cognitive and linguistic motivations, not an abstract primitive.

The primary function of case is the expression of semantic roles. In my proposal, semantic roles are language specific generalizations of argument functions. Argument functions constitute a multidimensional, language specific semantic map on which cases cover contiguous areas. Their domains are defined by a distance minimization procedure. The idea of proto-roles, as originally proposed by Dowty (1991), is integrated in this definition of semantic roles. It also solves the problem of a lack of a universal well-defined set of semantic roles.

Because of the frequent use of semantic roles, their (case) forms got shortened and their meanings more general. Both results led to a further increase of use, leading to a further shortening and generalization process. As a result, cases are among the most frequently used constructions of language, with the shortest form and most general meaning possible. This simultaneously describes the development of case and its real-time use by the same principles, capturing the intuition that language change is due to language use.

By using semantic roles, the speaker can economically encode the function of an argument (in a *zipf file*, so to speak). By enriching the interpretation of the semantic role with the semantics of the predicate, the hearer can unpack this information again. Structural case discriminates between the semantic roles that are most prominent for a particular predicate. Because their argument function is so predictable, it does not have to be guided by a semantic role marker, they only have to be kept apart. As such, structural case cannot be inherently characterized, it always concerns a semantic role in relation to its predicate. For economy reasons, it suffices to mark one of the prominent arguments only. What is called nominative in an accusative

language and absolutive in an ergative language is the absence of case. A selection principle, often in combination with topicality, determines which of the two roles becomes subject and which object.

Using corpus counts, I have shown that morphological case is as expected among the most frequent constructions of language and that structural case markers are more frequent and more general than semantic ones.

Chapter 3

The Case of Space

In this chapter the importance of frequency for spatial case is discussed. It will be argued that the directionality dimension of spatial meaning necessarily consists of three basic distinctions, which follows from the analysis of directionality in terms of a change of configuration over time. Place directionality is the absence of a change in configuration; Goal directionality is a change into some configuration, and Source directionality is a change out of some configuration. All other directionality meanings are shown to be derived from this basic set. Contrastingly, the configuration domain is much more complex, consisting of different ordering principles that lead to a larger set of language particular configuration contrasts. As a result, the distinctions of directionality are more frequently used than the contrasts of configuration. Because frequent use leads to grammaticalization, spatial case is expected to express directionality mainly. This prediction is shown to be correct in a study on the growth of spatial case inventories, in a comparison between spatial case and spatial adpositions, in a semantic analysis of the morphosyntactic parts of spatial adpositional constructions, and, finally, in a study of the case forms of spatial adpositions in Finnish and Hungarian.

3.1   Introduction

This chapter is about the way morphological case expresses spatial meaning. In the previous chapter, the importance of frequency was shown for case in general. In this chapter the importance of frequency for *spatial* case will be discussed.

De Hoop and Zwarts (2009, 178) argue that one of the interesting characteristics of spatial case for the study of spatial meaning is that it tends to encode spatial distinctions more systematically than lexical constructions because of its paradigmatic nature. As a result, they think, the study of spatial case might reveal something about fundamental distinctions and patterns in spatial meaning. Hopefully, this chapter lives up to their expectations. Following the line of argumentation of the previous chapter, what is most important for spatial meaning will be expressed most often and therefore is predominantly expected to develop a case marker. Thus, the study of spatial case is expected to show us the most important aspects of spatial meaning.

Consider the following examples from Hungarian:

Hungarian (Hegedűs, 2008)
(1)   a.   *a   ház   mellett*
              the house next.to
              'next to the house'
       b.   *a   ház   alatt*
              the house under
              'below the house'

(2)   a.   *A   ház-ban   állok.*
              the house-INE stand.1SG
              'I'm standing in the house.'
       b.   *A   ház-on   állok.*
              the house-SUPER stand.1SG
              'I'm standing on the house.'

In (1), the position of the speaker *next to* and *below* the house are expressed with the postpositions *mellett* and *alatt*. In (2), the position of the speaker *inside of* and *on* the house are expressed with the case suffixes *-ban* and *-on*. Apparently, the configurations IN and ON are more case worthy than NEXT TO and BELOW. The primary use of spatial case however, as I will argue below, is illustrated by the contrasts between (2) and (3). Spatial case first and foremost expresses *directionality*, the change of relative position

over time. Only if a directionality distinction is made, a further distinction among the more basic meanings of configuration is expected.

(3)   a.   *A   ház-ba   megyek.*
             the house-ILL go.1SG
             'I'm going into the house.'
      b.   *A   ház-ra   felmászok.*
             the house-SUPERL climb.1SG
             'I'm climbing up the house.'

This chapter is organized as follows. In Section 3.2 first some important concepts of spatial meaning will be discussed. Configuration and directionality will be the most important for present purposes.

In Section 3.3 a modified version of Jackendoff's analysis of directionality will be proposed. In this version basic directionality distinctions do not have to be stipulated but their number is necessarily restricted to three. In contrast, the set of distinctions that can be made on the configuration dimension is less restricted and therefore in general much bigger. Because the members of the smaller set of directionality functions are more often used than the members of the bigger set of configuration functions, the former are predominantly expected to develop case forms. This prediction is shown to be borne out in different ways in Section 3.4.

In Section 3.4.1 I will show that my analysis explains the semantic map of directionality that results from cross-linguistic comparison of syncretism patterns. On this map, Place is placed between Goal and Source. In Section 3.4.2 I will show that it correctly predicts the growth of spatial case inventories in the two dimensions of space. In Section 3.4.3 the division of labor between spatial constructions that differ with respect to their degree of grammaticalization will be discussed. In Section 3.4.4 the division of labor within the set of more lexical spatial constructions will be discussed. That is, spatial constructions in which more lexical elements, like adpositions, and more grammatical elements, like case, are used at the same time. Finally, in Section 3.4.5 a prediction concerning the case paradigms of spatial adpositions that follows from this distribution of labor will be tested.

3.2   About Space

The importance of a spatial conceptual system for any species with the ability to move around is obvious. According to Landau and Lakusta (2009),

humans do not differ from other species by having such a system, but only in having language as an additional, powerful representational system that allows us to share this representation of space with others. Language provides tools to strongly represent and combine aspects of spatial organization that are otherwise fragile. Therefore, the way we talk about spatial relations in the physical world should not be taken as a direct derivative of a single basic cognitive representation of space. Rather, it shows how different systems can be integrated into a linguistic representation. Similarly, Svorou (1993) argues that there is no direct mapping from spatial language to a state of affairs in the physical world. There is always a language-specific conception of space in between, comparable to the logical form of argument structure introduced in the previous chapter. Thus, contrary to what has been thought for long (see Levinson & Wilkins, 2006a), the combination of ordering principles behind spatial language and their relative importance may differ between languages. As is the case with pretty much any other domain of language, spatial language is arbitrary to some degree. As will be shown in this section, the organization of some domains of spatial meaning may vary greatly between languages. However, as will be argued in the next section, directionality is organized in a similar fashion for all languages.

In studying spatial language, I am only interested in more grammaticalized items ("spatial grams", in the terminology of Svorou, 1993). According to Talmy (2000, 178), these closed-class grammatical forms and syntactic structures (together constituting the so-called *fine structure* of language in contrast to its *macroscopic expository level*) provide a fundamental conceptual framework. Furthermore, I confine myself to the use of spatial language that describes *location* in space, disregarding predication of spatial *properties*. That is, utterances like *the house is big* or *the road is long* will not be discussed. Note however that these properties are important for descriptions of locations. For instance something can only be *along* some object if this object is long in some sense.

The location in space of objects is relational, that is, it involves other objects. Talmy (2000) proposes the notions *figure* and *ground* for disambiguation (similar to the notions *trajector* and *landmark* of Langacker, 1991). To communicate the location of a figure, we make use of grounds, reference objects whose position is evident. Spatial case relates figures to grounds by marking the latter. The definitions of the two notions are given in (4).

(Talmy, 2000, 312):

(4)   a.   The *figure* is a moving or conceptually movable entity whose

> path, site, or orientation is conceived as a variable, the particular value of which is the relevant issue.
>
> b. The *ground* is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the figure's path, site, or orientation is characterized.

In addition to concrete objects, also events are allowed to be taken as figures. For instance in (5), both *Lenny is singing a song* and *Lenny* can be the figure.

(5)   *Lenny is singing a song in the shower.*

The precise relative position between the two objects in space, e.g. AT, IN, ON, UNDER, etc., is the domain of the *configuration* function. *Directionality* is about the way this configuration changes over time. For example, if a figure is AT a ground at some point in time, but was not previously, we speak of Goal directionality. I will only discuss configuration here, as directionality will be the topic of the next section.

According to Levinson and Wilkins (2006b), the configuration function is a complex, multidimensional semantic space for which there are no simple surface universals. Their claim really concerns the topological domain, which, as we will see below, is a subset of the configuration domain. Bowerman and Choi (2003) show that children even at very early stages of spatial language acquisition already show language particular preferences, suggesting a lack of general ordering principles, or at least a lack of a universal hierarchy of these principles. In spite of this variation, the distinctions of the configuration function do not seem to vary unrestrictedly. For example, some distinctions seem to be easier to acquire than others (Casasola & Cohen, 2002; Gentner & Bowerman, 2009). Also, through studying the difference between languages in inventory size of topological expressions, Levinson, Meira, and the Language and Cognition Group (2003) establish an implicational scale of topological relations expressed by adpositions that at least holds statistically. They show that there are tendencies that describe the growth of the set of configuration options between languages. Their findings are summarized in (6).

Implicational scale of topological distinctions (Levinson et al., 2003)
(6)   AT $\succ$ IN $\succ$ ON/UNDER $\succ$ OVER/NEAR $\succ$ ON-TOP $\succ$ AT-TACHED $\succ$ INSIDE $\succ$ ...

This scale should be read as follows. With the addition of every new term,
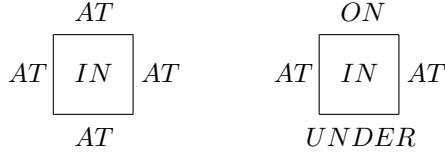
Figure 3.1: A two-way and a four-way configuration distinction

the meaning range of the already existing terms will be narrowed down. Whereas the semantic domain that is covered stays the same, the way it is cut up changes. If languages make a two-way topological distinction in their adpositional system only, it will probably be on the basis of an inclusion relation, distinguishing between IN and not-IN; if languages make a three-way distinction, it will either be between AT, IN, and ON, or between AT, IN, and UNDER, etc. The range of the markers for AT and IN in the latter cases is more limited than in a two-way distinction. As some languages make a very fine-grained distinction within their adpositional system, the scale may grow even up to 30 adpositions. In Figure 3.1, the distinction between a two-member and a four-member system is illustrated.

Levinson et al. (2003) show that there seem to be general underlying ordering principles like containment, vertical positioning, contact, support, and adhesion from which spatial concepts are compositionality constructed (see Talmy, 2000, 241, for a list of 20 such constraints). The ordering of the scale can be explained by inclusion relations between these notions. For example, Zwarts (2008b) shows how the interaction of such principles can account for the use of prepositions in situations in which in principle more than one preposition applies. Support is typically part of a situation of containment, as, because of gravity, a figure that is inside a ground will typically be supported by the surface of that ground. As a result, there is a default inference from containment to support. Similarly, support often implies a certain vertical positioning. The principles can be ranked according to such entailments. In choosing the applicable preposition for a certain situation, a speaker is faithful to a principle of maximal informativity (see Grice, 1989). That is, an adposition expressing containment is more informative than one expressing support only and therefore will be used in a situation of containment.

In spite of such implicational relations for the more basic notions, the implicational hierarchy in (6) only holds statistically and has an open end. This does not mean that the number of topological distinctions that can be made with adpositions is uncountable. Following Jäger and van Rooij (2007), the choices of the configuration function, or the underlying principles that motivate these choices, are functionally constrained, yielding practical upper limits (cf. also the criteria for semantic roles in Section 2.3). Only spatial functions that are sufficiently useful will be used and learned. What exactly counts as sufficiently useful differs between cultures. However, as discussed above, some basic distinctions recur in most languages. The open end only means that the particular set of meanings a language adopts is not *a priori* determined. Languages can add very specific topological notions to a more or less predictable starting set.

Configuration contrasts can be divided into *projective* and *non-projective* meanings (Herskovits, 1986; Zwarts & Winter, 2000). The truth conditions of the latter only depend on the region of space occupied by the two objects and generally also includes relations of propinquity, contact, and containment. When figure and ground are separated in space, further information about "projections" from the ground are required. These projections can be dependent on the intrinsic spatial or functional properties of the ground or on that of the speaker (cf. the notions *angular* and *non-angular* meaning in Levinson & Wilkins, 2006a and *AxParts* in Svenonius, 2006, 2008). The way in which projective meaning is described is dependent on the perspective point, or, in the terminology of Levinson that is adopted here, the *frame of reference* (Levinson, 2003; Levinson & Wilkins, 2006a). There are different frames of reference that languages can apply. For example, speakers can choose to place the origin of the spatial coordinate system that organizes space at the ground, using properties of the ground (applying an "intrinsic" frame of reference, *in front of the church*). Secondly, they can choose to place the origin at themselves, using their own bodily coordinates ("relative", *to the left of the tree*). Finally, speakers can use fixed bearings ("absolute", *to the south*). Often, languages use more than one frame of reference, having context dependent preferences. For example, in English, one would say that Brighton is *south of* London whereas the car is *in front of* the house.

Most studies of spatial languages look at spatial expressions in isolation, for example comparing the adpositional inventory of languages. Sinha and Kuteva (1995) argue against such an application of lexical semantics to spatial expressions (cf. also Levinson, 2003, 63). They propose to analyze spatial meaning as being syntagmatically distributed over both closed- and

open-class items. In principle, this idea was already established by Talmy (1975, 1985) in his typological study of the constituents that encode directionality in a clause. Talmy distinguishes satellite-framed from verb-framed languages. Directionality is encoded by the verb in verb-framed languages, whereas in satellite-framed languages, directionality is expressed by *satellites*. Manner of motion, on the other hand, is encoded by satellites in verb-framed languages, whereas it is encoded by the verb in satellite-framed languages. This is illustrated in the following example:

Spanish (Talmy, 1975, 224)

(7)   *La botella salió   flotando de   la   cueva.*
        the bottle exited floating from the cave
        'The bottle floated out of the cave.'

In Spanish, a verb-framed language, directionality is encoded by the verb (*salío* 'exited'), manner of motion is expressed by a coverb (*flotando* 'floating'). In the English translation however, manner of motion is encoded by the verb, whereas directionality is expressed by the prepositional phrase.

However, languages do not neatly fall into either of these two categories. At best, they can be characterized as having a preference for one or the other strategy. For example, like Spanish, English has the verb *to exit*, which expresses directionality but not manner of motion. In any event, such examples show that spatial meaning is indeed distributed over the sentence rather than being concentrated in a single item.

As another example of such distributed spatial semantics, Herskovits (1986, 41) notes the importance of the figure for the interpretation of a spatial construction, as illustrated by the difference between the spatial relationships denoted by *the water in the vase* and *the cracking in the vase*. Similarly, Lemmens (2002) shows how Dutch posture verbs may encode the posture of the figure and information about the duration of the configuration, which itself is encoded by a prepositional phrase, cf. (8).

Dutch

(8)   a.   *De vaas staat   op tafel.*
             the vase stands on table
             'The vase is standing on the table (vertically).'
        b.   *Het boek ligt onder de tafel.*
             the book lies under the table
             'The book is lying under the table (horizontally).'

In (8-a), the vertical orientation of the vase is expressed by the posture verb *staan* 'to stand'; the horizontal orientation of the book in (8-b) is expressed by the posture verb *liggen* 'to lie'.

As a final example, van Riemsdijk and Huijbrechts (2007) argue that there are syntactically and morphologically identifiable positions in grammatical structure that specifically express location and directionality. They argue for the hierarchically ordered sequence of directionality and configuration between the verb and the ground illustrated in (9).

(9)   V – DIRECTIONALITY – CONFIGURATION – GROUND

Van Riemsdijk and Huijbrechts (2007) use the notion of *locality* to test the predictions of this hierarchically ordered sequence. According to this notion, only adjacent heads can enter into morphological or syntactic relationships. More specifically, contiguous functions/members in the hierarchy may be covered by a single expression and two noncontiguous elements can only be expressed by the same marker if all intervening elements are also expressed by the same marker. Note that this analysis is not concerned with surface structure but has to assume movement and/or neglect case marking to account for the following examples:

German
(10)   a.   *Dirk geht in dem   Laden herum.*
              Dirk goes in the.DAT shop   around
              'Dirk is walking around the shop.'
        b.   *Dirk geht in den   Laden.*
              Dirk goes in the.ACC shop
              'Dirk is going into the shop.'

The difference between (10-a) and (10-b) is in the case marking of the prepositional complement. As in many Indo-European languages, this adpositional case determines directionality (see Lestrade, 2008). In these constructions however, this marker of directionality is in between the ground and the marker of configuration, i.e. the preposition, thereby violating the sequence in (9) proposed by van Riemsdijk and Huijbrechts (2007). The same holds for the English translation in (10-b). The directionality marker *-to* is in between the ground *the shop* and the configuration marker *in*.

Nevertheless, I believe van Riemsdijk and Huijbrechts (2007) are right in the sense that languages preferably have the configuration marker in between the ground and the directionality marker, which has also been observed by Kracht (2002) and Zwarts (2005a). Zwarts (2005a) explains this

observation by a preference to have syntactic surface structure follow semantics, which is referred to in this thesis as the *principle of isomorphism*. Below, it will be argued that the German and English examples above are exceptions to this general principle. The semantic structure of spatial constructions will be discussed in the next section, the principle of isomorphism will be discussed in Section 3.4.4.

Of course, there is much more to say about spatial meaning. Other studies of spatial language (concerning adpositions, mainly) concern for example deixis (see Senft, 2004), degree (see Koopman, 2000; den Dikken, 2006), and *axial parts* (see Svenonius, 2006). At a more abstract level, Zwarts and Winter (2000) propose a vector space semantics for spatial meaning, creating the possibility to look at algebraic properties of spatial PPs. This short introduction cannot do justice to all studies and spatial meaning aspects. I have only introduced those notions that I think are most important for spatial case.

As will be shown in the remainder of this chapter, spatial case primarily expresses directionality, configuration being next in line. Sometimes other meaning aspects are expressed by spatial case too. For example, there are languages that use spatial case to express the difference between proximate and distal (e.g. Tsez) or between general and more specific location (e.g. Tabasaran; Comrie & Polinsky, 1998). However, such distinctions are secondary to the expression of configuration and directionality. Only when configuration and directionality are expressed, additional meaning differences are made by means of case.

3.3 Directionality

As we saw in the previous section, spatial constructions can be ordered according to two dimensions of spatial meaning: a dimension of configuration, denoting the relative position of the figure with respect to the ground (AT, IN, ON, UNDER, ...), and one of directionality, describing the change of this relative position over time. In this section it will be argued that the directionality dimension necessarily consists of three basic distinctions, which, as a result, can be seen as cognitive universals. This contrasts with the previous section, which illustrated that there is no comparable uniform set of *configurational* concepts (Levinson et al., 2003; Bowerman & Choi, 2003; Gentner & Bowerman, 2009). The configuration domain is much more complex, consisting of different ordering principles that lead to a larger set of language particular configuration contrasts. As will be shown, this dif-

ference has consequences for the degree of grammaticalization of the forms of the two functions. The distinctions of directionality are much more frequently used than the distinctions of configuration. And because of its frequent use, directionality is the prime candidate for spatial case.

The discussion of directionality will start with with the analysis of Jackendoff (1983, 1990). Next, using the formal semantics machinery developed by Krifka (1998), it will be argued that the analysis of Jackendoff should be revised.

3.3.1   From Jackendoff

Jackendoff (1983, 1990) proposes that conceptualization can be decomposed into function-argument organizations. The two abstract formation-rules that are relevant for my spatial purposes are cited in (11). The existence of a hierarchical distinction between these two dimensions is standardly assumed (and often elaborated upon as in the functional structure developed in generative approaches for spatial adpositions by Koopman, 2000, den Dikken, 2006, Svenonius, 2006).

(11)   a.   [Place] $\rightarrow$ [$_{Place}$ Place-FUNCTION ([THING])]
        b.   [Path] $\rightarrow$ [$_{Path}$ {TO, FROM, TOWARD, AWAY-FROM, VIA}
              ([{THING, Place}])]

(11-a) says that a conceptual constituent belonging to the category Place is the result of the application of a Place function to an argument that belongs to the category THING. The argument serves as a spatial reference point in terms of which the Place function defines the region. The Place function could be any spatial relation, e.g. IN, ON, AT, etc. (11-b) says that a Path is the result of the application of a Path function to a reference THING or Place.

The interaction of the two functions is illustrated for *into the house* in (12):

(12)   Spatial meaning of *into the house* according to Jackendoff:

        [$_{\text{PATH}}$ TO [$_{\text{PLACE}}$ IN [$_{\text{THING}}$ the house]]]

In (12), the Path function TO selects the Place function IN, which selects the THING *the house* in its turn.

According to Jackendoff (1983, 165) there are five categories of directionality, divided into three broad types. The first class of *bounded paths* includes source paths and goal paths, FROM and TO. In bounded paths,

the reference object or Place is the beginning or endpoint of the path. The paths in the second class of *directions* do not include the reference object or Place, but would do so if the path were extended by some unspecified distance. The members of this class are AWAY FROM and TOWARD. The third and final class of *routes* consists of one member only, VIA. The reference object or Place is related to some point in the interior of the path and nothing is specified about the endpoint of the motion.

Before proposing my reanalysis of directionality, I would like to adapt the terminology. Following Talmy, the reference object is called a *ground*. What is called a *Place function* by Jackendoff will be called a *configuration function*; the *Path function* will be called a *directionality function*. Thus, I free up the notions *Place* and *Path* for their use in my account as a directionality distinction and semantic prime respectively. (12) is now reformulated as follows:

(13)   Spatial meaning of *into the house*, new terminology:

$[_{directionality}$ TO $[_{configuration}$ IN $[_{ground}$ the house$]$ $]$ $]$

The configuration function describes the position of the figure with respect to the ground. The directionality function describes the way in which this configuration changes. This change can be described in spatial terms only, as a sequence of positions in space (e.g. Zwarts, 2008a), with reference to event time (e.g. Kracht, 2002), or by the spatial application of an abstract change feature (Fong, 1997). In the explanation of my proposal below I will assume a temporal analysis as I think it is closest to our intuitive spatial thinking.

Now for the more fundamental part of my revision. According to Jackendoff, the directionality function is either TO, FROM, VIA, TOWARD or AWAY-FROM. I propose that there are only three basic distinctions, namely Place, Source, and Goal. All the others are derivations. In the next section, I will first show how VIA, TOWARD, and AWAY-FROM can be derived from Source and Goal. This argument will be grounded in formal semantics. An important criterion for my semantic analysis is its intuitive plausibility. I will try to stay as close as possible to the intuitive reasoning or human conception that I think is at the basis of these concepts.[1] Spatial language does not follow the physical logic of the external world, but rather describes the human conception of spatial relations, which is partly channeled by language specific conventions in addition (see Svorou, 1993, 32). The intuition about directionality is that it concerns a change of relative

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[1]Note that this is the point of view of Krifka (1998) too.

position. By decomposing a directionality path into subpaths, this change can be made explicit. In our perception of the world, a change of place necessarily involves development in time. Therefore, the spatial subpaths are linked to a temporal path.

My analysis will predict the implicational hierarchy of directionality distinctions given in (14).

Implicational scale of directionality distinctions

(14)   Place $\succ$ Goal, Source $\succ$ VIA, TOWARD, UP.TO, ...

Goal and Source entail Place directionality. Spatial language is only expected to express the first two if there also is a semantic feature for Place. All other directionality distinctions are derived from Goal and Source. Therefore, special spatial markers for these meanings are only expected if Goal and Source are expressed first.

3.3.2   Via Krifka

In this section the basic meanings of directionality will be defined. It will be shown that TOWARD and AWAY-FROM are atelic variants of Goal and Source. The problem to be tackled (and the reason that formal semantics is needed) is that TOWARD and AWAY-FROM do not involve a transition, which is the defining property of Goal and Source in my proposal. I think the fact that meaning a can be derived from meaning b without having the defining property of b is best explained in formal terminology. It will also be shown that VIA is a derived notion. All definitions and examples in the first part of this section are from Krifka (1998).

The basic structures that we need for the study of directionality are *part structures*. Eventually, we want to say that different parts of a path have certain properties because of which we analyze the path as belonging to a specific directionality distinction. Krifka (1998) defines a part structure as follows:

(15)   P $= \langle U_P, \oplus_P, \leq_P, <_P, \otimes_P \rangle$ is a *part structure* iff

   a. U_P is a set of entities;

   b. $\oplus_P$, the *sum operation*, is a function from $U_P \times U_P$ to U_P that is idempotent, commutative, and associative, that is:
         $\forall x, y, z \in U_P [x \oplus_P x = x \land x \oplus_P y = y \oplus_P x \land x \oplus_P (y \oplus_P z) = (x \oplus_P y) \oplus_P z]$;

c. $\leq_P$ the *part relation*, defined as: $\forall x, y \in U_P[x \leq_P y \leftrightarrow x \oplus_P y = y]$;

d. $<_P$ the *proper part relation*, defined as: $\forall x, y \in U_P[x <_P y \leftrightarrow x \leq_P y \wedge x \neq y]$;

e. $\otimes_P$ the *overlap relation*, defined as: $\forall x, y \in U_P[x \otimes_P y \leftrightarrow \exists z \in U_P[z \leq_P x \wedge z \leq_P y]]$;

f. remainder principle: $\forall x, y \in U_P[x <_P y \rightarrow \exists! z[\neg[z \otimes_P x] \wedge x \oplus_P z = y]$

(15-b) says that the sum of a part and itself is identical to itself, and that it does not matter in which order you add two or more parts. The part relation says that the addition of any subpart of a part to this part leads to this same part. The proper part relation says that if some subpart is a proper part of a part, it cannot be identical to this part. The overlap relation says that two parts overlap if they share a common subpart. The remainder principle says that if some subpart is a proper part of a part, there should be exactly one other subpart of this part that does not overlap with the first.

Given a part structure P, we can define two types of predicates: *cumulative* and *quantized* predicates, defined in (16) and (17) respectively.

(16) $\forall X \subseteq U_P[CUM_P(X) \leftrightarrow \exists x, y[X(x) \wedge X(y) \wedge x \neq y] \wedge \forall x, y[X(x) \wedge X(y) \rightarrow X(x \oplus_P y)]]$

(17) $\forall X \subseteq U_P[QUA_P(X) \leftrightarrow \forall x, y[X(x) \wedge X(y) \rightarrow \neg y <_P x]]$

A cumulative predicate applies to at least two distinct elements, quantized predicates do not apply to their proper parts. For example, *apples* is cumulative: if x and y are (sets of) apples, then their sum is too. *Three apples* is quantized: it has no proper part that is also *three apples*. These two notions will be important in distinguishing between atelic TOWARD and telic Goal, and between atelic AWAY-FROM and telic Source. Eventually, the atelic variants will be shown to be cumulative, the telic basic meanings to be quantized.

A second relation that we need for our definition of directionality is being externally connected or *adjacent*.

(18) A $= \langle U_A, \oplus_A, \leq_A, <_A, \otimes_A, \infty_A, C_A \rangle$ is an *adjacency structure* iff

a. $\langle U_A, \oplus_A, \leq_A, <_A, \otimes_A \rangle$ is a *part structure*,

b. ∞_A, *adjacency*, is a two-place relation in U_A such that

(i) $\forall x, y \in U_A[x \infty_A y \rightarrow \neg x \otimes_A y]$

(ii) $\forall x, y, z \in U_A[x\infty_A y \wedge y \leq_A z \rightarrow x\infty_A z \vee x \otimes_A z]$

c. $C_A \subseteq U_A$, the set of *convex elements*, is the maximal set such that $\forall x, y, z \in C_A[y, z \leq_A x \wedge \neg y \otimes_A z \wedge \neg y\infty_A z \rightarrow \exists u \in C_A[u \leq_A x \wedge u\infty_A y \wedge u\infty_A z]]$

Adjacent elements do not overlap and if an element x is adjacent to an element y that is part of an element z, either x is also adjacent to z or x overlaps with z (18-b). The condition for convex elements says that all convex subparts y and z of a part x that do not overlap and are not adjacent are connected by a subpart u that is adjacent to both y and z.

Adjacency can be used to characterize the notion of *paths*, which is of great importance for our understanding of directionality. Paths are elements that are convex and linear, a notion that can be enforced by adjacency.

(19)   Path structures: $H = \langle U_H, \oplus_H, \leq_H, <_H, \otimes_H, \infty_H, C_H, P_H \rangle$, such that

a. $\langle U_H, \oplus_H, \leq_H, <_H, \otimes_H, C_H \rangle$ is an *adjacency structure*,

b. $P_H \subseteq C_H$ is the maximal set such that
$\forall x, y, z \in P_H[y, z \leq_H x \wedge \neg y \otimes_H z \wedge \neg y\infty_H z \rightarrow \exists! u \in P_H[u \leq_H x \wedge y\infty_H u\infty_H z]]$

c. $\forall x, y \in U_H[\neg x \otimes_H y \wedge \neg x\infty_H y \rightarrow \exists z \in P_H[x\infty_A z\infty_A y]]$

(19-b) says that two disjoint, non-adjacent parts of a path are always connected by exactly one subpath. (19-c) says that each two disjoint, non-adjacent elements are connected by a path. Thus, there is a path between any two locations.

Some paths are illustrated in Figure 3.2. For example, $a \oplus b \oplus c$ is a path, but $a \oplus c \oplus d$ is not, as a and c are not connected by a subpath. Also, $a \oplus b \oplus c \oplus h$ is not a path as it violates uniqueness (cf. (19-b)): both b and $b \oplus h$ connect between a and c.
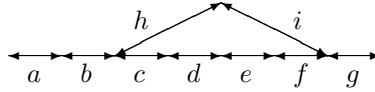
Figure 3.2: Path illustrations

Some paths are directed, meaning that their parts are not only adjacent but that there is a *precedence* relation in addition.

(20) $D = \langle U_D, \oplus_D, \leq_D, <_D, \otimes_D, \infty_D, P_D, C_D, \ll_D, D_D \rangle$ is a *directed path*

structure iff

a. $\langle U_D, \oplus_D, \leq_D, <_D, \otimes_D, P_D \rangle$ is a path structure;

b. $D_D \subseteq P_D$, the set of *direct paths*, is the maximal set, and $\ll_D$, *precedence*, is a two-place relation in D_D with the properties:

(i) $\forall x, y \in D_D [[\neg x \ll_D x] \wedge [x \ll_D y \rightarrow \neg y \ll_D x] \wedge [x \ll_D y \wedge y \ll_D z \rightarrow x \ll_D z]]$

(ii) $\forall x, y \in D_D [x \ll_D y \rightarrow \neg x \otimes_D y]$

(iii) $\forall x, y, z \in D_D [x, y \leq_D z \wedge \neg x \otimes_D y \rightarrow x \ll_D y \vee y \ll_D x]$

(iv) $\forall x, y \in D_D [x \ll_D y \rightarrow \exists z \in D_D [x, y \leq_D z]]$

The first property says that precedence is irreflexive, asymmetric, and transitive; the second says that precedence holds only for non-overlapping elements; the third says that whenever two subpaths of a directed path do not overlap, one must precede the other, and the fourth says that only parts of a directed path can stand in a precedence relation to each other.

A one-dimensional path structure is a structure for which any two paths are part of a path:

(21) A path structure H is *one-dimensional* iff $\forall x, y \in P_H \exists z \in P_H [x \leq_H z \wedge y \leq_H z]$

Many directed path structures are one-dimensional. In such structures, for each two convex, non-overlapping direct paths x, y it holds that either x precedes y, or y precedes x.

(22) A directed path structure V is *one-dimensional* iff $\forall x, y \in D_D [\neg x \otimes_D y \rightarrow x \ll_D y \vee y \ll_D x]$

Krifka further defines the domain of times and events, in which he derives the latter from the former (although in principle, this could just as well be done the other way around). Time can be seen as a one-dimensional directed path structure as illustrated in (23), in which "$\ll$" is interpreted as temporal precedence.

(23) A *time structure* T is a one-dimensional directed path structure $\langle U_T, \oplus_T, \leq_T, <_T, \otimes_T, \infty_T, P_T, C_T, \ll_T, D_T \rangle$

Events form a part structure and are subject to a temporal precedence relation.

(24) $E = \langle U_E, \oplus_E, \leq_E, <_E, \otimes_E, T_E, \tau_E, \infty_E, \ll_E, C_E \rangle$ is an *event structure* iff

a. $\langle U_E, \oplus_E, \leq_E, <_E, \otimes_E \rangle$ is a part structure,

b. T_E is a time structure $\langle U_T, \oplus_T, \leq_T, <_T, \otimes_T, \infty_T, P_T, C_T, D_T,$
$\ll_T \rangle$

c. τ_E, the *temporal trace function*, is a function from U_E to U_T,
∞_E, *temporal adjacency*, is a two-place relation in U_E,
$\ll_E$, *temporal precedence*, is a two-place relation in U_E,
C_E, the set of *temporally contiguous events*, is a subset of U_E
with the properties

(i) $\forall e, e' \in U_E[\tau_E(e \oplus_E e') = \tau_E(e) \oplus_T \tau_E(e')]$

(ii) $\forall e, e' \in U_E[e \infty_E e' \leftrightarrow \tau_E(e) \infty_T \tau_E(e')]$

(iii) $\forall e, e' \in U_E[e \ll_E e' \leftrightarrow \tau_E(e) \ll_T \tau_E(e')]$

(iv) $\forall e \in C_E[\tau_E(e) \in P_T]$

(v) U_E is the smallest set such that $C_E \subseteq U_E$ and for every
$e, e' \in U_E, e \oplus_E e' \in U_E$

The temporal trace function τ_E maps events to their run time. The first property says that the run time of the sum of two events is the sum of the run time of each event; the second and third property define temporal adjacency and precedence for events in relation to the corresponding run times; the fourth property says that temporally contiguous events are events with a contiguous run time, and the final property says that the set of all events is the closure of the contiguous events under sum formation.

Krifka defines the notion of a *telic predicate* by referring to the *initial* and *final* parts of an event. An event e' is an initial part of e if it is not preceded by any part of e, and is a final part if it is not followed by any part of e.

(25)   a. $\forall e, e' \in U_E[INI_E(e', e) \leftrightarrow e' \leq_E e \wedge \neg \exists e'' \in U_E[e'' \leq_E e \wedge e'' \ll_E e']]$

   b. $\forall e, e' \in U_E[FIN_E(e', e) \leftrightarrow e' \leq_E e \wedge \neg \exists e'' \in U_E[e'' \leq_E e \wedge e' \ll_E e'']]$

If a telic predicate applies to an event e, then it does not apply to a part of e that begins or ends at a different time. Alternatively, we can say that telicity is the property of an event predicate X that applies to events e such that all parts of e that fall under X are initial and final parts of e.

(26) $\forall X \subseteq U_E[TEL_E(X) \leftrightarrow \forall e, e' \in U_E[X(e) \wedge X(e') \wedge e' \leq_E e \rightarrow INI_E(e', e) \wedge FIN_E(e', e)]]$

At this point my account diverges from Krifka. Krifka uses event struc-

tures to describe directionality, whereas I will directly relate time to paths instead. Also, Krifka's characterization of telicity is too restrictive for my spatial purposes, as in this domain *either* the starting point *or* the endpoint is relevant, but not both. I propose a directed path structure for *directionality*, very similar to the event domain just described, only the subscripts differ.

(27)   dir $= \langle U_{dir}, \oplus_{dir}, \leq_{dir}, <_{dir}, \otimes_{dir}, T_{dir}, \tau_{dir}, \infty_{dir}, \ll_{dir}, C_{dir}, D_{dir} \rangle$
       is a *directionality structure* iff

   a. $\langle U_{dir}, \oplus_{dir}, \leq_{dir}, <_{dir}, \otimes_{dir}, C_{dir} \rangle$ is a directed path structure,
   b. T_{dir} is a time structure $\langle U_T, \oplus_T, \leq_T, <_T, \otimes_T, \infty_T, P_T, C_T, D_T, \ll_T \rangle$
   c. τ_{dir}, the *temporal trace function*, is a function from D_{dir} to U_T,
        ∞_{dir}, *temporal adjacency*, is a two-place relation in D_{dir},
        $\ll_{dir}$, *temporal precedence*, is a two-place relation in D_{dir},
        C_{dir}, the set of *temporally contiguous paths*, is a subset of D_{dir}
        with the properties
        (i) $\forall x, y \in D_{dir} [\tau_{dir}(x \oplus_{dir} y) = \tau_{dir}(x) \oplus_T \tau_{dir}(y)]$
        (ii) $\forall x, y \in D_{dir} [x \infty_{dir} y \leftrightarrow \tau_{dir}(x) \infty_T \tau_{dir}(y)]$
        (iii) $\forall x, y \in D_{dir} [x \ll_{dir} y \leftrightarrow \tau_{dir}(x) \ll_T \tau_{dir}(y)]$
        (iv) $\forall x \in C_{dir} [\tau_{dir}(x) \in P_T]$
        (v) U_{dir} is the smallest set such that $C_{dir} \subseteq U_{dir}$ and for
               every $x, y \in U_{dir}, x \oplus_{dir} y \in U_E$

The temporal trace function τ_{dir} maps directed paths to a temporal dimension. Thus, in the directionality domain, a path is no longer an atemporal notion. The first property says that the time corresponding to the sum of two paths is the sum of the times corresponding to each path; the second and third property define temporal adjacency and precedence for paths in relation to the corresponding run times. If two paths are adjacent, their run times are too, and if one path precedes the other, the run time of this first path precedes the run time of the second. The fourth property says that contiguous directed paths are paths with a contiguous run time. That is, the movement from one place to another necessarily involves development in time. The fifth property, finally, says that the set of all paths in a directionality structure is the closure of the contiguous paths under sum formation.

Maybe in this way the relation between the temporal and directed domain is put too strong , as I only wish to capture the intuition that a change

in place necessarily involves a change in time. For example, if Joost and Tineke make a walk of 80 km from Hoek van Holland to Leerdam, spread over several weekends, they could choose to first walk from Hoek van Holland to Rotterdam, then from Ablasserdam to Leerdam, and only in the last weekend from Rotterdam to Ablasserdam. The sum of the different directed paths makes a contiguous *from Hoek van Holland to Leerdam* path, but the sum of their corresponding time paths does not.

Before I define the different directionality distinctions, consider Figure 3.3 in which different directionality meanings are schematically illustrated. The development in time is (redundantly, as directionality paths themselves already have a temporal component) represented with the dashed vector at the top. The circles in the middle represent a region at which a configuration with respect to some ground holds. This can be any configuration with respect to any ground ('under the table', 'above my head', 'between the two houses', etc.) but for the sake of concreteness, let us say that one is 'inside the house' here. The first path *a* does not enter or leave this configuration. Path *a* may be a minimal element in the absence of motion or a path that stays within some configuration. In our example, the difference between the two options would be between *sitting in the house* and *walking around in the house*. In both cases, all subpaths of Path *a* are within the specified configuration. Path *b* has its endpoint in the house, Path *d* has its starting point in there. The other paths could be seen as variants of these two. Path f is the sum of Path b and d; Path c would be like Path b if we were to lengthen it, and Path e would be like Path d if we were to extrapolate its starting point. With respect to the specified configuration, we say that Path a is a Place; Path b is a Goal; Path d is a Source; Path f is VIA; Path c is TOWARD, and Path e is AWAY FROM.

We can use almost the same definitions for initial and final subpaths as the ones Krifka used for events, changing only the subscripts and type of arguments:

(28)   a. $\forall x,y \in D_{dir}[INI_{dir}(y,x) \leftrightarrow y \leq_{dir} x \wedge \neg \exists z \in D_{dir}[z \leq_{dir} x \wedge z \ll_{dir} y]]$

        b. $\forall x,y \in D_{dir}[FIN_{dir}(y,x) \leftrightarrow y \leq_{dir} x \wedge \neg \exists z \in D_{dir}[z \leq_{dir} x \wedge y \ll_{dir} z]]$

(28-a) says that a subpath y is the initial subpath of x if there is no other subpath z of x that precedes y. Similarly, (28-b) says that a subpath y is the final subpath of x if there is no other subpath z of x that y precedes.

Now, we can define the different directionality distinctions with respect
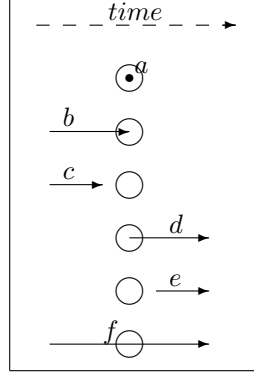
Figure 3.3: Directionality distinctions

to some subpath for which a given configuration holds. I simply assume a set of spatial relationships U_{config}. The exact structure of this domain need not concern us here, since I am trying to abstract away from specific configuration contrasts (but see Zwarts, 1997; Zwarts & Winter, 2000, for such an analysis). In this set, there is a configuration c that denotes a region with respect to ground $x : config(x, c)$ (cf. the place function of Jackendoff, 1983, discussed in Section 3.3.1). In the definitions below, $config(x, c)$ could denote any region with respect to ground x, for example IN, ON, UNDER, etc. To stick to our example, let us say that c refers to the region that is described by English *in* and our ground is *the house*.

As the discussion of Figure 3.3 above already meant to illustrate, in my analysis only Place, Source, and Goal are basic distinctions of directionality, the others are derived. The basic meanings of directionality can be defined formally as follows:

(29)   Basic distinctions of directionality

      a. $Place_c$: $\forall x \in D_{dir}[Place_c(x) \leftrightarrow \exists c \in U_{config} \forall y \in D_{dir}[y \leq_{dir} x \rightarrow config(y, c)]]$

      b. $Source_c$: $\forall x \in D_{dir}[Source_c(x) \leftrightarrow \exists c \in U_{config} \exists y, z \in D_{dir}[y \oplus_{dir} z = x \wedge INI_{dir}(y, x) \wedge Place_c(y) \wedge \neg Place_c(z)]]$

      c. $Goal_c$: $\forall x \in D_{dir}[Goal_c(x) \leftrightarrow \exists c \in U_{config} \exists y, z \in D_{dir}[y \oplus_{dir} z = x \wedge FIN_{dir}(y, x) \wedge Place_c(y) \wedge \neg Place_c(z)]]$

First note the subscript at the different meanings. A directionality distinc-

tion is always relative to a configuration. If we imagine a bird flying from a tree into a house, the same path could be described as a Source path for config(tree, AT) and as a Goal path with respect to config(house, IN).

According to the definition in (29-a), a path is a Place with respect to configuration c if this configuration holds for all of its subpaths. As before, this may be true in the absence of motion, if the path has no proper parts; in the absence of development in time, or when all subpaths of a path are within a given configuration.

A Source consists of two subpaths, of which only the initial path is in the specified configuration; a Goal is the opposite of a Source, cf. (29-b,c). Note that the definitions of Goal and Source both include the notion of Place. That is, Goal and Source imply Place. Without a Place to go to, you do not have a Goal.

In our example, *sitting in the house* and *walking around in the house* both are Places with respect to config(house, in). *Walking out of the house* necessarily involves a path with an initial subpath inside of the house and an endpoint in the complementary configuration outside of it, *walking into the house* is the opposite.

Let us now turn to the derived meanings. Crucially, derived meanings of directionality include the basic distinctions with some additional requirements:

(30)   Derived distinctions of directionality
    a.   AWAY FROM$_c$: $\forall x \in D_{dir}[\text{AWAY FROM}_c(x) \leftrightarrow \exists c \in U_{config} \wedge$
          $\exists y \in D_{dir}[y \ll_{dir} x \wedge Source_c(y) \wedge Source_c(x \oplus_{dir} y)]]$
    b.   TOWARD$_c$: $\forall x \in D_{dir}[\text{TOWARD}_c(x) \leftrightarrow \exists c \in U_{config} \wedge \exists y[x \ll_{dir}$
          $y \wedge Goal_c(y) \wedge x \oplus_{dir} y \in D_{dir} \wedge Goal_c(x \oplus_{dir} y)]]$
    c.   VIA$_c$: $\forall x \in D_{dir}[\text{VIA}_c(x) \leftrightarrow \exists c \in U_{config} \wedge \forall y, z \in D_{dir}[y, z \leq_{dir}$
          $x \wedge y \ll_{dir} z \wedge Goal_c(y) \wedge Source_c(z)]]$

AWAY FROM is a path that can combine with a Source to become a Source and the same applies to TOWARD. VIA is the combination of Goal and Source. Further note that AWAY FROM and TOWARD are cumulative, Source and Goal are quantized (cf. (16) and (17)). The combination of two AWAY FROM paths makes another AWAY FROM path but a Goal necessarily includes an endpoint at some configuration. Thus, AWAY FROM and TOWARD are the atelic variants of Source and Goal.

The fact that Source and Goal imply Place and that all other directionality distinctions are derived from these three basic meanings creates a number of predictions, which will be tested in Section 3.4. For example,

it predicts an implicational hierarchy of directionality distinctions that are cross-linguistically made with spatial cases. An AWAY-FROM case is only expected if a Source distinction is made first and the same goes for TO-WARD and Goal. As will be shown below, this and other predictions are borne out.

My analysis differs from the one proposed by Zwarts (2008a). Zwarts formally defines a path as a continuous function p from the real interval [0,1] to a domain S of places. A path has a starting point p(0) and an endpoint p(1) and for every $i \in [0,1]$, p(i) is an intermediary point of the path. In contrast to what I propose, directionality is an atemporal notion in this account. As a result, Zwarts (2008a) distinguishes four fundamental directionality types: *Transitions, Cycles, Progressions,* and *Continuations.* Transitions involve paths that go from one spatial domain to a different, complementary domain. The difference between Transitions (Jackendoff's bounded paths) and Progressions (Jackendoff's directions) is that only the latter are adjacent and cumulative. In Zwarts' analysis, two paths are adjacent ("connect") if one starts where the other ends, i.e. p(1)=q(0). A set of paths X is connected iff there are p $\in$ X with a connecting q $\in$ X. A set of paths X is non-connected iff there are no p $\in$ X with a connecting q $\in$ X. A connected set of paths X is cumulative iff for all p, q $\in$ X, if p+q exists, then p+q $\in$ X. Since Transitions are defined as having either a starting or end point in a different spatial region, they are necessarily non-connected. Progressions like *toward*, on the contrary, are connected and cumulative. You can add another four steps toward the house to four steps toward the house and still go toward the house (cumulativity) and therefore divide eight steps toward the house in two times four steps toward the house (connectivity).

Cycles and Continuations are different from Transitions and Progressions in that they are *reversible.* The path operation of *reversal* is defined as follows: the reversal of p is the path which assigns to every $i \in [0,1]$ the position that p assigns to $1 - i$. A set of paths X is reversible if and only if for every p, if p $\in$ X then the reversal of p $\in$ X. For example, Jackendoff's VIA is reversible (both 'jumping over the fence from left to right' and 'from right to left' are VIA), but the reversal of TO is FROM. Since my analysis of directionality is temporal and therefore directed, reversal is simply impossible. What Zwarts (2008a) analyzes as Cycles and Continuations are Places or combinations of Sources and Goals in my account. In the first case, the change of place does not result in a change of configuration, in the second they are not basic types.

In this section, I have defined directionality in formal semantics. By

defining directionality in terms of the development of paths in time, I arrive at three basic distinctions of directionality: Place, Source, and Goal. These basic meanings are defined on the basis of a subpath at which some configuration holds. If some configuration c is true for all subpaths of a path, we are dealing with Place directionality. If it is true for a final subpath but not for all earlier subpaths, we are dealing with Goal directionality. Finally, if a configuration is true for a first subpath but not for all later ones, we are dealing with Source directionality. I have shown that all other directionality options are derived from these three basic distinctions.

The advantage of my analysis is that it reduces the number of basic directionality distinctions. As I will show below, it correctly predicts an implicational scale of directionality distinctions made by spatial case. This is in direct opposition to the analyses of Jackendoff (1983, 1990) and Zwarts (2008a), which actually wrongly attribute an equal status to directionality distinctions that differ in markedness.

3.3.3 To a New Analysis of Directionality

With the help of formal semantics the previous section showed that the difference between Jackendoff's TO and TOWARD and between his FROM and AWAY-FROM is aspectual. In my analysis TOWARD and AWAY-FROM are atelic modifications of the TO and FROM function. In this section, I will reformulate my proposal in more accessible terminology, adapting the path analysis of Zwarts (2008a, which was discussed more elaborately in the previous section).

Whereas directionality is an atemporal notion for Zwarts, I add a temporal dimension to it. Motion is a change of location over time of a figure with respect to some ground. The figure follows a path, defined as a continuous function p from the real interval [0,1] to a domain S of places and to a corresponding domain T of time. Each place is linked to one or more points in time, but different places are always related to different points in time. Just like in Zwarts (2008a), a path has a starting point p(0) and an endpoint p(1) and for every $i \in$ [0,1], p(i) is an intermediary point of the path. Also following Zwarts, two paths are adjacent ("connect") if one starts where the other ends, i.e. p(1)=q(0). A set of paths X is connected iff there are p $\in$ X with a connecting q $\in$ X. A set of paths X is non-connected iff there are no p $\in$ X with a connecting q $\in$ X. A connected set of paths X is cumulative iff for all p, q $\in$ X, if p+q exists, then p+q $\in$ X. At some point, the path is in the region that is described by a configuration c of our interest. There are really only two things that can happen now. Either
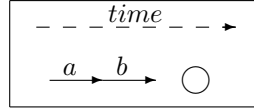
Figure 3.4: Connecting two TOWARD paths

the path stays within the region specified by some relevant configuration (Place$_c$) at all times or it does not. Within the latter option, the path can be in the region at p(0) and leave it at a later point in time (Source$_c$), or it can start outside of the region and end up in it (Goal$_c$).

Other directionality meanings can be shown to be variants of this basic set. First, a VIA$_c$ path is a combination of Goal and Source (and hence derived). For example, if you *walk through the forest in an hour* you first enter the forest and then leave it. It can also refer to motion within some configuration, which I analyze as *Place*. If you *walk through the forest for an hour* you were in the forest all the time. An AWAY-FROM$_c$ path is a path that would be a Source$_c$ path if we extrapolated its starting point to our region of interest. That is, if we connect it with a Source$_c$ path. The same goes for TOWARD$_c$. A TOWARD$_c$ path is a path that would be a Goal$_c$ path if we lengthened it to the region described by configuration c, i.e. connect it with a Goal$_c$ path. As is the case with AWAY-FROM$_c$, the combination of two TOWARD$_c$ paths makes another TOWARD$_c$ path, as illustrated for TOWARD$_c$ paths a and b in Figure 3.4. Thus, TOWARD$_c$ and AWAY-FROM$_c$ are cumulative, making them atelic. Goal$_c$ and Source$_c$ on the other hand are non-cumulative and telic, they necessarily include a transition.

If we allow only basic notions as directionality distinctions, only two of Jackendoff's original directionality classes remain, *viz.* TO and FROM, or, in my terminology: Goal and Source. To this set we need to add Place, that is, the absence of a change in configuration. In the previous section, I have argued that Place is the logical third (first, actually, as it is the most basic one) option if we consider directionality as the development of paths in time. In this analysis, I defined directionality distinctions in terms of configuration, thereby simply assuming that spatial meaning always consists of both a directionality and a configuration dimension. However, this assumption can be founded with evidence from spatial case inventories. First, however, I should mention that I am not the only one and certainly not the first to posit that all spatial meaning is decomposed into a directionality

and a configuration function. Kracht (2002, 2003, 2008) proposes that the absence of motion is really a directionality distinction, and not evidence for the absence of such a function. Note that the view of spatial meaning as necessarily consisting of these two dimensions is another crucial difference between Jackendoff's account and my proposal.

Consider the following examples of spatial case in Hungarian:

Hungarian

(31) a. *A   könyv-et   az asztal-ra   tesz-em.*
          the book-ACC the table-SUPERL put-1SG.DEF
          'I put the book on the table.'
      b. *A   könyv   az asztal-on   van.*
          the book-ACC the table-SUPER is-3SG
          'The book is on the table.'
      c. *A   könyv   elhagy az asztal-ról.*
          the book-ACC fell-3SG the table-SUPEREL
          'The book fell from the table.'
      d. *Az asztal-ig   megy-ek.*
          the table-TERM go-1SG.INDEF
          'I walk up to the table.'

In (31-a), there is a change of configuration from the book not being on the table to it being on it; in (31-b) there is no change of configuration; in (31-c) there is a change from the book being on the table to it not being on the table anymore, and in (31-d) finally, there is motion toward the table.

The spatial cases in (31) constitute the first row of the Hungarian spatial case paradigm given in Table 3.1. There are a few things to note in this spatial case paradigm. First, the different variants for each case are driven by vowel assimilation and therefore phonologically predictable. Next, there is no configuration distinction for TOWARD. The same marker -*ig* is used for each configuration distinction. The motivation for this absence is probably that the exact configuration does not matter for this meaning of directionality since the figure does not end up there any way. But most importantly, the different case markers are decomposable to some extent into their configuration and directionality dimension. The IN cases start with -*b*, the ON cases start with -*r*, the Place cases end with -*n*, and the Source cases end with -*l*. Thus, the morphological makeup of the spatial case system seems to reflect the semantic analysis of spatial meaning in (34). More specifically, the case paradigm supports the idea of analyzing Place as an independent directionality distinction. The configuration is expressed by the

first part of a complex morpheme that results from the combination with the part expressing directionality. In this decomposition, Place is added as a directionality distinction instead of being an underspecified configuration meaning. The same holds for the spatial case inventory of Finnish, which will be discussed in Section 3.4.5.

Configuration	Directionality Place	Source	Goal	TOWARD
ON	superessive *-on/-en/-ön/-n*	delative *-ról/-ről*	sublative *-ra/-re*	terminative -ig
AT	adessive *-nál/-nél*	ablative *-tól/-től*	allative *-hoz/-hez/-höz*	terminative -ig
IN	inessive *-ban/-ben*	elative *-ból/-ből*	illative *-ba/-be*	terminative -ig

Table 3.1: Hungarian spatial case paradigm

Also, as Creissels (2009a, 5) shows, Northern Akhvakh has an independent Place marker on top of the configuration markers. As is the case with Hungarian, the spatial markers can be decomposed into a configuration and directionality marker. As illustrated in Table 3.2, the marker for Place *-e/-i* is put on top of the set of configuration markers. For example, the Place marker *-i* is added to the configuration *-ƛ'* 'under' to express 'under'; if the Source marker *-a(je)* is added to this configuration instead, we get 'from under'.

Thus these spatial case paradigms support the analysis of spatial meaning as consisting of two dimensions in which the absence of a change of configuration is a directionality distinction proper.

Using yet another, more informal way of putting it, if spatial meaning is decomposed into a directionality and a configuration function, the three basic distinctions of directionality logically follow from the presence or absence of a change in configuration. If nothing changes, we are dealing with Place directionality. If there is a change, the directionality depends on its type. There can be a positive change in which some figure goes from '*not* being in the configuration specified by a spatial construction' to 'being there' ($\sim$P|P); or there can be a negative one, from 'being in a configuration specified by a spatial construction' to '*not* being there' (P|$\sim$P). Note that, just like in the formal definitions in the previous section, Goal and Source include the notion of Place.

Configuration	Directionality		
	Place	Source	Goal
default (OR1)	*-g-e*	*-g-a(je)*	*-g-u(ne)*
in the vicinity of (OR2)	*-χar-i*	*-l̄ir-a(je)*	*-χar-u(ne)*
(OR3) a. in a relatively narrow space b. distributed or diffuzed localization	*-q̄-e*	*-q̄-a(je)*	*-q̄-u(ne)*
under (OR4)	*-l̄'-i*	*-l̄'-a(je)*	*-l̄'-u(ne)*
(OR5) a. in a filled, dense space b. on a non-horizontal surface	*-l̄-i*	*-l̄-a(je)*	*-l̄-u(ne)*

Table 3.2: Northern Akhvakh spatial case paradigm

Fong (1997) uses the same transition features in her analysis of Finnish directional expressions. She analyzes directional expressions as ordered structures that are interpretable in any domain that is diphasic. Only in spatial domains, directional expressions denote a change in place. In other words, the spatial interpretation follows from *co-compositionality* (Pustejovsky, 1995): An underspecified semantic form becomes contextually enriched by its composition. Following Löbner (1989, cited in Fong, 1997, 29), the notion of *admissible phase-interval* is formulated as an interval that starts with a phase that is not-*p* and is followed by a phase that is (and stays) *p*. More formally, it starts with times t for which $p(t) = 0$, it extends to later times t' with $p(t') = 1$, and there is no later time t'' with $p(t'') = 0$ again. The strict development from $\sim p$ to p is given up in Fong (1997), also allowing for changes from p to non-*p*. The crucial point remains the monotonicity of a change (cf. also Zwarts, 2005b, for a similar analysis of directional aspect).

Thus, Fong (1997) can account for the use of directional expressions in examples like (32) and (33), in which there is no change of place.

Finnish (Fong, 1997, 17, 12)

(32)   a.   *Tuovi unoht-i   kirja-n   auto-on.*
           Tuovi forget-3.PAST book-ACC car-ILL
           'Tuovi forgot a/the book in (lit.'into') a/the car.'
   b.   *Tuovi löys-i   kirja-n   laatiko-sta.*
           Tuovi found-3.PAST book-ACC box-ELA

'Tuovi found a/the book in (lit.'from') a/the box.'

(33)   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'

In (32), the position of the book does not change, instead, the verbs entail a posterior or anterior state. In (33), only the orientation of the bridge is specified, not a real change of place.

The overall semantic analysis of the various uses of directional expressions may be best captured in terms of abstract admissible phase intervals, as Fong (1997) proposes. For me, however, directionality is spatial and concerns a change in place over time. Uses like the above are metaphorically or metonymically derived in my view, i.e., the results of *type coercion* (see Pustejovsky, 1995). In other words, the unified account of the basic and derived uses of spatial language is necessarily abstract, but I focus on the spatial use only.

In sum, the assumption that spatial meaning consists of a directionality and configuration dimension and the view of directionality in terms of a change of configuration over time gives us three basic distinctions of directionality. Other meanings can be shown to be derived from these three. Place directionality is the absence of a change in configuration; Goal directionality is a change into some configuration, and Source directionality is a change out of some configuration. Thus, Goal and Source imply Place (cf. also the formal definitions in the previous section), which will be important for their morphological decomposition in the next section. The different meanings are characterized in Table 3.3.

Directionality distinction	Characterization
Place	P
Source	P$\mid\sim$P
Goal	$\sim$P$\mid$P

Table 3.3: The basic distinctions of directionality

Spatial meaning in my analysis always consists of a directionality function of one of these three basic types that is applied to a language particular

configuration function from a much bigger set that is again applied to a ground, as illustrated in (34).

(34) $[_{directionality}$ {Place, Goal, Source} $[_{configuration}$ {. . . } $[_{ground}$ Thing]]]

In principle, analyzing Place as a directionality distinction is only a minor modification that is still in the spirit of the analysis of Jackendoff. However, it has far-reaching consequences. It entails that the meanings of directionality no longer have to be stipulated but follow from a general phenomenon, namely a change of state. As a result, it predicts a certain ordering of the directionality domain as will be shown in the next section. Place and Goal are similar in that they do not express a negative change, Place and Source are the same in that they do not express a positive change. Goal and Source are only the same if we completely neglect a change in configuration. That is, they can only be encoded by the same marker if Place is encoded by the same marker too.

Also, my analysis predicts an implicational hierarchy of directionality meanings, repeated in (35).

Implicational scale of directionality distinctions
(35)   Place $\succ$ Goal, Source $\succ$ VIA, TOWARD, UP.TO, . . .

According to this hierarchy, spatial case inventories of languages are only expected to express directionality distinctions higher on this scale if they also have forms for more basic meanings.

Moreover, the small set of basic distinctions of directionality is completely different from what we find in the configuration domain. As discussed in the previous section, there is no such basic set for the configuration function, as evidenced by the enormous variation among configurational systems of languages. This is an extremely important semantic difference between the two domains, on the basis of which a number of differences can be predicted. These predictions will be discussed in the following sections.

3.4   Testing Some Hypotheses

3.4.1   The Semantic Map of Directionality

This section is concerned with syncretisms between directionality distinctions.

Languages may choose whether they specify directionality locally, that is, in the spatial construction proper, or have it determined by the context. For example, Nikitina (2008) shows that in English *in* can be used instead of *into* when Goal meaning can be inferred from the context. This inference is facilitated by transition verbs (e.g. *get, bring, put*), directional modifiers (e.g. *up, back, out*), and "container" grounds (i.e., grounds that have a clear boundary, as for example rooms, but not forests). In the next example it is not necessary to encode directionality in the preposition as it becomes sufficiently clear from the context:

(36)   *Put the bunny back into/in the box.*

Since other cues help determine the exact directionality function already, it is possible to use the more economical form *in* instead of *into* to express Goal directionality. This is not possible for Source directionality:

(37)   *Take the bunny out of/*in the box again.*

Apparently, English allows the use of the same form for Place and Goal meaning, but not for Source.

Syncretisms between directionality distinctions are not uncommon cross-linguistically. For economy reasons, languages may choose to cover two or more directionality functions with the same form, having them disambiguated by context (see Sinha & Kuteva, 1995). My analysis of directionality in terms of a change of configuration over time restricts the number of possibilities for such syncretisms. As can be seen in Table 3.3, Source and Place are the same if we neglect the state of affairs after the change, whereas Goal and Place are the same if we neglect the previous state of affairs. It is important to see that, Goal and Source are only the same if we completely neglect change altogether. That is, they are only expected to be expressed by the same marker if it also expresses Place. Note that there is one way in which the two can be the same to the exclusion of Place. This option involves neglecting the directionality of change. Unexpected as this option may be given the inherent directionality of time (in my analysis), there are a few languages that actually do this, as I will show below.

On the basis of cross-linguistic data on syncretisms in the directionality domain, Nikitina (2009) establishes the following semantic map for the three basic directionality functions.

(38)   *Semantic map of directionality (Nikitina, 2009)*
         Goal – Place – Source

The most common syncretism is between Goal and Place directionality, and is illustrated for Alamblak in (39).

Alamblak (Bruce, 1984, 198, 201)

(39)   a.   *Fiñji tëhrmëm   bus-kor-t.*
            NEG   they.did.not.stand. forest-AD-3SG.FEM
            'They did not live in the forest.'

       b.   *Womr   brhiha-kor fakrmemër.*
            another outside-AD ran.in.fear.he
            'The other ran away in fear outside.'

       c.   *ɨnd-ëmbha-r-pnë   mithonalgetanëm.*
            DEM-place-3SG.MASC-REF floated.down.all.the.way.we
            'From there we floated down all the way.'

In (39-a) and (39-b), the adessive case marker *-kor* is used for Goal and Place meaning. For source meaning in (39-c), the referent case *-pnë* is used.

An example of a language that exhibits a syncretism between Source and Place is the East Sakhalin dialect of Nivkh in (40).

East Sakhalin Nivkh (Gruzdeva, 1998, 20-21)

(40)   a.   *T'ivlaṇ čaɣ-ux   ṇat'x-∅   vezla-d.*
            cold   water-ABL foot-NOM cramp-FIN
            'I have cramp in my foot in the cold water.'

       b.   *Umgu-∅   n'o-x   p'u-d'.*
            woman-NOM barn-ABL come.out-FIN
            'A woman came out from the barn.'

       c.   *Ty   t'ulf-∅   Muzgun-χan   miřn-∅   wo-roχ*
            this winter-NOM Muzgun-NONEVID we-NOM village-DAT
            laɣ-iny-vur   it-nt.
            visit-MOD-CONV:REP say-FIN
            'They say that, this winter, Muzgun is going to visit our village.'

In (40-a) and (40-b), the same ablative case marker is used for Source and Place meaning, whereas the dative case is used for Goal meaning in (40-c).

An example of a language that does not make a directionality distinction whatsoever is Wan, illustrated in (41). The actual directionality meaning is inferred from pragmatics or context:

WAN (Nikitina, 2009)

(41) a. $\grave{A}$ $y\bar{\imath}$ $k\bar{a}l\acute{e}$ $g\acute{o}$.
3PL sleep forest IN
'They fell asleep in the forest.'

b. $\grave{A}$ $g\bar{a}$ $k\bar{a}l\acute{e}$ $g\acute{o}$.
3PL go forest IN
'They went to the forest.'

c. $\grave{A}$ $g\bar{o}$ $k\bar{a}l\acute{e}$ $g\acute{o}$.
3PL left forest IN
'They left the forest.'

Depending on the context, the preposition *gó* IN can mean 'in' (41-a), 'into' (41-b), and 'out of' (41-c) without any explicit local coding.

According to Nikitina (2009), if a language covers two functions with the same form to the exclusion of the third function, this form will always cover a contiguous region on this map, i.e. taking together Goal and Place, or Place and Source, but never Goal and Source without Place (cf. also Creissels, 2006a). My analysis of directionality correctly predicts the map that follows from these observations. Source and Place are the same if we only consider the previous state of affairs. Something may or may not be in some configuration at some point in time, if it was previously, it can either be a Place or a Source but not a Goal. Similarly for the syncretism between Goal and Place: If we only consider the subsequent state of affairs, something may or may not have been in some configuration at some point in time. If it is at a later point, it can either be a Place or a Goal but not a Source. If we neglect the temporal development all together, all directionality distinctions are the same. At some point, something is in a region described by some configuration.

Unfortunately, the semantic map of directionality in (38) gives too simple a picture of the actual syncretism patterns in the directionality domain as it neglects the frequency with which the different syncretisms occur (a general shortcoming of standard semantic maps). Logically, there are five possibilities of syncretism given the three directionality distinctions (42), of which only one pattern is excluded and all others are treated equally in the semantic map of Nikitina. But in fact, the three different types of syncretism Nikitina describes are by no means equally often attested.

(42) a. No syncretism: Place $\neq$ Goal $\neq$ Source
b. Syncretism of Place and Goal: Place = Goal $\neq$ Source
c. Syncretism of Place and Source: Place = Source $\neq$ Goal

      d.   Syncretism of Source and Goal: Source = Goal ≠ Place
      e.   Syncretism of Place, Source, and Goal: Place = Goal = Source

There are a number of studies that look at the cross-linguistic occurrence of these syncretism patterns. Blake (1977, Appendix A3) studies spatial case syncretisms in a sample of Australian languages. Of the 83 languages that use case to express all basic directionality distinctions, 9 exhibit a syncretism between Goal and Place, other options are not attested. Noonan (2008) looks at syncretism patterns in 76 Tibeto-Burman languages. He finds 46 instances of syncretism between Goal and Place. Source and Place occur together only five times, Goal and Source four times. Most of these instances are part of a larger syncretism pattern also subsuming for example dative case functions. If we consider combinations of spatial functions only, the number of syncretisms of Goal and Place is 20. For each of the syncretisms between Source, Place, and Goal, between Source and Place, and between Goal and Source the number is one. Pantcheva (2010) studies the grammars of 53 languages from 22 genera (representing 14 language families) and two language isolates. She finds 18 syncretisms between Place and Goal and 7 between Place, Goal, and Source. In my typological sample of 23 unrelated languages, to be discussed in the next section, there are three instances of Goal-Place syncretism, two overall syncretisms, and one instance of a syncretism between Place and Source (the aforementioned Nivkh). Overall then, the syncretism between Goal and Place seems to be much more common than the one between Source and Place. Whereas such frequency differences are not represented in standard semantic maps, it is possible to do so by multidimensional scaling analyses (MDS). In MDS plots, syncretism frequencies are translated into plotting distances. Thus, in the MDS version of Nikitina's map, Goal and Place would be plotted close to each other whereas the distance between Source and Place would be much larger.

The difference in frequency between the different syncretism options, most notably the infrequence of the syncretism between Source and Place is hard to explain if directionality is just the application of a path function, i.e. Goal or Source, to a place function, as proposed by Jackendoff (1983, cf. Section 3.3.1). Pantcheva (2010) explains the absence of the syncretism between Source and Place in her sample by proposing a different decomposition of spatial meaning. She argues that a Source function is built on top of a Goal function that takes a Place function on its turn, as illustrated in (43).

(43)   The decomposition of directionality according to Pantcheva (2010):
         [Source [Goal [Place]]]

The function of Source in this proposal is to reverse the orientation
of the phase transition that Goal expresses. As explained in the previous
two sections, Goal directionality concerns a change from not being in some
configuration to being in this configuration. Source, according to Pantcheva,
is like a negation function. Applying Source to Goal says that the change is
from (not not) being in some configuration to not being in this configuration.

Pantcheva uses evidence from morphological decomposition for her pro-
posal. This is a method that was also used in the discussion of the Hungar-
ian and Northern Akhvakh case paradigms above. Consider the following
example:

Estonian (Pantcheva, 2010)

(44)   a.   *jala-l-t*
               foot-ON-Source
               'off the foot'
         b.   *jala-l-le*
               foot-ON-Goal
               'onto the foot'

In (44) the directionality distinctions Source and Goal are morphologically
built on top of a configuration function ON. Thus, in Estonian, the syntactic
and semantic function application of directionality to configuration is mor-
phologically transparent. By the same argumentation, in some languages,
Source can be shown to be built upon Goal. Consider the following example:

Quechua (Pantcheva, 2010)

(45)   a.   *Kay n^v an-ga   ayakučo-man   rin-n.*
               this road-TOP Ayacucho-ALL go-3SG
               'This road goes to Ayacucho.'
         b.   *May-manta-s   chay runa ka-n-man?*
               Where-ABL-REP this man be-3SG-COND
               'Where could this man be from?'

In this Quechua example, the Goal marker lexicalizes both the Goal and
Place function. The Goal marker is the simple morpheme *-man*. The Source
marker is morphologically complex, adding the morpheme *-ta* to the Goal
morpheme. In her sample of 55 languages there are five in which the Source

marker morphologically contains the Goal marker in such a way. Unfortunately, the only example Pantcheva gives of a language that spells out all directionality ingredients separately does not seem to be correct. According to Pantcheva (2010), the expression of directionality in Hua can be decomposed as follows:

Hua (Pantcheva, 2010)
(46) a. Source: $[_{Source}$ ri' $[_{Goal}$ ga $[_{Place}$ ro']]]
      b. Goal: $[_{Goal}$ ga $[_{Place}$ ro']]
      c. Place: $[_{Place}$ ro']

However, according to Haiman (1980) the combinations with *-ga* are really only alternative long forms of the Place and Source markers, as illustrated in (47). That is, *-(ro)ga* is underspecified for Place and Goal; *-ri'* always marks Source.

Hua (Haiman, 1980, 232-234)
(47) *Zu-roga/ro'-ri'*   *oe.*
      work-*roga/ro'*-Source came
      'I have come from work.'

(48) a. *zu'-ro'*
          house-*ro'*
          'at/to the house'
      b. *Mni' Zati roga*
          water Zati *roga*
          'by/to the Zati water'

Note that spatial case systems like that of Hungarian are problematic for the account of Pantcheva (2010) as the morphological inclusion relation between Place and Goal goes the wrong way. The marker for Place *-ban* includes the one of Goal *-ba*. Another example is the Alamblak Goal marker *-ko* that is included in the Place marker *-kor*.

Joint lexicalizations of directionality functions as in Quechua are subject to a number of pragmatic and wellformedness principles, the details of which need not concern us here. Most importantly it is impossible to lexicalize two noncontiguous functions in the representation in (43). Since Goal is in between Source and Place in the account of Pantcheva (2010), a syncretism between Source and Place is not possible to the exclusion of Goal. Thus, Pantcheva's analysis of directionality predicts the absence of a syncretism between Source and Goal, as evidenced in her sample.

According to Pantcheva (2010) the function of the Goal head is really only to encode a transition from one spatial domain to a complementary one. In principle, it could both describe a positive change (Goal) and a negative one (Source). The fact that this transition is positive follows from an apparent general cognitive bias for goals. Such a bias has been described in studies of English language acquisition by Lakusta and Landau (2005). Lakusta and Landau (2005) show that learners of English often omit Source but not Goal meaning, which is explained by a general cognitive preference for Goal over Source directionality. The same bias seems active in the interpretation of small clauses in English. Consider the following example of Hoekstra (1988):

(49)   *They painted the door green.*

In (49) the activity of painting leads to the result of the door being green and is never interpreted as an activity starting out with or caused by the door being green. In addition, Stolz (1992) argues that in Finno-Ugric and Caucasian languages the development of a special Goal case marker precedes the development of a Source marker.

The transition function is interpreted as Goal directionality because of this general Goal bias and therefore its negation or reverse operation denotes Source meaning. Thus the "real" analysis of directionality of Pantcheva (2010) is in fact as follows:

(50)   The "real" decomposition of directionality according to Pantcheva (2010):
         [Negation [Transition [Place]]]

In spite of the evidence in favor of a Goal bias, I think a word of caution about the default Goal interpretation of the transition function is in order. Some (spatial) meanings may indeed be easier to learn than others (cf. Casasola and Cohen 2002, Gentner and Bowerman 2009). Yet as Bowerman and Choi (2003) show, languages may differ in what they consider to be most important. As is shown in eye tracking research, the importance of Goals in motion events may differ between languages (Carroll, Lambert, Natale, Starren, & van Stutterheim, in press). Thus the presumably universal Goal bias may in fact be language dependent, albeit strongly preferred by as yet unclear cognitive motivations (cf. also Stefanowitsch & Rohde, 2004).

More specifically, my word of caution is inspired by the fact that (rare as they may be) there are languages that do join up Source and Place to the exclusion of Goal. (It would be interesting to see what the interpretation of

small clauses is in these languages.) As mentioned previously, both Noonan (2008) and Nikitina (2009) identify such a language in their samples. Unfortunately, Noonan does not mention the name of the language; Nikitina mentions Nivkh. In addition, according to Creissels (2006a, 2009b) Dinka, Iraqw, Kanuri, and Old Georgian are of this type. For example, in Iraqw, directive case *-i* is used for a Goal, ablative case *-wa* is used for Source and Place (Mous, 1992).

Iraqw (Mous, 1992, 104-106)

(51)   a.   *I   bará   xats-ta-ka-r-wa   qa-qéer.*
            S.3 in:CON valley-F-INDEF-F-ABL HAB-graze.3SG.F
            'It usually grazes in a certain valley.'

       b.   *Tlakway i-na   húu'   gawá   hhar-ta-wa*
            bag   S.3-PAST fall.3SG.M.PAST top.CON stick.F.ABL
            alé.
            RESPRO
            'The bag fell from the stick.'

       c.   *Ta-na   wa'angw-i dáh.*
            IMPS.S-PAST pit-DIR   enter.PAST
            'They entered the pit.'

In (51-a) and (51-b), the same ablative case marker is used for Source and Place meaning, whereas the directive case is used for Goal meaning in (51-c).

Similarly, in Old Georgian, the adverbial case *-(a)d* expresses Goal (e.g. 'They came to Bethphage and Bethania.'). The instrumental *-it* may express both Source (e.g. 'Jesus turned away from the Jordan.') and Place (e.g. 'she saw two angels sitting, one at the head and one at the feet.'; Schanidse, 1982, 178; no glossed examples).

Also in many Saami languages (Ida Toivonen, p.c.; Hansson, 2007), Place and Source share the same marker whereas Goal has its own marker. This is illustrated for a number of adpositions in Table 3.4.

	Place/Source	Goal
IN	*siste*	*sisa*
ON	*alde*	*ala*
AT	*luhtte*	*lusa*
BEHIND	*duohkin*	*duohkái*

Table 3.4: Adpositions in Northern Saami

In a similar fashion MacKenzie (1978) describes Source-Place transfers and syncretisms for spatial adverbs in a number of Indo-European languages, illustrating the possibility to combine these two directionality distinctions in contrast to Goal.

Another example is Latin (Leo Conolly, p.c.), illustrated in (52).

Latin (Mansveld & Waleson, 1970)

(52)   a.   *Roma-m   venit.*
                Rome-ACC go.3SG
                'He goes to Rome.' (p. 213)
        b.   *Romā   venio.*
                Rome.ABL go.1SG
                'I come from Rome.' (p. 224)
        c.   *Athenis   habitat.*
                Athens.ABL live.3SG
                'He lives in Athens.' (p. 232)

Goal meaning is expressed by accusative case, ablative case may express both Source (52-b) and Place (52-c). Note that this pattern is restricted to place names; generally, prepositional constructions are used. In the first and second case paradigm, an old locative case form is still used.

In proto-Polynesian, finally, *-i* was used for Source and Place, *-ki* is used for goal (Ross Clark, p.c.). An example is given from Nukuoro:

Nukuoro (Ross Clark, p.c.)

(53)   a.   *Kai kilaateu ka   teletele ai   i   te   moana*
                and they   PAST sail.sail PRT on the sea
                'And they kept sailing on the open sea.'
        b.   *Ka   hulo   kee   i   Kapingamaalangi.*
                PAST go.PL away from K.
                '[They] left Kapingamarangi.'
        c.   *Ka   lava   ka   hulo   ki Luuku ma Motolako.*
                PAST finish PAST go.PL to L.   and M.
                'Then they went to Truk and the Mortlocks.'

In conclusion there may very well be a cognitive bias toward Goals, but in light of the counterexamples just mentioned, I am hesitant to understand this bias as an inviolable cognitive or linguistic universal. Although most syncretisms are between Goal and Place, the languages that use the same marker for Source and Place should not be ignored.

Note that the more abstract decomposition of directionality of Pantcheva (2010) into a negation and transition function in fact equally applies to languages that choose to interpret the transition function as Source directionality. That is, languages that exhibit a syncretism between Place and Source to the exclusion of Goal. Thus, the languages just discussed in principle do not pose any problem for her account. However, the languages discussed above are problematic for both the claim that a transition necessarily involves Goal directionality and the one that Source is always built on top of Goal. In these languages, an unmarked transition is understood as Source directionality and Goal is differently marked from Source and Place.

What is *not* expected in either Pantcheva's or my account is a syncretism between Source and Goal to the exclusion of Place. For Pantcheva, this would render the negation of the transition function meaningless as the transition function itself in principle already distinguishes Place from the other directionalities. For me, this would mean that for these languages directionality is an atemporal notion. A change into some configuration is only the same as a change out of this configuration if we ignore time and just focus on the presence of a transition (cf. Section 3.3.2) at. Only in that situation it does not make a difference whether we analyze the change from the start to the end or the other way around. The absence of such a syncretism between Source and Goal is understandable from a functional perspective. It is not very informative just to say that there is a change of configuration without specifying the type of change. Often other elements in the discourse, such as motion verbs, already hint at a change in configuration. Whereas this information can be used perfectly to specify the distinction between Place and Goal or Source directionality in the corresponding syncretisms, it does not help much to use it to decide between the latter two. The question in a context of change is about the quality of this change. That is, whether the specified configuration is left or entered. If the verb needs to specify the type of change anyway, it could have marked the change of configuration in the first place already, making a syncretism between Place and Goal, between Place and Source, or between all three of them more likely. In a sense, a directionality system marking unspecified change is comparable to a structural case system that marks the A and O argument differently from the S, as was discussed in Section 2.3. In transitive constructions the ambiguity is between A and O, not between either of them and S. Such languages are extremely rare (Stiebels, 2002; Bickel & Nichols, 2009; Comrie, 2005).

Nevertheless, just like there are languages that case mark the distinction between A and O on the one hand and S on the other, there are also lan-

guages that do not specify the kind of spatial change locally, taking Source and Goal together to the exclusion of Place. Consider the following example from Ardeşen Laz (Kutscher, 2010).[2]

Ardeşen Laz (Kutscher, 2010)

(54) a. *Şişe   masa goo-dgun.*
          bottle table on-stand.3A.SG.PRES
          'The bottle is on the table.'
      b. *Bere oxori-şa   am-ulun.*
          child house-MOT into-go3A.SG.PRES
          'The child goes inside the house.'
      c. *Bere oxori-şa   gam-ulun.*
          child house-MOT out-go.3A.SG.PRES
          'The child goes out of the house.'

The same marker *şa* expresses Source and Goal directionality in (54-b,c) whereas a zero marker is used for Place in (54-a). Although the local ambiguity between (54-b) and (54-c) is dissolved by the use of verbal prefixes (in this example, *am* and *gam*), this solution still unnecessarily violates ECONOMY. The presence of a transition could have been told from the verb already as the verb is explicitly marked for Goal (54-b) or Source (54-c) meaning. There is no need to additionally mark a transition as such.

Another example of such a language is Hindi/Urdu. According to Butt and King (2004, 13, no example given) the spatial use of the oblique case in Hindi/Urdu can only mean Goal or Source, not Place.

Whatever the (diachronic) explanation for these systems is, they are exceptions to the analysis of directionality. In the case of Ardeşen Laz this seems to be an unnecessary violation of the principle of ECONOMY. A possible way out of this situation is to say that these languages do think of directionality along the lines proposed above, but that the syncretism pattern between Goal and Source is a semantically unmotivated diachronic accident. Indeed, Kutscher (2010) notices that in related varieties of Laz, the distinct markers for Goal (*-şa*) and Source (*-şen*) are close in phonological form. The typological rarity of the syncretism makes such a solution plausible.

The very fact that it is possible to draw an informative semantic map means that the syncretism between directionality distinctions is motivated. Apparently, there are some principles motivating particular syncretism pat-

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[2]Thanks to Denis Creissels for pointing this out to me.

terns and making others unexpected. My analysis of directionality, as summarized in Table 3.3, correctly predicts the semantic map of directionality. Goal and Place are the same if we neglect the previous state of affairs, whereas Source and Place are the same if we neglect the subsequent state of affairs. Moreover, Goal and Source are only the same if we completely neglect change altogether. That is, they are only expected to be expressed by the same marker if it also expresses Place.

By the assumption of a general but non-obligatory Goal bias, my analysis can also account for the difference in frequency between the syncretisms of Place with Goal and Source. Even though the syncretism between Place and Source is possible, languages prefer to make this distinction explicit.

3.4.2   Spatial Case Systems

The previous section was concerned with syncretisms between directionality distinctions. This section deals with the kind of distinctions a spatial case paradigm creates. Two predictions follow from my analysis. Firstly, it predicts an implicational scale of directionality distinctions. Derived meanings of directionality are only expected to have their own case marker if the more basic distinctions are expressed first.

Secondly my analysis assumes that spatial meaning always consists of both a directionality and a configuration dimension. Therefore all spatial meaning consists of a choice from only three directionality distinctions and from a much bigger set of configuration options. This means that the three distinctions of directionality are used much more often than those of the configuration function, which has important consequences for the way in which they are expressed. If frequent use leads to grammaticalization (cf. Section 2.2), the more often used directional part of spatial meaning should be expressed with more grammaticalized means than the less frequent configurational part. If spatial meaning always consists of a directionality function and a configuration function, and if directionality has significantly fewer meanings than configuration, the mean token frequency of the distinctions of the directionality function is necessarily higher than the mean frequency of those of the configuration function, viz. $1/3$ vs. $1/many$. From this follows that the way in which the two spatial dimensions are expressed should differ. Because of ECONOMY, the often used distinctions of directionality will be expressed by shorter, more grammaticalized means than the less often used distinctions of configuration.[3]

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[3]In fact, directionality is not necessarily encoded by cases. In many languages direc-

More concretely this means that if directionality is expressed with more grammatical means than configuration because of its higher frequency of use, we can expect spatial case, the most grammatical of spatial means, to express directional meaning primarily. If a spatial meaning distinction is made it should be between directionality meanings. A configuration distinction is only expected as a secondary aspect once directionality is established.

In order to test these hypotheses I looked into the spatial case inventories of 23 languages from different language families (cf. Appendix B2).[4] In Table 3.5 the directionality and configuration distinctions that are made by the spatial case inventories of these languages are given. For reasons of space, directionality distinctions are abbreviated: S Source, P Place, G Goal. More details about the different forms are given in Appendix A1.

If a cell is empty this does not mean that this meaning is not expressed. It only says that the corresponding meaning distinctions that can be made at this dimension are not expressed by spatial case. For example Passamaquoddy-Maliseet only has a general spatial marker that does not distinguish between directionality or configuration meanings (Leavitt, 1996) and spatial cases in Nivkh do distinguish Goal from Source and Place but do not specify the configuration (Gruzdeva, 1998).

Usually the directionality and configuration dimension make up a cartesian product of spatial cases. That is, for every language each directionality distinction mentioned is made for each configuration contrast. However, as mentioned previously, Hungarian has a terminative case meaning UP.TO that does not make any configuration distinction. Alamblak also only makes configuration distinctions for Place (Bruce, 1984). A few additional explanatory notes should be made here. In Mangarayi the special Goal case is only used for emphasis as the locative can also be used to express Goal meaning (Merlan, 1982). Standard Lithuanian only has a locative case marker; Eastern High Lithuanian distinguishes a Goal and Place case marker. The further distinction between interior and exterior is only made in Lithuanian in Belorus (Ambrazas, 1997). The paradigm of Burushaski exhibits a number of redundant forms and syncretisms (Lorimer, 1935). Mundari and Ika have spatial cases for meanings other than directionality and configuration. Mundari has different spatial case series for concrete and approximate meaning (Hoffmann, 1903). Ika has different spatial case series for general and far away (Frank, 1985). Finally, versions of the AT

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tional meaning is covered by verb semantics.

[4]Many thanks to Wessel Stoop for collecting the data for this section.

Language	Directionality	Configuration
Alamblak	S, P, G, VIA	IN, ON, AT
Basque	S, P, G, VIA	
Burushaski	S, P, G	IN, ON, AT
Dyirbal	S, P, G	
Evenki	S, P, G	
Greenlandic (West)	S, P, G	
Harar Oromo	S, P, G	
Hungarian	S, P, G, UP.TO	IN, ON, AT
Hua	S, P/G	IN, ON/AT
Hunzib	S, P, G, VIA	IN, ON, AT1, AT2, UNDER
Ika	S, P, G	
Imonda	S, P, G	
Lithuanian	P, G	IN, ON/AT
Kanuri	P, G	IN, ON/AT
Koasati	P, G	IN, ON/AT
Malayalam	P, G	
Mangarayi	S, P/G, G, (VIA)	
Meithei	S, P	
Mundari	S, P, G	
Nez Perce	S, P, G	
Nivkh	S/P, G	
Passamaquoddy-Maliseet		

Table 3.5: Distinctions made by spatial case inventories

configuration in Hunzib distinguish between plus and minus contact (van den Berg, 1995).

In line with my first hypothesis, a hierarchy within directionality can indeed be established. Derived meanings of directionality, like VIA and UP.TO, only occur once the basic distinctions are expressed. On the basis of the spatial case inventories of Finno-Ugric and Caucasian languages, Stolz (1992, 103) argues for such an implicational hierarchy of spatial meaning expressed by case. According to Stolz spatial case systems start out with a general locative case that is underspecified with respect to both directionality and configuration. In the development of the system the basic distinctions of directionality are developed first (cf. Appendix A1 and A2). The motivations for this first type are unclear to Stolz (1992, 31; but cf.

Section 3.3). Next, there are two possible paths to be followed. Either additional distinctions of directionality, like VIA and TOWARD, can be developed or different layers of configuration can be distinguished for which the directionality distinctions hold. Both options confirm the hypothesis that was formulated at the beginning of this section: first, the basic directionality meanings Goal, Source, and Place are discerned. Moreover, according to Creissels (2009b, 614), cross-linguistically, spatial case systems are ordered according to the two dimensions of directionality and configuration. If languages distinguish only one of these, they always seem to express directionality, mostly distinguishing between Place, Goal, and Source.

As Table 3.5 shows further, there is always a directionality distinction in place if a configurational one is made. Less than half of the languages make a configuration distinction. In contrast, spatial case systems consisting of more than one case always make a directionality distinction.

Spatial case primarily makes a directionality distinction. A very rough configuration distinction covering the more basic meanings is only made incidentally once a directionality distinction is established. The basic configuration distinctions that are discerned by spatial case seem to follow the implicational scale of topological distinctions in (6) discussed above (see Levinson et al., 2003; Zwarts, 2010). Firstly, a distinction is made on the basis of inclusion (e.g. Lithuanian, Kauri, Koasati). Next, support is distinguished from non-support (e.g. Alamblak, Burushaski, Hungarian). Other configuration distinctions are only made later (cf. Hunzib). The number of configuration distinctions that are made by spatial case may run up to five in my language sample.

In conclusion, the first predictions are borne out. In my typological sample the implicational scale of directionality distinctions is followed and spatial case first and foremost expresses directionality. Although some configuration contrast may be used frequently enough to grammaticalize into a case marker, the markers of directionality have a higher frequency of use and therefore have grammaticalized first. Other distinctions, like those between proximate and distal or general and concrete configuration, come third.

3.4.3 The Division of Labor between Spatial Constructions

In this section the meaning distinctions made by spatial constructions that differ with respect to their degree of grammaticalization will be compared.

Languages may have more than one system to express spatial meaning. The difference between two such systems can often be characterized

in terms of their degree of grammaticalization. Grammaticalized elements are syntactically less autonomous, morphologically less complex, and/or phonologically less heavy than their more lexical counterparts. Although this basically boils down to the difference between adpositions and case, this is not necessarily the case. For example in Marathi, the grammatical spatial marker in (55-a) is directly suffixed to the word it belongs to, whereas the more lexical one in (55-b) assigns a possessive suffix to its complement first.

Marathi (Pandharipande, 1997, 340)

(55)   a.   *Tsor gharā-t   s'irlā.*
                thief house-LOC entered
                'The thief entered the house.'
          b.   *Tsor gharā-tSyā-āt s'irlā.*
                thief house-PX-in   entered
                'The thief entered the house.'

The difference between the two strategies really concerns their relative position on the grammaticalization cline in (56) (see Hopper & Traugott, 2003) and not so much the actual syntactic category they are assigned to.

Grammaticalization cline

(56)   Noun/Verb $\prec$ Adposition $\prec$ Case

Cutoff points on this cline are rather arbitrary as the categories are not discrete. For example, since adpositions may still share grammatical properties with their source marker, they are often still referred to as nouns and verbs in grammars. Their grammaticalization, according to Dryer (2005), can be identified if they no longer take tense, aspect and mood inflection. Cases subsequently develop from adpositions when the adposition and its attribute are reinterpreted as one word; semantic and morphophonemic changes (e.g. semantic bleaching and vowel harmony) can take place concealing the word boundary and changing the syntactic category the element belongs to, resulting in new case suffixes (Harris & Campbell, 1995; Kulikov, 2006; Hopper & Traugott, 2003).

Often, linguists do not agree on the exact position on the cline of particular forms but they generally do on the relative position of the categories (Hopper & Traugott, 2003, 6). Since their precise syntactic category is of no importance here I simply assume that the more grammatical spatial construction in the examples below is spatial case. The hypothesis below concerns their relative position only.

Blake (1994) notes that when two spatial strategies are present in a language the more lexical one makes more fine-grained distinctions. Levinson (2000a, 9) also observes that spatial case expresses stereotypical, expected situations whereas more lexical constructions are used for unexpected spatial relations that do not follow from general world knowledge. I think this observation is correct, yet more can be said on the division of labor between the two systems. In this section I will show that the difference can be motivated in a principled way. I argue that although both the grammatical and lexical spatial constructions express spatial meaning, the two different spatial constructions do not have the same function. I will show that the more grammaticalized construction particularly expresses directionality, whereas the more lexical ones are used to specify the configurational part of spatial meaning. That is, although the spatial constructions can express both dimensions to some extent as illustrated by the Hungarian spatial case paradigm in Section 3.3, they are specialized in one dimension only. If directionality is expressed with more grammatical means than configuration because of its higher frequency of use we can expect the more grammatical spatial case to express directional meaning reserving the more lexical spatial means for the larger set of configuration distinctions.

In sum, if a language has two different spatial constructions that differ in their degree of grammaticalization, the more grammatical one is expected to express directionality mainly, the more lexical one to express configuration.

Note that in addition to the diachronic effect that causes the existence of a difference in grammaticalization between the two constructions in the first place, the principle of ECONOMY (waste as little energy as possible) becomes relevant in a different, real-time way. The fact that sometimes a spatial case construction can be used that omits configurational distinctions means that the speaker sometimes thinks that it is unnecessary to explicitly mention this distinction. That is, spatial meaning aspects can be omitted if they are predictable from context, which is relevant in light of ECONOMY. If it is possible, the speaker will use the more economical spatial case construction.

In Marathi (Indo-European; Indic), two constructions that differ in economy can express the same meaning, as illustrated in (57):

Marathi (Pandharipande, 1997, 340)
(57)   a.   *Tsor gharā-t   s'irlā.*
                thief house-LOC entered
                'The thief entered the house.'
        b.   *Tsor gharā-tSyā-āt s'irlā.*
                thief house-PX-in   entered

'The thief entered the house.'

According to Pandharipande (1997, 335) the general difference between the two constructions is that spatial cases in Marathi (i.e., locative, ablative, and allative) are used to express general location; postpositions express a more specific meaning. But the distinction between general location and more specific meaning cannot explain the optionality in (57) nor the following example:

Marathi (Pandharipande, 1997, 373; 336)

(58)   a.   *Kholī-t   khurtSī āhe.*
           room-LOC chair   is
           'There is a chair in the room.'
      b.   *Śāḷe-tSyā āt   ek   moṭhī lāyabrarī āhe.*
           school-PX inside one big   library   is
           'There is a big library inside the school.'

Both (58-a) and (58-b) concern inclusive meaning, the first one not being more general than the second. The difference is rather in the *predictability* of the spatial relation. A chair will more often be *inside* than for example *outside* or *above* a room. On the other hand, the spatial relation between a library and a school is less predictable as it probably is just as often *next to* as *inside*. Therefore the spatial relation in (58-b) needs specification, the one in (58-a) can do without.

     In Finnish (Uralic; Finnic) both constructions also are sometimes equally possible. If there were a preference for one over the other at all in (59), it would be the spatial case version because of its shortness. Unless noted otherwise, all Finnish (a) examples in this section are taken from the online CSC newspaper corpus,[5] the (b) versions are made up by a Finnish informant.

Finnish

(59)   a.   *Keitä mausteliemi, tarkista maku ja   kaada kuumana*
           cook   marinade,   check   taste and pour   while.hot
           sien-ten   pää-lle
           mushroom-PL.GEN on-ALL
      b.   *Keitä mausteliemi, tarkista maku ja   kaada kuumana*
           cook   marinade,   check   taste and pour   while.hot

---

[5]https://hotpage.csc.fi, consulted in the summer of 2006.

> *sieni-lle*
> mushroom-ALL
> 'Prepare the marinade, check the taste and pour while still hot on the mushrooms'

(59-b) is the made-up spatial case version of the more lexical construction in (59-a). Both sentences seem to have the very same meaning.

But this is not always the case, as is illustrated in (60):

Finnish
(60)   a.   *kulta-a   löytynyt Suome-n   ja   Norja-n*
           gold-PART found   Finland-GEN and Norway-GEN
           raja-lta
           border-ABL
      b.   **kulta-a   löytynyt Suome-n   ja   Norja-n*
           gold-PART found   Finland-GEN and Norway-GEN
           raja-n   pää-ltä
           border-GEN on-ABL
           'gold found on the border between Finland and Norway'

As is shown in (60) it is not possible to express the meaning 'on the border' with a lexical construction. This is because the lexical version is a specification of the configuration dimension. For example, in (61-a) the daredevil really drives on top of the line, whereas he also could be driving close to it in (61-b).

(61)   a.   *Hurjimus ajoi   usein keskiviiva-n   pää-llä*
           daredevil drove often middle.line-GEN top-ADE
           'The daredevil drove often on the midline [of the road]'
      b.   *Hurjimus ajoi   usein keskiviiva-lla*
           daredevil drove often middle.line-ADE
           'The daredevil drove often close to/on the midline [of the road]'

For some grounds, however, the configuration is necessarily kept underspecified: As there is no such thing as the precise 'top of a border', the adpositional construction with *pää-* 'on top of' specifying this meaning is simply not allowed in (60).

In Basque (isolate), the grammatical construction is used when the configuration of the meaning can be derived from context, the lexical construction is used otherwise.

Basque (Saltarelli, 1988, 178; 186)

(62)   a.   *Oporket-etan   iru   mendi-tara   igo-tze-ko*
              holiday-PL.LOC three mountain-ALL climb-NOM-REL
              asmo-a   d-u-gu.
              intention-SG.ABS 3ABS-PRES.AUX-1PL.ERG
              'We have the intention of climbing to (the tops of) three moun-
              tains during the holidays'.
        b.   *Etxe   bi-ren   arte-tik   egi-n*
              house two-GEN between-SG.ABL make-PERF
              z-u-te-n   laster.
              3ERG-PAST.3ABS.AUX2-PL.ERG-PAST run.ABS
              'They dashed out from between two houses.'

In the grammatical construction of (62) the top of the mountain is pragmati-
cally retrievable from the combination of the verb *to climb* and the mountain
and does not need further specification; the configuration BETWEEN with
respect to the two houses in the lexical construction, however, cannot be
derived from the verb *dash* or the context. Without explicitly mentioning
it the configuration could just as likely have been, for example, BEHIND,
UNDER, or INSIDE.

In Japanese (Japanese; Japanese) the locative marker *-ni* can be at-
tached directly to the ground as in (63). This marker is used when the
spatial relation between figure and ground needs no further specification.

Japanese (Iwasaki, 2002)

(63)   *Yamada-san-wa   Tokyo-ni   i-ru.*
        Yamada-Mr.-TOP Tokyo-DAT be-PRS
        'Mr. Yamada is in Tokyo.'

The fact that Mr. Yamada is *in* Tokyo is not very surprising. It is even hard
to think of situations in which a different spatial (configuration) relation
would hold. To express a more specific meaning, i.e., to denote a specific
region with respect to the ground, spatial adpositions are used that assign
genitive case to the ground. Had these adpositions been absent, the hearer
would not be able to tell which spatial relation is meant.

Japanese (Iwasaki, 2002)

(64)   *Ringo-wa booru-no   naka-ni / shita-ni   / ushiro-ni   a-ru.*
        apple-TOP bowl-GEN in-DAT / under-DAT / behind-DAT be-PRS
        'The apple is in/under/behind the bowl.'

In (64) the specification of the different configuration options is realized through adpositions. If it is not specified, the hearer will not be able to retrieve the intended configuration distinction. With IN probably being the default relation between an apple and a bowl, any deviation from this relation needs to be marked.

In Tamil (Dravidian; Southern Dravidian) the most common way of indicating a spatial relationship is by using locative case. According to Pederson (2006) by using this locative case does not specify or deny a more exact nature of the relationship between figure and ground, and is mostly used for canonical relationships. For example, a typical spatial relation like 'boat on the water' is expressed with spatial case. A postposition would be overly emphatic in this case (Pederson, 2006). However, a sunk boat *in* the water is expressed by means of a postpositional construction:

Tamil (Pederson, 2006, 405)

(65) a. *Paaymarakkapil kaTTal-il ninRukkoNTirukkiRatu.*
    sailboat   ocean-LOC stand.CONV.PROG.PR.3SN
    'The sailboat is on the water.'

  b. *Paaymarakkapil kaTTal-ku-uL-Lee*
    sailboat   ocean-DAT-INTERIOR-EMPH
    mungkiyirukkiRatu.
    sink.CONV.PERF.PR.3SN
    'The sailboat has sunk.'

Thus the more precise nature of the locative relationship need not be specified by a postposition when it is adequately recoverable. In the same way, when the location is ambiguous a specific postposition is preferred. For example since the IN and ON configuration are equally likely for a piece of paper with respect to a desk (i.e. contained in the drawer or on the upper surface), the choice between the two needs to be specified Pederson (2006):

Tamil (Pederson, 2006)

(66) a. $^{??}$*Peepar meecaiyil keTaikkiRatu.*
    paper table.LOC be.availablePR.3SN
    'The paper is on the table.'

  b. *Peepar meecaimeelee keTaikkiRatu.*
    paper table.top be.availablePR.3SN
    'The paper is on the table.'

As a final example take Evenki (Altaic; Tungusic). Here too an alter-

nation can be found between two spatial constructions:

Evenki (Nedjalkov, 1997, 175)

(67)   a.   *Asatkan d'olo ojo-du-n   tege-re-n.*
               girl   stone upper.part-DAT-3SG.POSS sit.down-NFUT-3SG
               'The girl sat down on the stone'
    b.   *Asatkan amkin-du hukle-d'ere-n.*
               girl   bed-DAT liePRS-3SG
               'The girl is lying on the bed.'

The girl in (67-a) could just as well sit *next to* as *on top of* the stone; lying *on* a bed, however, is more likely than lying *under* or *next to* it. Therefore, the more economical form can be chosen for the latter example whereas the more elaborate form has to be used for the first one.

    In conclusion, in all the examples above the adpositional case construction specifies a configuration dimension that is left underspecified in the spatial case construction.

    As was predicted spatial cases mostly express directionality; spatial adpositions can be used to express the configurational dimension that is otherwise left underspecified. This underspecification in the spatial case construction is possible because much of spatial meaning is retrievable from context and world knowledge (cf. Chapter 2). Just like we saw for directional meaning in the previous sections, configurational meaning can be underspecified. Consider again the implicational scale of topological distinctions made with adpositions in (6) (Levinson et al., 2003), repeated in (68).

(68)   AT ≻ IN ≻ ON/UNDER ≻ OVER/NEAR ≻ ON-TOP ≻ AT-TACHED ≻ INSIDE ≻ . . .

The implicational scale emerges by the very fact that some languages make more specific configurational distinctions than others. Distinctions higher up in the hierarchy are neglected by some languages. They can be recognized in principle of course, but these distinctions apparently were not frequent enough grammaticalized into spatial adpositions. For example in Tzeltal specification of configuration takes place outside the PP via figure properties, dispositional predicates, and/or relational nouns. Whatever the categorization of topological meaning, a category in one language will combine instances that are fundamentally different in another. For example, Bowerman and Choi (2003) show how English *in* and *on* distinguish between *putting Lego **on** Lego stacks* from *putting a cassette **in** a case* and

*putting an apple **in** a bowl* whereas the first two for Korean are both expressed by *kkita* 'interlock, fit tightly', the latter being an instance of *nehta* 'put loosely in or around'. This means that some of the spatial features that English uses to characterize an *on* or *in* situation are neglected by the topological expressions of Korean. Similarly, some of the spatial features that Korean uses to characterize a *kkita* or *nehta* situation are neglected in the spatial language of English.

Because of their less frequent use, spatial adpositions have a less grammaticalized form than spatial cases. Moreover, most adpositions in languages that have both spatial case and spatial adpositions are marked for directionality themselves. For reasons of economy the spatial case construction is the preferred option, as it consists of less (costly) morphemes. If the configurational part of spatial meaning is predictable, a speaker will use the spatial case construction leaving the configuration dimension underspecified.

The way in which this division of labor between spatial constructions comes about in languages is a difficult question. It could either be a real-time choice speakers make, a diachronic result, or a combination of both. Indeed, the exact relation between linguistic universals and language change is notoriously difficult. In a special volume on this topic Haspelmath (2008, 213) considers (69) as the basic question:

(69)   Do synchronic universals arise from universals of change, or do universals of change arise from synchronic constraints?

Haspelmath does not really choose between the two options, saying that implicational universals arise from universal tendencies of change to more economical patterns. These universal diachronic tendencies themselves are motivated by the (synchronic) constraints that speech behavior should be rational and take both speakers' and hearers' needs into account. There is a pressure on languages to change to more normal, economical patterns. According to Haspelmath (2008, 214) changes are motivated by the speakers' desire to speak economically, which is not a synchronic grammatical constraint or even a more general cognitive constraint, but "simply a constraint on any rational behavior."

I am also of the opinion that the two options in (69) cannot be disentangled. The diachronic development of more economical forms and hence the synchronic possibility to choose is the result of a universal of change. As explained in Section 2.2, because of a directional skewing in the acquisition of word forms, forms can only become shorter. The fact that this direc-

tional skewing exists in the first place, however, is again due to synchronic principles. Note that ECONOMY is not the only principle that is active here, as its use is only made possible by ADD$_W$. Without this second constraint that asks for a cooperative hearer, the application of ECONOMY would lead to communication failure.

Consider again the example from Marathi repeated in (70).

Marathi (Pandharipande, 1997, 373; 336)

(70) a. *kholī-t   khurtSī āhe.*
            room-LOC chair   is
            'There is a chair in the room.'
      b. *śāḷe-tSyā   āt   ek   moṭhī lāyabrarī āhe.*
            school-PX inside one big   library   is
            'There is a big library inside the school.'

The optimization process for (70-b) is illustrated in Tableau 3 (cf. Section 2.5 for a more elaborate discussion of Optimality Theoretic analyses). The spatial construction is more economical than the lexical construction and therefore preferred from a speaker's perspective. However, as there is no preferred spatial relation between libraries and schools, the underspecification of this relation will not lead to the desired outcome. To make sure the hearer understands her correctly, the speaker has to use the lexical construction. Any other interpretation than 'inside' for *āt* leads to a violation of *Faith$_L$*. This explicit marking is not necessary for the relation between a chair and a room in (70-a), as there is a default interpretation for this pair. In this case the speaker can rely on the world knowledge (ADD$_W$) of the hearer.

In conclusion we end up with a situation in which the bigger class with more precise lexical semantics is used for a dimension in which most meaning differences are to be made, and the smaller class with cheaper morphemes is used for a dimension with highly frequent members with more general semantics. The cheap grammaticalized construction is used for the expression of the frequent directional meaning, the more costly lexical construction is used for the less frequent configurational meaning. Again, both the real-time choice and the diachronic development that leads to the set of candidates to choose from are motivated by the same principles.

PROD:	'library inside school'	FAITH$_L$	ADD$_W$	ECONOMY
☞	*school.Place*			
👎	*school.*PX *inside*			*
INT:	*school.Place*	FAITH$_L$	ADD$_W$	ECONOMY
☞	'library inside school'			
☞	'library next to school'			
☞	'. . .'			
INT:	*school.*PX *inside*	FAITH$_L$	ADD$_W$	ECONOMY
☞	'library inside school'			
	'library next to school'	*		
	'. . .'	*		

Tableau 3: The choice between spatial constructions

3.4.4 The Division of Labor within Spatial Constructions

The hypothesis in this section is very similar to the previous one. This time round, however, instead of comparing grammatical and lexical spatial constructions, focus will be on lexical constructions only. Lexical spatial constructions consist of lexical and grammatical elements. The question is now which formal elements express which part of the meaning.

In the expression of spatial meaning adpositions and case are sometimes used to the exclusion of each other as was shown in the previous section. Often, however, the two are simultaneously used in lexical spatial constructions. Consider the following example from Finnish:

Finnish (Lestrade, 2010)
(71)   *Auto   on talo-n   lähe-llä.*
        car.NOM is house-GEN near-ADE
        'The car is near the house.'

In (71) the adposition *lähe-* 'near' itself bears adessive case and combines with a genitive case marked object. In Lestrade, de Schepper, and Zwarts (2009), we study the mapping of the semantic parts of spatial meaning onto the morphosyntactic parts of spatial adpositional constructions. We call the case that is "assigned" by the adposition to its complement *internal* case (K_{int}) and the case that the adposition itself bears *external* case (K_{ext}).

Thus in (71) genitive is the internal case, adessive is the external case. The full syntactic structure of a (spatial) PP as we analyze it is given in Figure 3.5.
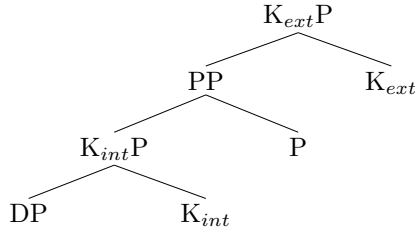
Figure 3.5: The syntactic structure of spatial PP

In this representation we analyze case as a functional head of its own (cf. also Zwarts, 2005b; Asbury, 2008). According to Asbury (2008, 23) the only real difference between cases and syntactically independent items like adpositions and nouns is in their phonological load. The former are phonologically dependent and therefore spelled out as suffixes, the latter are independent. For me this difference will be of crucial importance. It is caused by a difference in grammaticalization and therefore semantic specificity (cf. Section 2.2).

Note that we use a left branching analysis. This is the easiest way to describe the surface structure, since most languages in our sample using postpositions and case is almost always placed at the right of its noun or P argument. However, the important point really is the relative order of the different morphosyntactic parts with respect to the complement. That is, internal case is on the ground and external case is on the P.

In the semantic representation of spatial meaning proposed in Section 3.2 there are three meaning ingredients: a ground, a configuration function, and a directionality function. In Figure 3.5 we have identified four morphosyntactic parts of complex spatial expressions: a DP complement, an internal and external case, and an adposition. It is reasonable to assume that the ground obligatorily maps onto the complement. Although somewhat restricted by pragmatic principles that for example say that the ground should be bigger and less movable than the object it locates, it is semantically an open category. Clearly such a category should map onto a lexical form. Thus we are left with six plus three logical possibilities to combine the two remaining spatial meaning ingredients with the three re-

maining formal parts listed in Table 3.6. The additional three options are
to combine both configuration and directionality in one element.

	DP	K_{int}	P	K_{ext}
1.	Ground		Config	Dir
2.	Ground		Dir	Config
3.	Ground	Config	Dir	
4.	Ground	Dir	Config	
5.	Ground	Config		Dir
6.	Ground	Dir		Config
7.	Ground	Dir+Config		
8.	Ground		Dir+Config	
9.	Ground			Dir+Config

Table 3.6: Logically possible distributions of labor within the PP

In Lestrade, de Schepper, and Zwarts (2009), it is hypothesized that
there are three principles at work constraining the possibilities, namely Iso-
MORPHISM, GRAMMATICALIZATION and ECONOMY. The first says that syn-
tactic structure should mirror semantic structure (Zwarts, 2005a) and will
be discussed below. The latter two really are the diachronic and synchronic
variants of the same ECONOMY principle and are distinguished for explana-
tory purposes only. Following the ideas of Chapter 2 and Section 3.4.3,
GRAMMATICALIZATION says that more frequent elements are expressed by
more grammatical forms. ECONOMY prohibits the use of meaningless lexi-
cal elements. In a bidirectional perspective it does not make much sense to
use costly words without any meaning.

The principle of ISOMORPHISM is proposed by Zwarts (2005a). In lan-
guages that map the different parts of spatial meaning to different parts of
a spatial expression we expect the order of function application to be pre-
sented in the syntactic expression. This principle can be seen as a stronger
version of the principle of COMPOSITIONALITY given in (72) as it specifies
the *order* of the syntactic and semantic function application to each other.

(72)   COMPOSITIONALITY: the interpretation of a phrase is a function of
        the meaning of its parts and the way they are syntactically com-
        bined.

According to compositionality, the semantic interpretation process takes
a syntactic structure and maps it to a representation of the meaning. In

its strongest form this principle interprets every syntactic combination as a semantic function application. Syntactic heads are thus interpreted as functions that apply to their complement.

Recall from Section 3.3 that directionality is a function that takes a configuration function that takes a Thing on its turn. Although Jackendoff (1983, 1990) explicitly allows the directionality function to bypass the configuration function and take a ground directly, it is not possible in his or any other account that I am aware of, to apply the configuration function to the directionality function. With the principle of ISOMORPHISM we expect the marker for configuration to be in between the marker for directionality and the ground.

Zwarts (2005a) observes that in German prepositions and cases do not compose in the way elements of a combinatorial system are expected to compose. Compare the following constructions:

German
(73)   a.   *in das   Haus*
             in the.ACC house
             'into the house'
        b.   *in dem   Haus*
             in the.DAT house
             'in(side) the house'

As the contrast between (73-a) and (73-b) shows, the preposition determines the configuration and the case it assigns determines directionality. In other words, German violates the principle of ISOMORPHISM as the syntactic order of functions does not reflect the semantic order.

The division of labor of spatial meaning within the German PP is unexpected given the principle of ISOMORPHISM and therefore is one of the distributions we in fact predict not to occur. More specifically, in combination with the principle of GRAMMATICALIZATION we only expect to find distributions one and eight in Table 3.6. Distributions in which the marker of directionality is in between those for configuration and the ground are prohibited by ISO(MORPHISM); distributions in which configuration but not directionality is expressed by a grammatical marker are prohibited by GRAM(MATICALIZATION). Distributions that do not assign meaning to lexical elements are prohibited by ECO(NOMY), as speakers are unlikely to use costly lexical elements if this does not contribute to the meaning.

Our predictions for each logical distribution are summarized in Table 3.7. Again, only the first and eighth strategy are expected to occur.

	DP	K_{int}	P	K_{ext}	Iso	Gram	Eco
1.	Ground		Config	Dir	OK	OK	OK
2.	Ground		Dir	Config	X	X	OK
3.	Ground	Config	Dir		OK	X	OK
4.	Ground	Dir	Config		X	OK	OK
5.	Ground	Config		Dir	OK	OK	X
6.	Ground	Dir		Config	X	OK	X
7.	Ground	Dir+Config			NA	X	X
8.	Ground		Dir+Config		NA	OK	OK
9.	Ground			Dir+Config	NA	X	X

Table 3.7: Predicted distributions of labor within the PP

For our typological survey of spatial expressions we make use of the PCaseBase (Lestrade, de Schepper, & Zwarts, 2009). The PCaseBase is a typological database of languages with both case and adpositions, consisting of 32 languages from 25 different language families and has been established on the basis of reference grammars (cf. Appendix B1). Big language families, that is, languages with many subfamilies, are represented by two languages from different subfamilies. Thus we hope to capture the variation that may exist within bigger families. The database contains 1355 entries on adpositions and their case-marked objects plus an additional 548 entries for the functions of the cases when not governed by an adposition. The goal of the database is to compare the case and adposition inventories of different languages and to study the interaction and differences between the two systems. For our present purposes, we only consider its 403 spatial adposition types that make up for 981 different construction tokens (differentiated on the basis of their internal and external case). For example the Alamblak adposition *bi* 'front' makes up one type, its combinations with three different internal cases that can each assign two external cases make up six tokens.

In the following I will go through the various possibilities spelled out in Table 3.6. But first it should be noted that there is one important drawback to our method of consulting reference grammars only. Although many grammars mention the option for adpositions to combine with different internal cases, they hardly ever mention a corresponding meaning difference.

Similarly, grammars sometimes gloss over meaning contributions that may be made by external cases. For example in Finnish the adposition *pää-* marked with the IN case series means 'at the end of', whereas it means 'on top of' when marked with a case from the ON/AT series (cf. Section 3.4.5). But this meaning distinction is not mentioned in Sulkala and Karjalainen (1992). In other words, not all correspondences between meaning and form will become manifest in our study.

STRATEGY 1. P/CONFIGURATION, K_{ext}/DIRECTIONALITY The first logical possibility is to map directionality onto the external case and configuration onto the adposition. This option is very frequently attested and accounts for more than 50% of the tokens (568) in which 121 types from 13 languages are involved. As an example, consider the Evenki adposition *xergi-* 'under'. It can bear different cases that determine its directionality. It does not assign case to its complement. This is illustrated in Table 3.8.

form	P	K_{ext}	directionality	configuration
xergiduk	*xergi-*	ablative	Source	under
xergile	*xergi-*	allative	Goal	under
xergidu	*xergi-*	dative	Place	under
xergili	*xergi-*	prolative	Path	under

Table 3.8: Evenki *xergi-* 'under'

In (74) some examples are given of *do:-* 'in'.

Evenki (Nedjalkov, 1997, 172)
(74) a. *D'u   do:-du-n   teget-chere-n.*
          house interior-DAT-3SG.POSS sit-PRES-3SG
          'He is sitting in(side) the house.'
      b. *D'u   do:-la-n   ngene-re-n.*
          house interior-ALL-3SG.POSS go-NONFUT-3SG
          'He went into the house.'
      c. *D'u   do:-duk-n   ju-re-n.*
          house interior-ABL-3SG.POSS go.out-PRES-3SG
          'He went out of the house.'

Depending on its external case, *do:* means 'inside', 'into', or 'out of'. Other languages that make use of this strategy are Alamblak, Basque, Burushaski, Finnish, Gamo, Ket, Kolyma Yukaghir, Lezgian, Malayalam, Marathi, Turkish, and Warao.

STRATEGY 4. K_{int}/DIRECTIONALITY, P/CONFIGURATION There is only one language, viz. Polish, in which 9 adpositions use the fourth possibility, combining directionality with the internal case and configuration with the adposition. An example is given in (75).

Polish (Bielec, 1999, 224)

(75) a. *Pracuję   na poczcie.*
          work.1SG at postoffice.LOC
          'I work at the post office.'
      b. *Pracuję na poczce.*
          go.1SG at postoffice.ACC
          'I am going to the post office.'

Although this strategy is fairly typical for Indo-European languages (see Lestrade, 2006), it is unexpected from a functional perspective as it violates the principle of isomorphism. As it turns out, the strategy is indeed not found for other languages in our sample.

STRATEGY 5. K_{ext}/DIRECTIONALITY, K_{int}/CONFIGURATION There is only one adposition in Lezgian that seems to use the fifth possible strategy to combine configuration with internal and directionality with external case, viz. the adposition *win-* 'above, top'. This is illustrated in Table 3.9 and the examples in (76) (following the order of presentation in the table).

K_{int}	P	K_{ext}	directionality	configuration
genitive	*win-*	superessive	Place	'above'
inelative	*win-*	superessive	VIA	'up (along)'
genitive	*win-*	superelative	Source	'above'
inelative	*win-*	dative	VIA	'up (along)'

Table 3.9: Lezgian *win-* 'above'

Lezgian (Haspelmath, 1993, 214-215)

(76) a. *Č'ulaw cif-er.i   xür.ü-n   winel   mič'i*
          black   cloud-PL.(ERG) village-GEN above.SUPERES dark
          q^hen   wehe-nwa-j.
          shadow throw-PERF-PAST
          'Black clouds had cast a dark shadow over the village.'
      b. *Sa dağwi   žiğir.d-aj winel   jajlax.di-z*
          one mountaineer path-INEL above.SUPERES pasture-DAT

> *fi-zwa-j.*
> go-IMPERF-PAST
> 'A mountaineer was going to a pasture up a path.'

c. *I   aslan čna   či   winelaj   alud-in.*
   this lion   we.ERG we.GEN above.SUPEREL take.away-HORT
   'Let's take this lion from above us.' (i.e. 'Let's overthrow him.')

d. *Zun   taxta.di-n gurar-aj   winiz   xkaž x̂a-na.*
   I.ABS plank-GEN stairs-INEL up.DAT raise ANTIC-AOR
   'I walked up the plank stairs.'

The pattern may not be directly clear, but internal inelative case seems to correspond to 'above' configuration, internal genitive case to 'up (along)'. External superessive can have Place or VIA directionality; external superelative expresses Source, and external dative expresses VIA.

However, we could say that 'above' and ' top' refer to the same configuration and that the difference in interpretation (or, at least, in glossing) is due to the difference in directionality. If this is the case then Strategy 5 does not occur in our sample.

STRATEGY 8. P/DIRECTIONALITY+CONFIGURATION The eighth strategy to have both the directionality and configuration expressed by the P was the second-most frequent option in our sample. It was chosen by 271 tokens (234 types) in 29 of our 32 languages. The difference between the number of tokens and types is due to token variants that cannot be analyzed as case forms. These adpositions did not make use of internal or external case to create meaning differences although the language does have morphological case. As the language counts show, languages use this strategy for some adpositions whereas they use different internal and external cases for others. The only three languages that did not make use of this strategy at all are Alamblak, Brahui, and Harar Oromo.

None of the other possibilities are attested in our sample.

In conclusion, out of all the logical possibilities, there are only two that are used abundantly. The strategy to express configuration with the adposition and to have the internal case specified directionality seems to be restricted to Indo-European. Its rare occurrence can be explained by its violation of the principle of ISOMORPHISM (cf. Table 3.7). None of the other strategies is attested in our sample. A summary is given in Table 3.10. A comparison with Table 3.7 shows that only the predicted languages occur significantly.

	N	K_{int}	P	K_{ext}	Attested
1.	Ground		Config	Dir	++
2.	Ground		Dir	Config	–
3.	Ground	Config	Dir		–
4.	Ground	Dir	Config		+
5.	Ground	Config		Dir	–
6.	Ground	Dir		Config	–
7.	Ground	Dir+Config			–
8.	Ground		Dir+Config		++
9.	Ground			Dir+Config	–

Table 3.10: Attested distributions of labor within the PP

3.4.5   The Case Paradigm of Adpositions

In the previous section we saw that the spatial adposition can itself be marked with spatial case, as illustrated by the lexical spatial construction in Evenki, repeated in (77).

Evenki (Nedjalkov, 1997, 172)
(77)   a.   *D'u   do:-duk-n   ju-re-n.*
           house interior-ABL-3SG.POSS go.out-PRES-3SG
           'He went out of the house.'

In (77), the adposition *do:* 'in' is marked with the ablative case denoting Source.

    The third prediction following from my analysis concerns these case forms. If the spatial case paradigm makes a rough configuration distinction, while adpositions, as the more lexical spatial construction, specify the configurational part of spatial meaning much more explicitly, it is not to be expected that spatial adpositions inflect for the complete spatial case paradigm. That is, if adpositions themselves specify configuration already, then the configuration distinction that spatial case makes is redundant. Therefore spatial case is not expected to make a configuration distinction on adpositions. This prediction is tested for Finnish and Hungarian.

    As discussed above the Hungarian case paradigm distinguishes three configuration contrasts and three directionality distinctions (again illustrated in Table 3.11).

    But as illustrated in Table 3.12, the case paradigm of Hungarian post-

Configuration	Directionality		
	Place	Source	Goal
ON	superessive -on/-en/-ön/-n	delative -ról/-től	sublative -ra/-re
AT	adessive -nál/-nél	ablative -tól/-től	allative -hoz/-hez/-höz
IN	inessive -ban/-ben	elative -ból/-ből	illative -ba/-be

Table 3.11: Hungarian spatial case paradigm

positions only makes a three-way distinction that goes back to the Old Hungarian spatial case system (Creissels, 2006b; Stolz, 1992, 61).

configuration	directionality		
	Place	Goal	Source
OVER	fölött	fölé	fölül
UNDER	alatt	alá	alól
IN FRONT	elött	elé	elől
BEHIND	mögött	mögé	mögül
IN BETWEEN	között	közé	közül

Table 3.12: The case paradigm of Hungarian postpositions

As Table 3.12 shows, the different case forms of Hungarian postpositions only make a directionality distinction. As argued above, spatial adpositions specifically express configurational meaning. The configuration distinctions that are made in the spatial case paradigm are redundant on adpositions and therefore omitted; only the directional part is used.

Now consider the inventory of Finnish spatial case in Table 3.13. Just like in Hungarian, spatial cases in Finnish can morphologically be decomposed into a configurational and a directional part. The configurational dimension is taken care of by the first part of the spatial cases: -l- for ON/AT and -s- for IN. The directional function is expressed by the second part: -lV for Place, -tV for Source, and a no longer recognizable morpheme for Goal. The full spatial meaning of the ablative, for example, consists of the directionality function Source and the configuration part ON. Note that the Finnish spatial case system thus makes a two-way configuration distinc-

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	Directionality		
	Place	Source	Goal
Configuration	-lV	-tV	-xx
ON/AT -l-	adessive	ablative	allative
(external cases)	(*-llV*)	(*-ltV*)	(*-lle*)
IN -s-	inessive	elative	illative
(internal cases)	(*-ssV*)	(*-stV*)	(*-(h)VVn*)

Table 3.13: Finnish spatial case paradigm

tion, distinguishing *external* (ON/AT) from *internal* (IN) cases.[6]

So I assume that the Finnish spatial case construction *talossa* 'in the house' is as follows:

Finnish spatial case construction
(78)   a.   *talo-s-sa*
              house-IN-STAT
              'in the house'
        b.   [DIR [CONFIG [GROUND *talo-*]-*s*]-*sa*]

The *-s* morpheme adds the configurational part of the meaning (IN), the *-sV* morpheme expresses the directionality Place.

In addition to spatial cases, Finnish has a number of adpositions to express spatial meaning. Unlike postpositions in Hungarian, these adpositions are themselves marked for directionality with a "complete" spatial case, as illustrated in (79-a):

Finnish spatial adposition construction
(79)   a.   *talo-n   sisä-llä*
              house-GEN in-ADE
              'in the house'
        b.   [DIR [?? [CONFIG [GROUND *talon*] *sisä*]-*l*]-*lä*]

The problem is that the configurational part of the spatial case (*-l*) is redundant and therefore should not occur. That is, in (78) the *-s* morpheme expresses the configurational part of the meaning (IN) and directionality is

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[6]Note that this use of the terms *external* and *internal* differs from the one in the previous section where it described structural position. In this section the terms refer to configuration distinctions.

only expressed by the second part, the *-sV* morpheme. If the adposition in (79) expresses the configuration, then we would only need *-la* (and not *-l-la*) to make the spatial expression complete (79-b). Because spatial case on adpositions marks directionality only, its configuration part becomes meaningless. But unlike in Hungarian, this does not mean that it can be left out. In other words the Finnish PP *talon sisällä* 'in the house' in fact is as follows:

Finnish spatial adposition construction (revised)

(80) a. *talo-n   sisä-llä*
          house-GEN in-ADE
          'in the house'
      b. [DIR [CONFIG [GROUND *talon*] *sisä*]-*llä*]

The adessive marked postposition combines with a genitive case marked DP. The postposition denotes the configuration, the adessive case on the P only adds stative directionality. The configurational part of the adessive case does not add configurational meaning, as this is already done by the P. But how can this be? How can this part remain meaningless when it does add meaning in the spatial case variant in (78)? If the configuration part is already specified by the postposition, then what does the configuration of the spatial case in (80) do? In principle we would expect to have a directionality marker only. According to Kracht (2003) this is indeed what we get.

Kracht (2003) argues that a case marker can be used to express a case feature or a case function. A case feature is a syntactic requirement without any meaning; a case function is a semantic function that does have a meaning proper. The case feature and the case function are never expressed by the same case marker at the same time. For example, if an adposition structurally assigns accusative case to its object (as a feature) this case does not have any meaning. It does have meaning, however, if there is a possible case alternation, and the case is assigned as a function. Kracht (2003) shows how these two different (i.e., feature vs. function) possibilities can be expressed by the directionality and configuration parts of a spatial case independently from each other. It is imporant to note that the configuration and the directionality morpheme have to occur together (semantically empty or not) to form a grammatical case marker. This is illustrated in the following example:

Finnish (Kracht, 2003)

(81) a. *Hän menee laiva-l.ta   (alas)*
          He   walks ship-ABL   (down)
          'He is going/walking from the ship'
      b. *Hän löysi   rahansa   laiva-l.ta   (*alas/alhaalta)*
          He   found money.3PX ship-ABL   (down/from downstairs)
          'He found his money on ('off') the ship'
      c. *Tämä näyttää   laiva-l.ta   (*alas/*alhaalta)*
          This   resemble ship-ABL   (down/from downstairs)
          'This looks like/resembles a ship'

The configurational and directionality dimensions have different functions and features. In (81-a) both semantic components are present. In (81-b) the verb selects a place, and the Source component only has a syntactic function. In (81-c) both components have null semantics and the verb semantically selects for a thing. This is illustrated by the possibility to replace *laivalta* in (81) with the spatial particles *alas* 'down' and *alhaalta* 'from downstairs' (put between parentheses). So (81) shows that spatial case in Finnish consists of two elements that can be meaningful or semantically empty independently from each other.

The Finnish spatial case system makes a configuration distinction between internal (IN) and external (AT/ON) cases. As postpositions themselves express configuration already it is not to be expected that spatial case makes such a configuration distinction on postpositions. That is, it is not expected that spatial adpositions inflect for both internal and external cases as there is no semantic contribution this configuration distinction can make. Therefore I predict that adpositions choose either the set of internal (inessive, elative, illative) or the set of external (adessive, ablative, allative) cases to mark the directionality distinction only. Many postpositions do not have a complete paradigm. Out of the seventeen adpositions listed in Sulkala and Karjalainen (1992), only four (*al-* 'under', *jälke-* 'often', *lähe-* 'near', and *ympäri-* 'around') have either the internal or the external case forms; seven other adpositions either do not inflect at all or only for nonlocal cases like partitive, essive, translative and/or prolative.

I investigated two adpositions that do seem to inflect for all six local cases according to the list in Sulkala and Karjalainen (1992). For this purpose, I selected six newspapers from the CSC corpus: *Demari* 2000, a newspaper of the Social Democrats; *Karjalainen* 1998 and *Aamulehti* 1999, which are two pretty high standard, big newspapers, the latter especially for the region of Tampere; *Hyvinkään Sanomat* 1997 and *Hämeen Sanomat*

2000, which are two lower quality, smaller newspapers, and finally *Helsingin Sanomat AE* 1995, which is generally considered the highest quality newspaper. From this approximately 26 million word corpus I extracted all PPs that involved the postpositions *sisä-* 'in' and *pää-* 'on'. The results are shown in Table 3.14.

	pää- 'on'	*sisä-* 'in'
Inessive	2293	47
Illative	2296	395
Elative	1919	5
Total internal	**5408**	**447**
Adessive	882	2052
Allative	1859	186
Ablative	208	208
Total external	**2949**	**2446**

Table 3.14: Case forms of Ps in Finnish

At first sight the numbers for *pää-* 'on' might look surprising: both the internal and external case forms are very frequent. One would have expected to have either the internal or the external case forms but not both. The explanation is very simple: *pää-* with the internal cases means 'at the end of'; only with the external cases does it mean 'on' (82). This means that for the relevant meaning of *pää-* the alternation in configuration is no longer possible at all. I hypothesize that the internal case forms of *pää-* were vacant and therefore were able to take up a new meaning 'at the end of'.

FINNISH (Sulkala & Karjalainen, 1992, 250; 261)
(82) a. *Kirja on   pöydä-n   pää-llä.*
          book be.3SG table-GEN *pää-*ADE
          'The book is on the table.'
      b. *Tulen   tunni-n   pää-stä.*
          come.1SG hour-GEN *pää-*ELA
          'I'll come in an hour'

As Table 3.14 shows *sisä-* complements have a clear preference for the external case forms. What differs from the variation with *pää-* is that the internal and the external forms of *sisä-* seem to express the same meaning 'in(side)'. Figure 3.6 shows for all *sisä-* 'in' objects with which proportion

they occur with an internal case form of *sisä-*. A proportion of 0 means that a complement is always selected by an external case form of *sisä-*; a proportion of 1 means that a complement is always selected by its external case forms; an intermediate value means that a complement is selected by both internal and external case forms. The density curve in Figure 3.6 shows that almost all complements are only selected by the external case forms, a smaller group is exclusively selected by the internal case forms. There are very few complements that are selected by both sets. The ones that do occur as the complements of both forms of *sisä-* occur with a very high token frequency (for discussion on similar frequency findings, see Lestrade, 2010). (Note that the density curve is smoothened. Proportions below zero or above one are impossible.)

If we look at the individual constructions, we see that most complements appear as the object of *sisä-* in either of the two case types exclusively. That is, there are very few objects with a proportion of internal cases between 0 and 1. This means that the internal and external case forms of *sisä-* 'in' select for a different kind of object. However, there seems to be no clear semantic difference between the two classes of objects (yet). To illustrate this, in (83) some examples of the three different classes of complements of *sisä-* 'in' are given: complements that almost exclusively (in more than 90% of the cases) go with the external case form of *sisä-*, complements that almost exclusively go with the internal case form of *sisä-*, and complements that go with both sets.

(83)   a.   Examples of complements of *sisä-* with internal cases:
        bussin sisään 'into the bus'
        pallon sisään 'into the ball'
        tunnelin sisästä 'from inside the tunnel'
    b.   Examples of complements of *sisä-* with external cases:
        muutoksen sisällä 'in the alternation'
        talon sisällä 'in the house'
        asunnon sisälle 'into the house'
    c.   Examples of complements of *sisä-* with both cases:[7]
        laatikon sisällä 'in the box'
        laatikon sisään 'into the box'
        seinän sisällä 'in the wall'
        seinän sisään 'into the wall'

---

[7]The grammaticality judgments of native speakers may differ from the corpus findings and one of the two forms may be preferred.
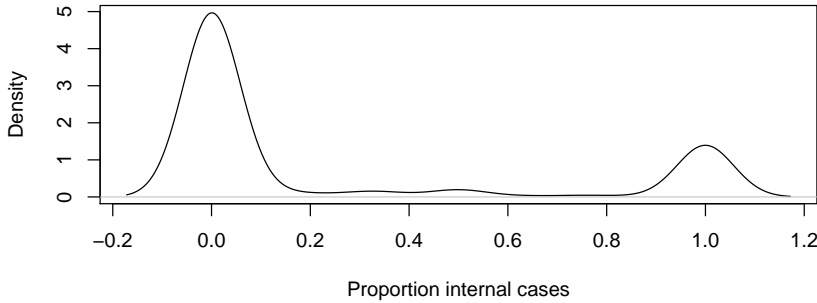
Figure 3.6: Division of case over *sisä-* objects

The density plot together with the frequency numbers in Table 3.14 suggests that the internal form of *sisä-* 'in' is the marked option.[8] Only rarely and only few complement types occur with these forms of *sisä-*. Given the clear preference for the external case forms of *sisä-* and given the different object selection of the internal and external case sets, I expect that the internal case forms of *sisä-* 'in' will become obsolete (like for most other adpositions), or take up another meaning (as in the case of *pää-*). In the first case the paradigm will become more economical; in the second case the internal case forms will become meaningful and hence useful again.

In this section it was shown that configuration distinctions that are made in spatial case paradigms become meaningless when combined with adpositions. This redundancy can be resolved in two ways. In Hungarian the configurational part of the spatial case is simply left out. In Finnish this is not possible as a spatial case necessarily consists of both subcomponents. In this situation there are again two possibilities. Either adpositions may combine with spatial cases from one configuration series only, or the different case series can develop new meaning distinctions.

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[8]The mean frequencies of the different complement classes of *sisä-* differ significantly according to a Wilcoxon rank sum test with Bonferonni correction; applied to logged frequencies to correct for outliers: all ps $\approx$ 0

3.5 Conclusion

In this chapter the importance of frequency for spatial case was discussed. It was assumed that spatial meaning consists of both a directionality and configuration dimension. It was argued that the directionality dimension necessarily consists of three basic distinctions, which follows from the analysis of directionality in terms of a change of configuration over time. Place directionality is the absence of a change in configuration; Goal directionality is a change into some configuration, and Source directionality is a change out of some configuration. In contrast, there is no uniform set of configurational concepts that is similarly privileged in human cognition and language. As a result the distinctions of directionality are more frequently used than those of configuration. Because of their frequent use the markers of directionality grammaticalize. In a number of studies it was shown that spatial case indeed mainly expresses directionality, as predicted by my analysis. Within directionality, I argued for an implicational scale that says that Place is expressed first, then Goal and Source, and only then the derived meanings. This prediction was also borne out by a cross-linguistic comparison of spatial case paradigms.

Chapter 4

The Optional Use of (Spatial) Case

This chapter will show how the semi-bidirectional OT model that was developed in Chapter 2 explains the optional use of spatial case. The model also straightforwardly extends to various types of structural differential case marking. In some languages the use of case can be judged unnecessary which leads to the omission of case marking. Although other rules of grammar may interfere with this general procedure, I propose that in principle all DCM can be explained by predictability.

4.1 Introduction

The semi-bidirectional OT model that was introduced in Chapter 2 predicts the economical use of language. In Section 3.4.3, it was shown how this model accounts for the alternation between spatial case and more lexical constructions. In this chapter, the model will be applied to the alternation between case and an even more economical alternative. Although the use of case is a relatively cheap strategy to encode argument structure, using nothing is even cheaper. Therefore, if it is possible, speakers will not use case. This optional use of case marking is known as *differential case marking* (*DCM*) and is illustrated in (1).

Bukharian Uzbek (Aziz Djuraev, p.c.)

(1)   a.   *Siz bozor borasizmi?*
            you market go
            'Will you go to the marketplace?'
      b.   *Siz bozor-ga borasizmi?*
            you market-DAT go
            'Will you go to the marketplace?'

In Bukharian Uzbek dative case expressing location is optional for nouns that refer to places (Aziz Djuraev, p.c.). Because a marketplace prototypically has a spatial function, dative case that marks this function can be omitted in (1-a).

Most case languages exhibit differential case marking to some extent. It is a relatively well-known phenomenon for the structural use of case. In many languages, the use of structural case is conditioned by prominence hierarchies of animacy, definiteness or specificity (cf. among many others Aissen, 2003; de Hoop & Swart, 2008; de Swart, 2007; de Hoop & Malchukov, 2007).[1] Entities that are high-up in these hierarchies behave differently from entities that are lower down. For example, some languages restrict the use of case to their pronominal system. In English the pronoun has a different form in subject (2-a) and object position (2-b); the form of the full noun phrase however is the same in both functions.

(2)   a.   He sees the woman.
      b.   The woman sees him.

In some languages it may also be the case that specific or definite objects can receive case marking whereas indefinites remain caseless. This is illustrated for Hindi in (3).

Hindi (de Hoop & Malchukov, 2008, 576)

(3)   a.   *Wo ek laD.kaa dekhtaa hae*
            he one boy seeing is
            'He sees a boy.'
      b.   *Wo ek laD.ke-ko dekhtaa hae*
            he one boy-ACC seeing is
            'He sees the boy.'

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[1]Note that the use of *prominence/prominent* in this chapter differs from the one in Chapter 2. In that chapter it referred to predictability of argument functions of particular predicates.

The indefinite object in (3-a) does not receive case marking, whereas the more prominent object in (3-b) does.

Such alternations are generally explained in terms of markedness (Aissen, 2003), or by the identifying or disambiguating function of case (de Hoop & Malchukov, 2007). Aissen (2003) argues that definite objects are semantically marked (definites most often being subjects) and therefore accordingly morphologically marked by accusative case. Indefinites, on the other hand, are typical objects and therefore remain unmarked. De Hoop and Malchukov (2007, cf. Section 4.3 for more elaborate discussion) argue that such case variation should be explained by principles of economy, distinguishability and identification. For reasons of distinguishability, prominent objects should be marked with accusative case to tell them apart from subjects. Identification says that prominent arguments prefer case marking, no matter what their syntactic function is. The ranking of these constraints is language specific.

Aristar (1996, 1997) argues that prominence alternations as illustrated in (3) also occur in the semantic use of case. Geographical names, for instance, often have a "lighter" spatial marking than most other nouns, whereas nouns that refer to animates may have special more elaborate forms of spatial case (Creissels, 2009b, 612). Aristar (1996, 1997) proposes a markedness account with typical pairings of case and argument (similar to the idea of Aissen, 2003). The prototypical pairing of case and argument is called *typing*. He discerns three strategies for dealing with potentially type-incongruent cases and nominals. Firstly, a nominal that does not fit the typing criteria of some case simply does not occur in that case (*blocking*; cf. also Kiparsky, 2004; Karlsson, 1986). Secondly, a nominal that does not fit the typing criteria of some case receives additional marking (*bridging*). Finally, an atypical combination of a nominal and a case gets reinterpreted (*extension*). As illustrated in (4), the second and third strategy are often applied together.

Yidiny (Australian) (Aristar, 1997, 317)

(4)   a.   *mandi-m*
                hand-ABL
                'from the hand'
    b.   *buɲa:-ni-m*
                woman-BRIDGE-ABL
                'because of the woman'

In (4) an additional bridging morpheme is used for the type incongruent

combination of the ablative case with an animate argument. The meaning is also extended to the abstract domain.

Aristar (1997) argues that the difference between typing effects of structural and nonstructural cases is that in the former there is a clear alternation between some marker and zero, whereas in the latter there is no such alternation. Instead, there is an alternation in the use of a bridging morpheme as illustrated in (4). Each case has its own particular typing criteria. According to Aristar, the reason that typing has not previously been identified as the coordinating principle in both structural and semantic case is that the alternation in the use of bridging morphemes is harder to detect than the alternation between a marker and zero. Aristar (1997) suggests that because of the resulting focus on differential case marking in the structural domain only, people did not see the overall typing picture. However, typing each combination of case function and filler and marking incongruent pairings is said to explain both structural and semantic case alternations (Aristar, 1997, 356).

I agree with Aristar that structural and spatial DCM are preferably explained by the same principles and that the accounts of structural DCM are too specific for this purpose. However, I disagree with him on two points. Firstly, as will be shown in Section 4.3, not all case alternations can be explained by marking marked combinations. Secondly, not all spatial DCM is between a spatial case and a more elaborate form. In my account of DCM case sometimes can be omitted when the function that some constituent performs is already sufficiently clear. Such economical use applies equally to structural and spatial case. As was illustrated in the first example of this chapter and as will be elaborated in Section 4.2, we find that spatial case alternates with zero forms.

In this chapter it will be shown how my model can account for very different kinds of differential case marking. DCM is shown to follow from the very same principles that already explained the development of case and its nondifferential use in Chapter 2. The (differential) use of case is explained by predictability, that is, the semi-bidirectional evaluation of a form candidate. Although most use of case probably is a result of fossilization, in some languages the speaker does not always have to use case. When building a sentence, the speaker checks whether there are enough cues for the hearer to derive the interpretation already. If the use of case turns out to be redundant it can be left out in these languages. Obviously the factors that determine the predictability of some case function differ per function, as prototypical Agents are not exactly the same as prototypical Goals. Thus, in the argument domain prominence may account for predictability; in the

spatial domain, spatial prototypicality does.

Not all behavior of case can be explained by my model. Other rules of grammar, which are differently motivated, may interact with the ones that follow from the general principles I propose. Anttila and Fong (2000) argue for example that there is a general syntactic constraint CASE-OCP that prohibits the use of identical cases on adjacent constituents. For example Finnish elative case, which normally is assigned to the plural NP of a quantitative determiner like *one third*, is categorically blocked in environments where the complete DP is assigned elative case by a verb. Instead, the NP receives partitive case marking as illustrated in (5).

Finnish (Anttila & Fong, 2000, 10, 15)

(5)   a.   *Kolmasosa munkke-i-sta / ??munkke-j-a on italialaisia.*
             one.third   monk-PL-ELA / monk-PL-PART are Italians
             'One third of the monks are Italians.'
    b.   *Sointu-sta tuli   munkki.*
             Sointu-ELA became monk
             'Sointu became a monk.'
    c.   *[Kolmasosa-sta [*mieh-i-sta / mieh-i-ä]]   tuli*
             one.third-ELA   man-PL-ELA / man-PL-PART became
             munkkeja.
             monks
             'One third of the men became monks.'

Yet another example of variation I cannot account for is the variation among grammatical constructions in which case redundancy is allowed. For example, Latin always exhibits case concordance between adjective and head noun whereas in Hungarian this is not the case in attributive constructions, but it is the case in predicative ones (Stiebels, 2002). In short, I do not pretend to explain all uses of case. My model is concerned with very general principles of case that may be overruled by various more specific ones.

This chapter is organized as follows. Firstly, cross-linguistic examples of the optional use of spatial case will be discussed. In Section 4.3 structural DCM and some OT accounts that have been proposed for this type will be discussed. In Section 4.4 it will be shown how my account can describe all versions of differential case marking. Finally, in Section 4.5, it will be shown how it straightforwardly accounts for other, lesser known types of DCM.

4.2 Spatial Differential Case Marking

This section will discuss cross-linguistic examples of the optional use of spatial case because of predictability. The general observation is that sometimes spatial case does not have to be used if the speaker thinks the meaning contribution it would make is sufficiently clear already.

As illustrated in the previous section, in Bukharian Uzbek the spatial marker *-ga* can be dropped when added to nouns with semantics of place.

Bukharian Uzbek (Aziz Djuraev, p.c.)

(6)   a.   *Siz bozor-ga   borasizmi?*
            you market-DAT go

    b.   *Siz bozor   borasizmi?*
            you market go
            'Will you go to the marketplace?'

A marketplace is a prototypical ground (cf. Section 3.2). Because of this predisposition it is not necessary to mark its spatial function explicitly (6-b).

Creissels (2006a) observes a similar phenomenon for Tswana. Consider the following example.

Tswana (Creissels, 2006a, 26)

(7)   a.   *Ke   tlaa huduga Kanye.*
            S1SG FUT move   Kanye
            'I am going to move from Kanye.'

    b.   *Ke   tlaa huduga (ko) motse-ng.*
            S1SG FUT move   LOC village-LOC
            'I am going to move from the village.'

    c.   *Ke tlaa huduga (ko) motse.

In (7-a) the spatial function of the place *Kanye* is not explicitly marked. This is done by the locative suffix *-ng* and an optional additional preposition for *motse* 'village' in (7-b). As (7-c) shows, it is not possible to leave out the locative suffix for the full DP. According to Creissels (2006a, 26-27) the use of place names as spatial arguments or adjuncts does not have to be marked with the spatial markers that are obligatory for common nouns fulfilling the same functions, because their very meaning predisposes them to be interpreted as a ground.

In Korean, just like most other case markers, spatial markers can be

dropped in casual speech if no emphasis, exclusiveness, or contrast is expressed:

Korean (Sohn, 1994, 231)

(8)   a.   *Minca-uy   tongsayng-i   hakkyo-ey   ka-ss-ta.*
           Minca-GEN brother-NOM school-GOAL go-PAST-DECL

      b.   *Minca-uy   tongsayng-i   hakkyo ka-ss-ta.*
           Minca-GEN brother-NOM school go-PAST-DECL
           'Minca's brother went to school.'

Given a context of going, the school is easily understood as the goal in (8). Explicit marking is therefore not necessary.

In Maricopa too, spatial case marking is optional (Gordon, 1986, 48). According to Gordon (1986), its absence does not result in much ambiguity or processing difficulty because of the inherent properties of the noun referent and/or by information from the context. From this discussion it does not become exactly clear whether this optionality is general or restricted to situations in which the function of the case is predictable.

Maricopa (Gordon, 1986)

(9)   a.   *Kwnho lames-k   '-shvaw-k.*
           basket table-LOC 1-put-REAL

      b.   *Kwnho lames '-shvaw-k.*
           basket table 1-put-REAL
           'I put the basket on the table.'

In (9) the locative marker *-k* is optional as the function of the table is clear from the context. If you put a basket somewhere and there is a table involved, the table is probably the place where you put the basket.

Furthermore, Kittilä (2008) shows how in the Indo-Iranian languages Nepali and Gujarati goal marking for place names is dropped. Firstly consider the example from Nepali.

Nepali (Kittilä, 2008, 255)

(10)   a.   *Sikchak-le   eutaa kiitaab maanche-lai pathaa-yo.*
            teacher-ERG one   book   man-DAT   send-PAST
            'The teacher sent a book to the man.'

       b.   *Maanche-le kiitaab pustakaalaya-ma pathaa-yo.*
            man-ERG   book   library-IN   send-PAST
            'The man sent the book to the library.'

     c.   *Sikchak-le   eutaa kiitaab maisore pathaa-yo.*
         teacher-ERG one   book   Mysore send-PAST
         'The teacher sent a book to Mysore.'

Animate goals receive dative marking (10-a), inanimate goals are marked with *-ma* 'IN' (10-b), the place name in (10-c) remains unmarked.

A similar pattern holds for Gujarati. Both animates and inanimates are marked with dative case, whereas place names are zero marked.

Gujarati (Kittilä, 2008, 255)

(11)   a.   *Sikshak-e   vidaarthi-ne pustak   mokl-y-un.*
         teacher-ERG student-DAT book.N.SG send-PAST.PERF-N.SG
         'The teacher sent a/the book to the student.'
      b.   *Sikshak-e   pustakalaya-ne pustak   mokl-y-un.*
         teacher-ERG library-DAT   book.N.SG send-PAST.PERF-N.SG
         'The teacher sent a/the book to the library.'
      c.   *Sikshak-e   delhi pustak   mokl-y-un.*
         teacher-ERG Delhi book.N.SG send-PAST.PERF-N.SG
         'The teacher sent a/the book to Dehli.'

As the contrasts between the *b* and *c* examples show, the case variation cannot be explained by a simple interaction between case and animacy only. Both humans and inanimate goals receive marking. Only for place names, which are inherent locations by definition, goal marking can be dropped.

In Tariana, a language from the Arawakan family, the locative and instrumental case markers are optional. They can be omitted if a constituent is repeated in the same function (only the first occurrence of the constituent then is marked); if the meaning can be recovered from the context, and from inherently instrumental or locational nouns (Aikhenvald, 2003, 154-155).

The spatial case marker *-se* is used to mark Place, Goal, and Source, as illustrated in (12).

Tariana (Aikhenvald, 2003, 148)

(12)   a.   *Na-pidana   uni-se.*
         3PL.go-REMP.REP water-LOC
         'They went into water.'
      b.   *Nawiki pa:-putʃita-se   nehpani-pidana.*
         people one-CL:CLEARING-LOC 3PL.work-REMP.REP
         'People were working on a clearing.'

c. *Hĩ̃*　　　*wyaka-se ka-nu-kaɾu*
DEM.ANIM far-LOC　REL-come-PAST.REL.FEM

dhuma-naka　　　*waku-nuku.*
3SG.FEM.hear-PRES.VIS 1PL.speech.TOP.NONA/S
'She who came from far away understands our speech.'

(13) illustrates the omission of this locative marker because of recoverability from the context. The example comes from a text in which a girl escaped from her ritual seclusion while her parents went to the garden.

Tariana (Aikhenvald, 2003, 155)

(13)　*Ha-niɾi*　　　*hinipuku ka:-kaɾi*
parent-MASC garden　REL.go-PAST.REL.MASC.SG

di-dia-ka　　　　　*di-nu-pidana*
3SG.NONFEM-return-SUB 3SG.NONFEM-come-REMP.REP

di-ka　　　*pamuña-sawa-se*
3SG.NONFEM-see middle-CLASS:GROUP-LOC

hipa-da-sawa-se
ground-CLASS:ROUND-CLASS:GROUP-LOC

yaru-maka-si-pe　　　　　*dhupa-ka-pidana.*
thing-CLASS:CLOTH-NONPOSS-PL 3SG.FEM.wash-SUB-REMP.REP
'When the father who had gone returned from the garden, he saw that she was washing clothes on the middle heap of stones.'

In (13) the father is coming back from the garden. *Hinipuku* 'garden' need not be marked with locative case. It has already been said at the beginning of the story that her parents went to the garden. Therefore the Source function is obvious from the context (Aikhenvald, 2003, 155).

(14) illustrates the omission of the locative marker on an inherently locational noun, *viz.* a place name.

Tariana (Aikhenvald, 2003, 155)

(14)　*Papuɾi-nuku*　　　*na-wa*　　　*na:-pidana*
Papuri-TOP.NONA/S 3PL-enter 3PL.go-REMP.REP
'They (Tariana forefathers) came onto the Papuri river.'

In my proposal the different conditions Aikhenvald (2003) discerns are variants of the same principle. Spatial case is not used when the spatial meaning is predictable.

All examples above concern instances of differential *case* marking. How-

ever, as I said in the introduction, this pattern is not expected to be restricted to case but should hold for other types of linguistic constructions too. For the spatial domain, languages that use prepositions to express spatial meaning are a case in point. In German for instance, prepositions can be omitted with names of metro and railway stations and the like (Gisbert Fanselow p.c.).

German (Gisbert Fanselow p.c.)

(15)   a.   *Sie müssen am   Domplatz aussteigen.*
             you must   at.the.DAT Domplatz exit

        b.   *Sie müssen Domplatz aussteigen.*
             you must   Domplatz exit
             'You must exit at Domplatz.'

In Yukatek Maya, prepositions are also used to express spatial meaning. However, place names, cardinal directions, and prototypical grounds go without a preposition.

Yukatek Maya (Bohnemeyer & Stolz, 2006, 284, 285; glosses adapted, *SL*)

(16)   a.   *Sáamal   walakil-a'   yan   in   bis-ik-ech*
             tomorrow this.time-PROX OBLIG 1SG go:CAUS-INC-2SG
             Carrillo.
             Carrillo
             'Tomorrow at this time, I will take you to (the town of) Carrillo.'

        b.   *(...) u che'-il,   mehen che'il-o'b   bèey-a',   k-u*
             ...   3 wood-REL small   and-REL-PL thus-PROX IMPF-3
             lúub-ul lu'm
             fall-INC earth
             '(...) the trees, like the small trees, they fall to the ground'

        c.   *Le   lùuch-o ti'=yàan   y-óok'ol le   mèesa-o'.*
             DEF cup-DIST LOC=exist.3SG 3-top   DEF table-DIST
             'The cup, it's there on the table.'

The place name *Carrillo* and the inherent ground *lu'm* 'earth' are used as bare nouns (16-a,b) other grounds like *mèsa* 'table' need to combine with a preposition (16-c) in their spatial use.

As a final example consider the following example from Yélî Dnye.

Yélî Dnye (Levinson, 2000a, 10)

(17)   a.   *Kpîdî pee   pi   kêpa   mbêmê ka   t:a.*
             cloth piece person forehead on   TAM hanging
             'The piece of cloth is hanging on the person's forehead.'
       b.   *Kpîdî pee   pi   kêpa   ka   t:a.*
             cloth piece person forehead TAM hanging
             'The piece of cloth is hanging (around) the person's forehead.'

The adposition used in (17-a) is omitted in (17-b), which is otherwise the same. According to Levinson (2000a) the omission of postpositions is only possible for expected, stereotypical relations. The explicit use in (17-a) results in a marked reading in which the head-band is perched on top of the head.

The examples in this section show that spatial case can alternate with zero marking, just like structural case. We have also seen that case marking not only results from inherent markedness. Case can rather sometimes be omitted if predictable, whether from context or inherently.

The variation is easily captured by my semi-bidirectional account. The constraint ADD$_W$ ("use world knowledge to enrich an utterance") tells the hearer to interpret an unmarked constituent with the most likely argument function. The constraint ECONOMY ("be economical in expressing what you want to say") dictates the speaker to omit case if she thinks the function of a constituent is predictable enough to have the hearer fill it in himself. Consider the example from Maricopa again, which is repeated in (18):

Maricopa (Gordon, 1986)

(18)   a.   *Kwnho lames-k   '-shvaw-k*
             basket table-LOC 1-put-REAL
       b.   *Kwnho lames '-shvaw-k*
             basket table 1-put-REAL
             'I put the basket on the table.'

The optimization procedure is illustrated in Tableau 4. The violation of ADD$_W$ is parenthesized, as the omission of the spatial case marker is optional, not obligatory. ECONOMY prohibits the use of this marker and therefore the zero marked form is preferred from the perspective of the speaker. Depending on her evaluation of ADD$_W$, the speaker may use the spatial case anyway. If she thinks world knowledge is insufficient, the unmarked candidate is judged ambiguous and locative case has to be used. However, if she thinks the semantic role of the table is sufficiently clear from context,

she can use a zero marker.

Prod: Put(e) & Agent(e, I) & Theme(e, basket), Ground(e, table)	Faith$_L$	Add$_W$	Economy
☞(👆) a. *table-∅*			
👆 b. *table*-LOC			*
Int: a. table-∅	Faith$_L$	Add$_W$	Economy
table = Instrument		(*)	
(☞) table = Ground			
Int: b. table-LOC	Faith$_L$	Add$_W$	Economy
table = Instrument	*	(*)	
☞ table = Ground			

Tableau 4: Semi-Bidirectional Analysis of spatial marking in Maricopa

The same analysis can be applied to all other examples. The speaker prefers the most economical form, which she actually uses if she thinks the hearer will find out the ground function himself. If she does not think so, she will add more material until she thinks she will be understood.

In the next section, structural DCM and some of the OT accounts that have been proposed to deal with this type will be discussed. In Section 4.4 it will be shown how my model accounts for it.

4.3   Structural Differential Case Marking

In this section the optional use of structural case and some of the optimality theoretic accounts that have been proposed for this type of DCM will be discussed.

4.3.1   Markedness, Identification and Distinguishability

An explanation of structural differential case marking in terms of markedness is proposed by Aissen (2003). Meaning can be recoverable because of a typical combination of some function with a performer. In these cases it is not necessary to use case marking. The case marking of marked combinations is used precisely because of the markedness of that combination. From a functional perspective the hearer is told that its unexpectedness

notwithstanding, the argument structure is as it is. For example, it is typical for subjects to be animate and definite. If the actual subject indeed is animate and definite there will be no case marking. However, if the subject is inanimate and/or indefinite, there will be case marking. The opposite pattern holds for direct objects.

The predictions Aissen (2003) makes are borne out in some languages, but in the subject domain differential use of case marking exhibits more variation (see de Hoop & Swart, 2008). De Hoop and Malchukov (2008, cf. also de Hoop & Swart, 2008; de Hoop & Malchukov, 2007) argue that differential case marking is better explained by the two main functions of case identified in functional-typological literature, the *distinguishing* and the *identifying* function (Mallinson & Blake, 1981; de Hoop & Malchukov, 2008). The identifying and distinguishing function together help in explaining differential object marking (DOM) and the more varied differential subject marking (DSM).

(19)   a.   ID(ENTIFY): Encode internal argument properties (i.e., ergative case identifies strong subjects and accusative case identifies strong objects)

            b.   DIST(INGUISHABILITY): The two arguments of a transitive clause should be distinguishable

According to de Hoop and Malchukov (2008) the identifying function encodes prominent (animate) arguments and the distinguishing function ensures that prominent objects are not misunderstood as subjects or that low-prominent subjects are not misunderstood as direct objects. The two functions of case considerably overlap in the argument domain: if a transitive argument is identified, it can be distinguished from the other; if it is distinguished, it can be identified. However, the two functions diverge in the subject domain, as de Hoop and Malchukov (2008) argue. Because of the identifying function, prominent subjects should be case marked, but because of the distinguishing function *non*-prominent subjects should be case marked. Instead, they work in the same direction in the object domain, both marking prominent objects. Because of this, differential object marking is much more uniform across languages than differential subject marking.

The interaction of these two constraints with ECONOMY accounts for the differential use of case marking. Consider the following example from Manipuri:

Manipuri (de Hoop & Malchukov, 2008)

(20)   a.   *əy-nə tebəl-də   theŋŋi.*
             I-ERG table-LOC touched
             'I touched the table (volitionally).'

        b.   *əy tebəl-də   theŋŋi.*
             I   table-LOC touched
             'I touched the table (involuntarily).'

The volitional Agent in (20-a) is marked with ergative case, whereas the nonvolitional one in (20-b) remains unmarked. Note that the markedness account of Aissen (2003) predicts exactly the opposite pattern, Agents typically being volitional and therefore nonvolitional Agents are expected to become case marked.

The optimization procedure for this example is illustrated in Tableau 5. As opposed to what we have seen so far, de Hoop and Malchukov (2008) use a bidirectional OT analysis. In this approach, form-meaning pairs are evaluated simultaneously, which explains the different notation. For reasons of clarity, tableaux taken from de Hoop and Malchukov (2008) are marked with *(dHM)*.

	Subject	ID	ECONOMY
☞	[ERG, A]		*
	[ERG, a]	*	*
	[∅, A]	*	
☞	[∅, a]		

Tableau 5: DSM in Manipuri (dHM)

The use of case violates ECONOMY. The use of ergative case for a low-prominent A (*a*) and the lack of ergative case for a prominent A (*A*) are violations of ID. The only form-meaning pair that does not violate a single constraint is the combination of the low-prominent A with a zero expression. As a result, this combination becomes the *first superoptimal* form-meaning pair.

In bidirectional OT (Blutner et al., 2006) (which should be distinguished from the semi-bidirectional version of de Swart (2007, in prep.)) optimization goes in two rounds. In the first round, the best combination of form and meaning becomes optimal. If the speaker wants to express a more marked meaning, she cannot simply choose the most economical form as she knows

the hearer will understand this in the wrong way. This combination of a marked meaning with an unmarked form is said to be *blocked* by the first superoptimal pair. To express the marked meaning, the speaker has to use a more marked form. The hearer, in his turn, will not interpret this marked form with an unmarked meaning as he knows that there is a more economical expression for this unmarked meaning. Since this combination is blocked he will interpret it with the marked meaning.

By such bidirectional reasoning, the combination of the prominent A with ergative case becomes the *second superoptimal* candidate, in spite of its violation of ECONOMY. It is the only possible form to express a prominent Agent that does not have another interpretation already and it is the only possible interpretation for the ergative case that is not assigned to another form already.

Now consider the following example from Fore:[2]

Fore (Scott, 1978, 115-116)

(21)   a.   *Yaga:-wama wá   aegúye.*
               pig-ERG   man 3SG.OBJ.hit.3SG.SU.IND
               'The pig attacks the man.' not: 'The man kills the pig.'
    b.   *Yaga: wá   aegúye.*
               pig   man 3SG.OBJ.hit.3SG.SU.IND
               'The man kills the pig.' not: 'The pig attacks the man.'

This pattern can be explained by the interaction of the distinguishing function with ECONOMY, as illustrated in Tableau 6.

	Subject	DIST	ECONOMY
	[ERG, A]		*
☞	[ERG, a]		*
☞	[∅, A]		
	[∅, a]	*	

Tableau 6: DSM in Fore (dHM)

In Fore ergative case is not used to identify prominent As, but to keep low-prominent ones apart from Ps. That is, it is the relative instead of the absolute prominence of the Agent (in terms of animacy) that determines

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[2]What is called ergative case by de Hoop and Malchukov (2008) in (i) is analyzed as a delineator by Scott (1978).

case marking. In OT terms this means that it is DIST rather than ID that is ranked above ECONOMY, as illustrated in Tableau 6. The only faultless form-meaning pair is the combination of the prominent A with a zero expression. The combination of the ergative case with the low-prominent A follows from bidirectional reasoning. There is a better interpretation for a zero marked form and a better form for the unmarked meaning. Thus in differential subject marking, depending on which of the two main functions outranks ECONOMY, either strong As (ID) or weak ones (DIST) receive ergative case marking.

In differential *object* marking the pattern is more uniform. Consider the following example from Hindi again.

Hindi (de Hoop & Malchukov, 2008, 576)
(22)   a.   *Wo ek laD.kaa dekhtaa hae*
                he   one boy   seeing is
                'He sees a boy.'
        b.   *Wo ek laD.ke-ko dekhtaa hae*
                he   one boy-ACC seeing   is
                'He sees the boy.'

The pattern in (22) can be explained by either the analysis in Tableau 7 or the one in Tableau 8. Both analyses lead to the same results in which prominent Ps receive accusative case marking. Since the two functions point in the same direction it is not always possible to see which of the two is really at play in DOM.

	Subject	ID	ECONOMY
☞	[ACC, P]		*
	[ACC, p]	*	*
	[∅, P]	*	
☞	[∅, p]		

Tableau 7: DOM by ID in Hindi (dHM)

Differential case marking that is sensitive to the appropriateness of a given noun for some argument is called *local* DCM (Malchukov & de Swart, 2009). In (the less common) *global* DCM the properties of a given argument are compared with those of the other argument of the transitive clause. In global DOM, the use of object marking depends on the properties of both the object and the subject, that is, the relation between the two. This was

	Subject	Dist	Economy
☞	[ACC, P]		*
	[ACC, p]		*
	[∅, P]	*	
☞	[∅, p]		

Tableau 8: DOM by Dist in Hindi (dHM)

illustrated above for Fore already and is illustrated again for Awtuw in (23).

Awtuw (de Hoop & Malchukov, 2008, 577)

(23)   a.   *Tey   tale   yaw dæli.*
            3FEM.SG woman pig bit
            'The woman bit the pig.'

        b.   *Tey   tale-re   yaw dæli.*
            3FEM.SG woman-ACC pig bit
            'The pig bit the woman.'

Generally speaking, subjects are higher in animacy than objects (Comrie, 1981, 128). If this default pattern applies, case marking is unnecessary in Awtuw (23-a). However, if the object outranks the subject in animacy, the object marker *-re* has to be used. Crucially, it is not the animacy of the arguments per se, but the animacy of the subject *in relation to* that of the object that determines the case marking. If this animacy relation is unexpected, case marking is necessary.

    In the Awtuw example above, the object is only marked with accusative case if it outranks the subject in animacy. In local DOM the use of object marking is only dependent on the properties of the object. This can be illustrated with the following examples from Central Pomo:

Central Pomo (de Hoop & Malchukov, 2008, 578)

(24)   a.   *M'u·tu ʔa·hk'úm.*
            he.ACC I.killed
            'I killed him.'

        b.   *Mu·l ʔa·hk'úm.*
            he   I.killed
            'I killed it.'

In Central Pomo human objects are case marked and inanimates are not.

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One could still explain this pattern by distinguishability if the pattern did not carry over to differential subject marking:

(25)   *Q'alá·w m'u·tu.*
       died   he.ACC
       'He died.'

The accusative marker in (25) cannot be explained by distinguishability as there is no other argument to confuse the subject with.

Differential object marking is normally found in nominative accusative languages, while differential subject marking is usually found in ergative languages (Bossong 1985, Drossard 1991; cited in de Hoop & Malchukov, 2008). To account for this observation, de Hoop and Malchukov (2008) replace the general ECONOMY constraint with Malchukov's (2006) constraint PAIP, originally for *Primary Actant Immunity Principle.* The primary actant refers to the unmarked argument of a transitive clause, that is, the argument that is encoded like the intransitive subject.

(26)   PAIP: Avoid (case) marking of the unmarked argument.

In accusative languages, where the subject of the transitive clause is the unmarked argument, DOM does not violate PAIP: the nominative subject is unmarked. In ergative languages, in which the object of the transitive clauses is the unmarked argument, DOM would lead to a violation of PAIP. In order to prevent this from happening, these languages may use an antipassive construction. Consider the following example from Greenlandic Eskimo:

Greenlandic Eskimo (Bittner 1988; cited in de Hoop & Malchukov, 2008)
(27)   a.   *Jaaku-p   arnaq   tuqut-p-aa.*
            Jacob-ERG woman kill-IND-3SG.ERG/3SG.NOM
            'Jacob killed the woman.'
       b.   *Jaaku arna-mik   tuqut-si-v-uq.*
            Jacob woman-INSTR kill-AP-IND-3SG.NOM
            'Jacob killed the woman.'

The object in the transitive construction in (27-a) is specific, whereas it is nonspecific in the antipassive construction in (27-b). Thus by shifting to an antipassive construction ergative languages avoid the violation of PAIP that marking the alternation on the unmarked object would cause. In an antipassive construction, the subject is unmarked for case, thereby satisfying

PAIP.

In the same line of reasoning the marking of a weak Agent in accusative languages is not expected to take place via DSM. Indeed, a weak Agent regularly leads to passivization in such languages. Also, in some languages passive forms are used to indicate nonvolitionality of the subject according to de Hoop and Malchukov (2008).

In conclusion, PAIP nicely explains the fact that features that lead to differential subject marking in ergative languages may cause the use of the passive constructions in accusative languages and features that trigger differential object marking in accusative languages may cause the use of an antipassive construction in ergative languages. Only in this way, there is always an unmarked argument. Note that de Hoop and Malchukov (2008) really need two distinct economy constraints as they cannot use PAIP in the DCM part of their analysis. For example in Tableau 6 it would not penalize the use of ergative case.

In DCM structural case can alternate with a zero expression as in the discussion above, or with another (overt) case.[3] The latter phenomenon is called *symmetrical* DCM; the former *asymmetrical* (de Hoop & Malchukov, 2008; Malchukov & de Swart, 2009). An example of symmetrical DCM from Lezgian is given in (28).[4]

Lezgian (Haspelmath, 1993, 292)
(28) a. *Zamira-di   get'e xana.*
          Zamira-ERG pot   break.AOR
          'Zamira broke the pot.'
      b. *Zamira-di-waj   get'e xana.*
          Zamira-ERG-ABL pot   break.AOR
          'Zamira broke the pot accidentally/involuntarily.'

The explanation in the bidirectional OT model of de Hoop and Malchukov (2008, 574) goes as follows. Both pairs violate ECONOMY as both involve morphological case. An "accidental" meaning attributes a less strong interpretation to the A. Because of this, both the combination of ergative case with a non-volitional A and the combination of oblique case with a volitional A violate the constraint ID. Thus, the combinations of volitional A with ergative case and non-volitional A with the oblique case both become optimal in the first round of optimization. This is illustrated in Tableau 9.

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[3]Note that this is contra the claim of Aristar (1996, 1997).
[4]Haspelmath (1993) glosses *-waj* as *adelative* case; for reasons of consistency in this thesis, it is called *ablative*.

	Subject	ID	Economy
☞	[ERG, A]		*
	[ERG, a]	*	*
	[OBL, A]	*	*
☞	[OBL, a]		*

Tableau 9: Symmetrical differential case marking in Lezgian (dHM)

I do not analyze symmetrical case variation as differential case marking. I think the spatial case that is involved in the alternation is semantically used. Ablative case directly marks nonvolitionality. I will not elaborate on symmetrical DCM here, as it will be the topic of Chapter 5.

The bidirectional OT account of de Hoop and Malchukov (2008) straightforwardly explains different kinds of structural differential case marking. However, in its present form it cannot account for spatial DCM. The constraints DIST and ID are too specific for this purpose. This can easily be solved by thinking of them only as specific structural instances of the more general principles distinguishability and identification (which they are in fact). However, I have some more fundamental problems with their proposal, and with bidirectional OT in general. First, the two principles describe the semi-bidirectional optimization process rather than that they are used in it as constraints. Identification of some semantic property is always necessary if the interpretation check shows that some semantic property is not recoverable yet. Distinguishability is really the same thing, but then for argument functions. If the argument structure is not clear, case should be used. Secondly, bidirectional OT assumes that optimization involves the comparison of form-meaning pairs, which I find implausible. Meanings do not come in predefined pairs. For instance, in the last Lezgian example it is unclear to me why a hearer should consider 'nonvolitional touching' as a meaning alternative for the unmarked form instead of 'aggressive touching' or 'nervously touching'. In my analysis, this meaning alternative is only there because it is the direct interpretation of the ablative case marked form. Finally, bidirectional OT is too rigid as it cannot explain variation in which the unmarked form may sometimes express marked meanings or the other way around.

Because of these problems, I follow Zeevat (2000) in assuming an asymmetric account in which optimization procedures go from meaning to form. Speaking is an active process in which the speaker has control; listening is

essentially a passive activity. As a result, there is a naturalistic interpretation of conflicting constraints in language production in the choice between more economical and more elaborate ways of expression. In contrast to production, there is no such interpretation for language interpretation (Zeevat, 2000, 246-248).

Before I introduce my own analysis of differential case marking in Section 4.4, I will discuss the semi-bidirectional version of OT in which it is couched as proposed by de Swart (2007, in prep.).

4.3.2 Recoverability

De Swart (2007, in prep.) shows how the differential use of case marking is motivated by an assessment by the speaker of the recoverability of the grammatical roles in the clause. Crucially differently from bidirectional approaches, in this semi-bidirectional version of OT, there is only one meaning input, for which there are multiple output candidates. If the speaker thinks that there are enough semantic and/or syntactic cues already for the hearer to tell the arguments from each other, she will avoid the use of morphological case for economy reasons.

De Swart (2007) proposes the following constraints:

(29)   a.   ECONOMY: avoid the use of overt case marking.
       b.   FAITHINT: make use of available morphosyntactic information.
       c.   BIAS: interpret a sentence according to the following regularities:
            (i)   As are +animate, +definite, given, pronominal, and/or topic;
            (ii) Os are ±animate, ±definite, ±, ±nominal, and/or comment.
       d.   SELECTION: obey the selection restrictions of the verb.

Their working is illustrated in Tableau 10 for the following example from Malayalam.

Malayalam (Asher & Kumari, 1997, 204)
(30)   a.   *Kappal   tiramaalakaḷ-e bheediccu.*
            ship.NOM waves-ACC   split.PAST
            'The ship broke through the waves.'
       b.   *Tiramaalakaḷ kappal-e bheediccu.*
            waves.NOM   ship-ACC split.PAST

'The waves split the ship.'

As the two sentences in (30) show, ships and waves are both possible subjects of the verb 'to split' in Malayalam. To mark the Agent from the Patient, case is used.

The optimization procedure for example (30-a) in de Swart's model is given in Tableau 10. The candidate that is not marked with accusative case is more economical and therefore, from the speaker's perspective, preferred. However, as the interpretation check of this candidate shows, the hearer will not be able to choose between the two relevant possible meaning candidates. The less preferred form candidate that makes use of accusative case does lead to an unambiguous interpretation. Therefore, if the speaker wants to be understood, she has to choose this form.

Prod: split(ship, waves)	ECON	FAITH	SEL	BIAS
☞ a. ship.NOM waves.NOM split				
☝ b. ship.NOM waves.ACC split	*			
Int: a. ship.NOM waves.NOM	ECON	FAITH	SEL	BIAS
☞ (i) split(ship,waves)				*
☞ (ii) split(waves, ship)				*
Int: b. ship.NOM waves.ACC	ECON	FAITH	SEL	BIAS
☞ (i) split(ship,waves)				*
(ii) split(waves, ship)		*!		*

Tableau 10: Evaluation of waves and ships in Malayalam (dS)

Now consider the following example, in which it is possible to use zero marking.

Malayalam (Asher & Kumari, 1997, 204)

(31)   *Tiiyyə   kuṭil naʃippiccu.*
       fire.NOM hut   destroy.PAST
       'Fire destroyed the hut.'

In (31) no accusative case is used. Fires are more likely destroyers than huts, and huts are more easily destroyed than fires. The optimization procedure is given in Tableau 11. The difference with the previous optimization process is that the more economical form candidate is unambiguous and therefore can be used. Also the accusative candidate would lead to the

right interpretation, but this form is dispreferred because of ECONOMY.

Prod: destroy(fire, hut)	ECON	FAITH	SEL	BIAS
☞ a. fire.NOM hut.NOM destroy				
b. fire.NOM hut.ACC destroy	*			
Int: a. fire.NOM hut.NOM	ECON	FAITH	SEL	BIAS
☞ (i) destroy(fire,hut)				*
(ii) destroy(hut, fire)			*!	*
Int: b. fire.NOM hut.ACC	ECON	FAITH	SEL	BIAS
☞ (i) destroy(fire,hut)				*
(ii) destroy(hut, fire)		*!	*	*

Tableau 11: evaluation of fire and huts (dS)

De Swart (2007) acknowledges the effect of prominence in addition to recoverability. Generally case is used independently of ambiguity. With some exceptions, animate objects in Malayalam receive accusative case marking *-e* (32-a), inanimate objects are zero marked (32-b) (Asher & Kumari, 1997, 202).

Malayalam (Asher & Kumari, 1997, 203)
(32)   a.   *Avan pustakam vaayiccu.*
             he   book   read.PAST
             'He read the book.'
        b.   *Avan oru paʃuvin-e vaaŋŋi.*
             he   a   cow-ACC buy.PAST
             'He bought a cow.'

The cow in (32-b) is almost as unlikely an Agent of 'to buy' as the book is of 'to read' in (32-a). Nevertheless, the cow is case marked. This is even more obvious in the next example from Hindi.

Hindi (de Swart, 2007, 127)
(33)   *Ilaa-ne bacce-*(ko) uthayaa.*
        Ila-ERG child-P   lift.PERF
        'Ila lifted the/a child.'

Patient marking is obligatory on human objects in Hindi, even if the Agent is marked with ergative case already.

Apparently, in these languages a constraint like PROMINENCE $\rightarrow$ P MARKING is active, dictating obligatory marking of prominent arguments. As I have explained in Chapter 1, this use of case is due to the fossilization of optimization processes. Instead of checking whether it is really necessary to use case, the speaker simply uses it for all members of a class. De Swart (2007, 126-133) illustrates for the Spanish direct object marker *a* how such a constraint could have developed out of recoverability. Eventually, the use of case marking for disambiguation is generalized to the marking of all prominent arguments, irrespective of ambiguity. Such extension of its use is not unexpected given the fact that case is a very cheap instrument after all, as evidenced by languages that do not exhibit differential case marking (cf. Chapter 2).

The advantage of the semi-bidirectional model of de Swart (2007) is that recoverability results from the optimization procedure itself and does not have to be stipulated as a separate constraint like DISTINGUISHABILITY, as in de Hoop and Malchukov (2008, 2007). Therefore, it is more parsimonious. In addition, the bidirectional version of OT suffers from an overgeneration of form-meaning pairs: it is not always the case that there is a marked form alternative (cf. de Swart, in prep.; for a more elaborate discussion of different OT models, cf. Beaver and Lee (2004)).

4.4 A General Account of Differential Case Marking

In the previous sections, we have seen various ways in which the meaning contribution of case can become redundant. First, case can be redundant because of the inherent properties of a noun referent. Some entities are prototypical performers of some functions and therefore the cases that express these functions need not be used on the nouns that refer to these entities. According to Comrie (1981, 128), the most natural kind of transitive construction has an A that is high in animacy and definiteness, and a P that is low(er) in animacy or definiteness. For example, we have seen that in Malayalam, an animate object is deemed unexpected and therefore needs accusative case marking. In the spatial domain, place names are inherent grounds and therefore remain unmarked in Tariana, for example. Secondly, the use of case can be superfluous because of the selection restrictions of the verb. For example, in the argument structure of the predicate 'to read', books are better readees than readers. The difference between

these two predictability types is the level of generalization. The first type corresponds to high or medium levels of generalization, the second type to low levels (cf. Chapter 2). Slightly different from this second type is global predictability. In the presence of a human argument, a second, nonhuman argument is more likely to be the Patient. In the spatial domain, in the context of a basket that is put somewhere, a table, if involved, probably is the ground. Whereas the first two types are concerned with the appropriateness of an argument in a given function, this third global type takes into consideration all arguments and only then assigns functions. Languages may simultaneously use more than one strategy and distinguishing between local and global DCM or choosing between explanations in terms of (verbal) selection criteria or universal animacy hierarchies is not always easy. For the OT evaluation in my model this does not matter. All three types are instances of the application of world knowledge (ADD_W).

Ignoring symmetrical DCM for the moment (but see Chapter 5), my account differs from the one proposed by de Hoop and Malchukov (2008) in that it does not considers form-meaning pairs but takes a single meaning as the input of an optimization procedure (cf. Section 4.3.2). Consider the example from Manipuri again, repeated in (34) for convenience. Recall that de Hoop and Malchukov (2008) argue that ergative case is used here to mark the prominent Agent.

Manipuri (de Hoop & Malchukov, 2008)

(34)   a.   *əy-nə tebəl-də   theŋŋi.*
             I-ERG table-LOC touched
             'I touched the table (volitionally).'
        b.   *əy tebəl-də   theŋŋi.*
             I   table-LOC touched
             'I touched the table (involuntarily).'

The object in (34) bears locative case marking. This means that it can already formally be distinguished from the subject. Since distinguishability is already satisfied, ergative case can be used to identify prominence features like volitionality, which is one of the prototypical properties of the Agent (cf. Chapter 2).

The optimization procedure under my analysis is illustrated in Tableau 12. Recall the definitions of my constraints from Chapter 1, repeated in (35).

(35)   a.   FAITH$_L$: interpret linguistic signs
        b.   ADD$_W$: use world knowledge to enrich an utterance

c. ECONOMY: be economical in expressing what you want to say

Any use of case is a violation of ECONOMY, multiple uses are multiple violations. Because of the locative case marking on the object in (34), there is no need to mark the subject for distinguishing it from the object. As illustrated in Tableau 12, both forms will indeed lead to the interpretation in which the table is the object of the touching event. Identification of volitionality, however, does need the use of ergative case. It does not (sufficiently) follow from world knowledge that the Agent touched the table on purpose.

PROD: Touch(e) & Agent(e, I) & Theme(e, table) & Volitional (I)	Faith$_L$	ADD$_W$	ECONOMY
☞ a. I-∅, table-LOC			*
☙ b. I-ERG, table-LOC			**
INT: a. I-∅, table-LOC	FAITH$_L$	ADD$_W$	ECONOMY
Agent(e, I) & volitional(I)		*	
☞ Agent(e, I) & nonvolitional(I)			
Agent(e, table) & volitional(I)	*	**	
Agent(e, table) & nonvolitional(I)	*	*	
INT: b. I-ERG, table-LOC	FAITH$_L$	ADD$_W$	ECONOMY
☞ Agent(e, I) & volitional(I)		*	
Agent(e, I) & nonvolitional(I)	*		
Agent(e, table) & volitional(I)	**	**	
Agent(e, table) & nonvolitional(I)	**	*	

Tableau 12: Semi-bidirectional optimization process for Manipuri

As is shown in the first part of Tableau 12, the non-ergative form is preferred because of ECONOMY. Ergative case is needed to mark the volitionality of the Agent, as this does not follow from world knowledge. The optimal interpretation of the non-ergative form is 'I touched table'; that of the ergative form is 'I touched the table on purpose'.

This is different from DCM in Fore in which ergative case is needed to mark the argument structure of the clause.

Fore (Scott, 1978, 115-116)

(36)   a.   *Yaga:-wama wá   aegúye.*
            pig-ERG   man 3SG.OBJ.hit.3SG.SU.IND

'The pig attacks the man.' not: 'The man kills the pig.'
b. *Yaga: wá   aegúye.*
   pig   man 3SG.OBJ.hit.3SG.SU.IND
   'The man kills the pig.' not: 'The pig attacks the man.'

First, let's consider the optimization procedure of (36-a): 'The pig attacks the man'. If the speaker does not use ergative case on *yaga:* 'pig', the hearer would get the wrong interpretation. World knowledge would lead him to believe that the man, not the pig, is the Agent, since humans more often act on animals than the other way around. Alternatively, and not illustrated here, such world knowledge may have developed into a rule of grammar saying that subjects should be higher on the animacy scale than objects. Then the second interpretation candidate for form *a* in Tableau 13 would violate FAITH$_L$. In both analyses, by using a slightly more elaborate form, i.e. marking the pig with ergative case, the speaker can overrule this preference.

PROD: Attack(e) & Agent(e, pig) & Patient(e, man)	Faith$_L$	ADD$_W$	ECONOMY
☞ a. pig-∅, man-∅			
☞ b. pig-ERG, man-∅			*
INT$_a$: pig-∅, man-∅	FAITH$_L$	ADD$_W$	ECONOMY
☞ Agent(e, man)			
Agent(e, pig)		*	
INT$_b$: pig-ERG, man-∅	FAITH$_L$	ADD$_W$	ECONOMY
Agent(e, man)	*		
☞ Agent(e, pig)		*	

Tableau 13: Semi-bidirectional optimization process for Fore

Now let's consider the optimization procedure of (36-b): 'The man kills the pig'. The crucial difference of Tableau 14 with the previous two tableaux (and a bidirectional analysis) is that there is one form candidate that is optimal from both a unidirectional and bidirectional perspective. Both form candidates lead to the same correct interpretation result, and because of that the more economical version can be chosen. The addition of ergative case would not change the meaning and therefore is forbidden by ECONOMY. In the first two tableaux, however, the use of case was necessary to express a meaning that would otherwise not be conveyed. Note that in a bidirectional

analysis, there would be a remaining marked form alternative, i.e. candidate *b*, that needs to be combined with some marked meaning.

PROD: Kill(e) & Agent(e, man) & Patient(e, pig)	Faith$_L$	ADD$_W$	ECONOMY
☞ a. man-∅, pig-∅			
b. man-ERG, pig-∅			*
INT$_a$: man-∅, pig-∅	FAITH$_L$	ADD$_W$	ECONOMY
☞ Agent(e, man)			
Agent(e, pig)		*	
INT$_b$: man–ERG, pig-∅	FAITH$_L$	ADD$_W$	ECONOMY
☞ Agent(e, man)			
Agent(e, pig)	*	*	

Tableau 14: semi-bidirectional optimization process for Fore II

In semi-bidirectional OT, there is only one meaning for the expression of which in principle only one form is considered. Although *differential* may not be the best term to use as it suggests that case marking is used to differentiate between different meaning inputs, I will stick to it as it has been firmly established to describe the type of case variation discussed in this chapter. The speaker checks whether the economical form of her preference will do to express this meaning. If not, she uses a slightly more elaborate form that does express the intended meaning.

Recall that de Hoop and Malchukov (2008) explain the observation that differential subject marking mostly appears in ergative languages and differential object marking mostly in accusative languages by the stipulation of an economy constraint PAIP, that says to avoid (case) marking of the unmarked argument. It is not necessary to adopt such a more specific economy constraint, however. The voice alternations that it explains also follow from my account, as I will show now.

Any use of case is a violation of ECONOMY, the use of more than one case leads to multiple violations. Differential *object* marking in accusative languages restricts the number of cases in a transitive construction to one, just like differential *subject* marking in ergative languages. Marking weak subjects in accusative languages by passive constructions and weak objects in ergative languages by antipassive constructions is the optimal solution in my model too, under the crucial assumption that verb morphology is a less serious violation of ECONOMY than case marking. This is illustrated in

the abstract for accusative languages in Tableau 15, in which I ignore word order.

PROD: Agent(e, x), Patient(e, y), weak(x)	FAITH$_L$	ADD$_W$	ECONOMY
a. x-∅ y-ACC V			**
☞ b. x-∅ y-∅ V-PASSIVE			*
c. x-OBLy-ACC V			****
☟ d. x-OBLy-∅ V-PASSIVE			***
INT$_a$: x-∅ y-ACC V	FAITH$_L$	ADD$_W$	ECONOMY
☞ Agent(e, x), Patient(e, y)			
Agent(e, x), Patient(e, y),weak(x)		*	
Agent(e, y), Patient(e,x)	*		
Agent(e, y), Patient(e,x),weak(x)	*	*	
INT$_b$: x-∅ y-∅ V-PASSIVE	FAITH$_L$	ADD$_W$	ECONOMY
☞ Agent(e, x), Patient(e, y)			
Agent(e, x), Patient(e, y),weak(x)		*	
☞ Agent(e, y), Patient(e,x)			
Agent(e, y), Patient(e,x),weak(x)		*	
INT$_c$: x-OBL y-ACC V	FAITH$_L$	ADD$_W$	ECONOMY
Agent(e, x), Patient(e, y)	*		
☞ Agent(e, x), Patient(e, y),weak(x)			
Agent(e, y), Patient(e,x)	**		
Agent(e, y), Patient(e,x),weak(x)	*		
INT$_d$: x-OBL y-∅ V-PASSIVE	FAITH$_L$	ADD$_W$	ECONOMY
Agent(e, x), Patient(e, y)	*		
☞ Agent(e, x), Patient(e, y),weak(x)			
Agent(e, y), Patient(e,x)	**		
Agent(e, y), Patient(e,x),weak(x)	*		

Tableau 15: Voice alternations in accusative languages

If we just use the default transitive form, we get the default transitive interpretation, as the interpretation of candidate *a* shows. Therefore, we cannot use this candidate to express a nonprominent Agent. Note that the double violation of ECONOMY follows from the assumption that the use of case marking is less economical than using a passive marker, which only causes one violation. If we only use a passive marker on the verb without any case marking on the arguments, we cannot tell the subject from the

object (interpretation b). Therefore, we cannot use candidate *b*, which is optimal from a unidirectional perspective. If we simply use the default transitive construction but mark the subject with oblique case in addition, this leads to quadruple violation of ECONOMY. Although it will lead to the right interpretation, there is a more economical alternative. The fourth candidate yields a triple violation of ECONOMY. As such, it is the most economical candidate that expresses the intended meaning. The passive marker on the verb makes sure that the subject role is correctly understood as a Patient, the oblique case marker on the Agent marks its weakness. Thus, there is no need for PAIP.

In sum, the semi-bidirectional OT analysis I adopt assumes the optimization procedure of a single meaning input in which different forms are considered. This procedure has the advantage over bidirectional versions in that it does not assume, let alone overgenerate, form-meaning pairs and that recoverability does not have to be stipulated as a constraint but follows from the procedure itself. Also, in my view it is never just markedness per se for which another form is used. Instead, the use of a form is always intrinsically motivated (cf. also Chapter 5).

4.5 Special Types of Structural DCM

In the above, I have discussed a relatively well-known version of DCM in which the use of structural case depends on inherent prominence properties of the argument(s). If the speaker thinks that the information case would convey can be derived from these clues already, case will not be used. However, there are other information sources that can lead to the predictability of argument structure, and my model predicts that these can similarly cause the optional use of case. In this section, I will discuss DCM driven by tense and structural position.[5]

4.5.1 DCM by Tense

Case and tense, or case and aspect, seem totally unrelated at first sight, the first one pertaining to the nominal domain, denoting properties of individuals, the second one to the verbal domain, denoting properties of events. Case alternations triggered by tense (or aspect), however, are not at all uncommon. Usually, it is only transitive and unergative clauses in the past

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[5]The first discussion is joint work with Helen de Hoop, the second a spin-off from joint work with Kees de Schepper, Steven Westelaken, and Helen de Hoop.

that have an ergative marked subject (Butt & Poudel, 2007; Dixon, 1994; Trask, 1979, 100). The question, of course, is why. In Lestrade and de Hoop (2009) we provide an explanation for this type of differential case marking. We analyze the case-tense interaction in terms a verification procedure for factuality. That is, we argue that morphological case on a subject or an object may be required in situations when the hearer is not able to check the factuality (realization) of the denoted event. In the terminology of this thesis: The ability to check the factuality of an event makes the use of case redundant. Before I get to the details of this proposal, I will discuss two alternative accounts of this interaction.

According to Woolford (2007a), the primary function of an aspect split is to provide a cheap way of (redundantly) marking aspect. Because the use of case is only blocked for specific aspect levels, e.g. imperfective aspect, the mere presence of case marking provides information about aspect. Consider the following example from Urdu/Hindi:

Urdu/Hindi (Woolford, 2007a)

(37) a. *Ram   gari cala-yi   (hai).*
          Ram.NOM car   drive-IMPF bePRES
          'Ram drives a car.'
      b. *Ram-ne   gari cala-ta   (hai).*
          Ram-ERG car   drive-PERF bePRES
          'Ram has driven a/the car.'

In (37-a), the use of Ergative case is omitted in the imperfective. As a result, aspect is redundantly marked.

Technically, Woolford (2007a) explains this alternation using a faithfulness constraint $\text{IDENT}_{Perf(ective)}$ (ERG(ATIVE)) says to preserve ergative case in the perfective aspect. This constraint is ranked higher than the markedness constraint *ERG(ATIVE), which penalizes the use of ergative case. This latter constraint in its turn is ranked higher than a general ergative faithfulness constraint. This is illustrated in the (unidirectional OT) tableau below.

In Tableau 16, in the first competition, the highest ranked constraint IDENT_{Perf} (ERG) is fatally violated by the zero marked candidate as the ergative case of the perfective input is not preserved by this candidate. In the second competition, IDENT_{Perf} (ERG) is vacuously satisfied as it only applies to perfective environments, whereas the input to this second optimization procedure is imperfective. As a result, in the second competition the markedness constraint *ERG becomes decisive and the zero marked candidate optimal.

	INPUT: DP-ERG (perfective)	IDENT$_{Perf}$ (ERG)	*ERG	IDENT (ERG)
☞	DP-ERG		*	
	DP-∅	*!		*
	INPUT: DP-ERG (imperfective)	IDENT$_{Perf}$ (ERG)	*ERG	IDENT (ERG)
	DP-ERG		*!	
☞	DP-∅			*

Tableau 16: OT analysis of aspectual split in Hindi (Woolford 2007)

Thus, Woolford (2007a) argues for the use of contextually restricted faithfulness constraints. The expression of ergative case is more important in the perfective aspect than in the imperfective aspect. As a result, ergative case is correctly predicted only to be preserved in perfective contexts. However, the constraint IDENT$_{Perfective}$ (ERGATIVE) (and the ranking of the constraints) remains unmotivated. It is unclear why the expression of ergative case is more important in perfective aspect than in imperfective aspect. Therefore, in Lestrade and de Hoop (2009), as I will illustrate shortly, we prefer a more general approach, having context dependent differences following from different inputs in optimization procedures with general constraints.

Poudel (Poudel, 2007; Butt & Poudel, 2007) discusses differential subject marking in Nepali and Manipuri. Consider the following example:

Nepali (Butt & Poudel, 2007, 3)

(38) a. *Mai=le   sodhpartra   lekh-ye-ẽ.*
          PRON.1SG=ERG research.paper write-PAST-1SG
          'I wrote the/a research paper.'
      b. *Mai   sodhpartra   lekh-chu.*
          PRON.1SG research.paper write-NONPAST-1SG
          'I (will) write the/a research paper.'

In (38-a), the subject of a clause with past tense marking bears Ergative case. In (38-b), the subject of a clause with nonpast tense marking is zero marked. We find the same pattern in (39).

Nepali (Butt & Poudel, 2007, 3)

(39) a. *Goru=le   mut-yo.*
bullM.3SG=ERG urinate-PAST-M3SG
'The bull urinated.'

b. *Goru   mut-cha.*
bullM.3SG urinate-NONPAST-M3SG
'The bull will urinate.'

However, in Nepali ergative subjects may show up in non-past clauses too. Poudel argues that this case alternation can be analyzed in terms of a difference between stage and individual level predication. Ergative case is used for individual level predication, nominative case is used for stage level predication. Stage level predication says something about the property of a referent that only holds momentarily; individual level predicates predicate an inherent property of a referent. As a result, it is not possible to modify individual level predicates with temporal adverbial phrases (40-a), which is perfectly fine for stage level predicates (40-b).

Nepali (Butt & Poudel, 2007)

(40) a. *Raam=le   (#aajaa) angreji jaan-da-cha.*
Raam-ERG today   English know-IMPF-NONPAST.M.3SG
'Ram knows English (#today).' (individual level)

b. *Raam (aajaa) angreji bod-da-cha.*
Raam today   English speak-IMPF-NONPAST.M.3SG
'Ram will speak English (today).' (stage level)

Butt and Poudel (2007) show how ergative case is indeed used as expected for a number of contexts in which stage and individual level predication behave differently. For example, individual level predication entails a presuppositional interpretation, whereas stage level predication correlates with an existential assertion. This is illustrated in (41):

Nepali (Butt & Poudel, 2007)

(41) a. *Caalak=le gaaṛi calaau-cha.*
driver=ERG vehicle drive-NONPAST.M.3SG
'The driver drives the vehicles.'

b. *Guru   gaaṛi calaau-cha.*
teacher vehicle drive-NONPAST.M.3SG
'The teacher is driving/will drive the vehicle.'

Butt and Poudel (2007, 9) say that in the past the distinction between stage and individual level predication collapses as in the past everything necessarily is stage level. But note that on this account, contrary to what we find, we would expect zero marking in the past. Except for this false prediction, I think the explanation for the use of ergative case of Poudel is very interesting and on the right track. In Lestrade and de Hoop (2009) we propose that it can be put in more general terms, covering both the aspectual distinction and the distinction between stage and individual level predication.

Lestrade and de Hoop (2009) argue that a checkability account explains both differential case marking driven by an aspectual distinction and DCM driven by a distinction between stage and individual level predication. Because of ECONOMY, the speaker uses ergative case only if the hearer cannot determine the argument structure himself already. Since the hearer cannot check the truth of a state of affairs in the past, he literally has to take the word of the speaker for it. Propositions that concern the present, on the other hand, can in principle be observed directly. Because the argument structure can thus be derived from the here and now, the speaker can be more economical in her utterance, omitting the case. It is easy to show how this proposal can account for the examples discussed above.

First, it accounts for the use of ergative case on the subject of individual level predicates only, as evidenced in Nepali and Manipuri. A stage level predicate can be evidenced by a hearer. It is however inherently impossible to check the truth of an individual level predicate, as it is an inherent property that holds generally. At best, it can be proven wrong. This is illustrated in the following example.

Manipuri (Poudel, 2007)

(42) a. *Imaa=naa   caak t^hong-i.*
          mother=ERG food cook-REAL
          'Mother cooks food.'
      b. *Imaa   caak t^hong-i.*
          mother food cook-REAL
          'Mother is cooking food.'

In (42), it is not possible to use the here and now to check if it is true that mother generally cooks food. It is however possible to check whether she is cooking right now.

Secondly, a checkability account explains the use of ergative case in the past tense.

Marathi (Pandharipande, 1997)

(43) a. *Lili   pustək vac-ət   ahe.*
          lili.NOM book   read-PRES is
          'Lili is reading a book.'

      b. *Lili-ne   pustək vac-l-e.*
          lili-ERG book   read-PAST-3SG
          'Lili read a book.'

Again, it is not possible to use the here and now to check whether it is true
that Lili read a book (43-b). It is however possible to check whether see is
doing that right now (43-a).

    Moreover, the proposal of Lestrade and de Hoop (2009) also accounts
for the following example where the location is of importance:

Manipuri (Poudel, 2007)

(44) a. *Tomba iruja-re   aikhoi cat-si*
          Tomba bathe-ANT.REAL 1PL   move-HORT
          'Tomba has taken a bath; let's move'

      b. *Tomba=naa iruja-re   adugaa Imphal cat-le*
          Tomba=ERG bathe-ANT.REAL and   Imphal go-ANT.REAL
          'Tomba has taken a bath and went to Imphal'

Both events of Tomba taking a bath took place in the past. However in
(44-a) the hearer can check the state of affairs himself directly, whereas he
cannot in (44-b).

    In addition to the use of ergative case with individual level predicates
and past tense, examples of differential case marking in which evidentiality
plays a role can also be accounted for. Consider the following example:

Georgian (DeLancey, 1981, 648)

(45) a. *kaceb-i   çer-en çeril-s*
          men-NOM write   letter-DAT
          'The men are writing a letter.' (imperfect)

      b. *kaceb-ma da-çer-es   çeril-i*
          men-ERG AOR-write-3PL letter-NOM
          'The men wrote a letter.' (aorist)

      c. *kaceb-s   u-çer-is-t   çeril-i*
          men-DAT 3RD-write-PERF-PL letter-NOM
          'The men have [apparently] written a letter.' (perfect)

As we saw previously, nominative is used if the here and now can be used to determine the argument structure, whereas ergative is used for the past. Interestingly however, if the speaker herself is not sure about the truth of her statement: in case of hear-say, she uses dative case (45-c).

Finally, our proposal can be used to explain differential case marking that concerns volitionality, illustrated in the following examples.

Urdu (Butt & King, 2004)

(46) a. *Nadya=ne   zu ja-na hɛ.*
          Nadya.F=ERG zoo go-INF be-PRES.3SG
          'Nadya wants to go to the zoo.'
      b. *Nadya=ko   zu ja-na hɛ.*
          Nadya.F=DAT zoo go-INF be-PRES.3SG
          'Nadya wants/has to go to the zoo.'

The hearer might be able to check the external force that makes Nadya go to the zoo, but he cannot as easily tell whether Nadya likes going. By using ergative case, the speaker makes this intention explicit. Similarly, in (47), the hearer has to take the word of the speaker on the intentions of Tomba to touch the table.

Manipuri (Poudel, 2007)

(47) a. *Tomba=naa teba=daa t^heng-i.*
          Tomba=ERG table=LOC touch-REAL
          'Tomba touched the table (intentionally).'
      b. *Tomba   teba=daa t^heng-i.*
          Tomba.NOM table=LOC touch-REAL
          'Tomba touched the table (unintentionally).'

The drop of accusative case in imperative constructions can be explained in the same vein, as Malchukov and de Hoop (to appear) show. The subject in imperative constructions is clear from the context, since it necessarily is the addressee who is told to do something. As a result, there is no need to mark the object as such. Consider the following example from Finnish.

Finnish (Malchukov & de Hoop, to appear)

(48) a. *Nainen näwi poja-n.*
          woman saw boy-ACC
          'The woman saw the boy.'

b. *Hae   poika.*
  fetch.IMPER boy
  'Fetch the boy!'

In (48-a), the direct object is marked with accusative case. This marker can be dropped however if the role of its bearer becomes unambiguously clear already from the construction it appears in. Although the details of the analysis of Malchukov and de Hoop (to appear) differ, the general idea is largely the same. If the meaning contribution case would make is derivable, case is suspended. Case is only used when necessary.

If checkability was the only factor of importance in differential case marking along the lines of tense and aspect, we could not account for examples like the following.

Manipuri (Poudel, 2007)

(49) a. *Tomba=naa cithi amaa i-ra-e.*
        tomba=ERG letter one   write-ANT-REAL
        'Tomba has written a letter.' (perfective)
      b. *Tomba=naa cithi amaa i-i.*
        tomba=ERG letter one   write-REAL
        'Tomba wrote a letter.' (past)
      c. *Tomba cithi   i-i.*
        tomba letter write-REAL
        'Tomba writes letters.' (present)
      d. *Tomba cithi   amaa i-gani.*
        tomba letter one   write-IRR
        'Tomba will write a letter.' (future)

Just like it is not possible for the hearer to check the truth of events that happened in the past, he cannot check the truth of events that are still going to happen. As a result, we would expect ergative case in both tenses, which is not borne out. This can be explained by optimization procedures fossilizing into rules of grammar, as explained in the introduction chapter. According to such a rule, Agents of events in the past have to be marked with ergative case.

In sum, Lestrade and de Hoop (2009) argue that the differential use of ergative case can be explained by checkability. If its meaning contribution cannot be derived, ergative case is used. But if there are enough clues to the argument structure already, ergative case does not have to be used. Differently from most other case accounts, we propose that also situational

information like the here and now can be taken into consideration for this decision. Similarly, Svorou (1993, 6-7) notes that we can use more general expressions if we share the here and now, and talk about entities in the context. A higher degree of explicitness is necessary in cases in which we talk about situations that are removed from the here and now temporally and spatially.

4.5.2 DCM by Structural Position

In this section I will show that DCM sometimes is dependent on the (structural) position of its potential bearer.

Yang and van Bergen (2007) show that in Mandarin Chinese scrambled objects in principle are marked with *ba*. Mandarin Chinese has an SVO basic word order. When the word order changes, the argument functions can no longer be told from the relative position with respect to the verb and *ba* is used to distinguish subjects from objects. (In postverbal position, *ba* is never used.) Both definiteness and animacy DCM of scrambled objects. First, the marker can be dropped if the argument function can be told from the animacy of the referents. Animate objects require *ba* marking. Independently from this animacy principle, lexically indefinite NPs are obligatory marked with *ba*. In principle, the preverbal position in Chinese requires a specific and definite reading for its filler. The case marker *ba* is used to license indefinite objects to occur in preverbal position.

The two principles explain variation in case marking that is otherwise incomprehensible. Consider the following example:

Mandarin Chinese (Yang & van Bergen, 2007, 1630)
(50)   *Ta *(ba) zhe-tiao she   dasi   le.*
        He BA   this-CL   snake hit.dead PRT
        'He killed this snake.'

Although the scrambled object meets the prominence requirements of the preverbal position (it is definite because of which *ba* does not have to be used), it is is animate, making case marking obligatory. Now consider example (51).

(51)   *Ta *(ba) yi-ge   pingguo chi le.*
        He BA   one-CL apple   eat PRT
        'He ate an apple.'

Although the scrambled object is inanimate (because of which *ba* does not

have to be used), it does not meet the prominence requirements of the preverbal position (it is indefinite), making case marking obligatory again. Finally consider Example (52).

(52)   *Ta (ba) na-ge   pingguo chi le.*
       He BA that-CL apple   eat PRT
       'He ate that apple.'

Because the scrambled object is inanimate, *ba* does not have to be used to distinguish the subject from the object. Also, because the scrambled object is definite, it meets the prominence requirements of the topic position, and *ba* is unnecessary. Nevertheless, because the object has scrambled, *ba* is optional.

   Thus, Yang and van Bergen (2007) conclude that to understand differential case marking in Chinese, one needs to take into consideration syntactic position too. If the argument structure can be told from SVO word order, no case marking is necessary. If the verb does not separate the subject from the object and animacy does not tell them apart, case marking has to be used. In addition, if the scrambled object does not meet the definiteness criteria of the preverbal position, case marking has to be used too.

   In the remainder of this section, I will discuss a number of genetically unrelated languages in which the use of case is sensitive to position. As I will show, in each case, the use of case can be understood as being subject to an economy principle.

   Müller (2002) argues that free word order is a prerequisite for morphological case, rather than the other way around as it is often claimed, because (i) only languages that have free word order have morphological case (not the other way around) and (ii) not all objects that stay in base position receive morphological case. An example of the second observation is given in (53).

Korean (Müller, 2002, translations are mine, SL)

(53)   a.   *Suna-ka   nuku(-lûl)$_i$ manna-ss-ni?*
            Suna-NOM who(-ACC) meet-PAST-Q
            'Who did Suna meet?'
       b.   *Nuku$^?$*(-lûl)$_i$ Suna-ka   t$_i$ manna-ss-ni?*
            who(-ACC)   Suna-NOM t$_i$ meet-PAST-Q
            'Suna met who?'

As illustrated in (53-a), in Korean, a direct wh-object may or may not bear a morphological case *in situ*, that is, directly in front of the verb. In

contrast, it must bear morphological case when scrambled, as illustrated by the ungrammaticality of its omission in (53-b).

Müller explains these findings by a constraint CASE that says that "a DP at the edge of vP has morphological Case", in which *edge* is defined as the outer specifier of XP. My proposal can be seen as the motivation behind such a constraint, making its stipulation superfluous indeed. If its preverbal position already informs about the syntactic function of a constituent, case marking is optional. If the position of a constituent does not give information about its syntactic function, case can be used to do so.

Consider the following example from Warlpiri. In this language, case concord only takes place if the adjective is nonadjacent to the noun.

Warlpiri (Moravcsik, 2009)

(54)   a.   *Tjantu wire-ngki tji yalkunu.*
            dog   big-ERG   me bit
            'The big dog bit me.'
    b.   *Tjantu-ngki tji yalkunu wire-ngki.*
            dog-ERG   me bit   big-ERG
            'The big dog bit me.'

In the next tableau, I illustrate the optimization process for (54-b). The use of case is dependent on the position of the constituents it marks. If the function or relation of this constituent is made sufficiently clear by its position already, case is unnecessary and therefore omitted because of ECONOMY.

PROD: 'the big dog bit me'	FAITH$_L$	ADD$_W$	ECONOMY
☞ a. dog-ERG me bit big			
☟ b. dog-ERG me bit big-ERG			*
INT$_a$: dog-ERG me bit big	FAITH$_L$	ADD$_W$	ECONOMY
☞ 'the big dog bit me'			
☞ 'the dog bit the big me'			
INT$_b$: dog-ERG me bit big-ERG	FAITH$_L$	ADD$_W$	ECONOMY
'the big dog bit me'			
☞ 'the dog bit the big me'	*		

Tableau 17: Optimization procedure for Warlpiri example b

Without the use of ergative case on the adjective, it is not clear to which nominal it belongs. By the use of ergative case, the speaker makes sure that the hearer does get the right interpretation.

The intuitive motivation for this variation in case marking is very simple (see Lestrade, de Schepper, Westelaken, & de Hoop, 2009, for a slightly different argumentation). If the relation between a verb and its object, or more generally, a head and its dependent, is not clear from word order, the speaker should use case to express this relation. If an object stands in canonical object position, using morphological case to mark it as such would be redundant, which is penalized by Economy. Only when the objecthood cannot be told from the word order, morphological case is used.

Note that this idea squares nicely with the distinction between strong and weak case, as proposed by de Hoop (1996). Weak case is seen as a structural default case, establishing a direct relation between a structural position and the type of case. Objects that bear weak case may not move from their original (structural) position. Only strong case is inherited under movement, and therefore only moved NPs that are marked with strong case can survive the case filter.

In Turkish, in addition to structural position, the use of case is sensitive to specificity. Specific objects, that is, objects whose reference is presupposed by the speaker, bear accusative case; non-specific objects don't. Only accusative case marked objects can scramble. Zero marked objects have to remain *in situ*, directly adjacent to the verb, as illustrated in (55).

Turkish (Kornfilt, 2003, 127-128)

(55)   a.   *Ahmet dün   akşam yag-tığ-ım   şahane   bir*
             Ahmet yesterday evening make-F.NOM-1SG fantastic a
             pasta-yı   ye-di.
             cake-ACC eat-PAST
             'Ahmed ate a fantastic cake which I made yesterday evening.'

        b.   *Ahmet şahane   (bir) pasta-yı   dün   akşam   ye-di.*
             Ahmet fantastic a   cake-ACC yesterday evening eat-PAST
             'Ahmed ate a fantastic cake [+specific] yesterday evening.'

        c.   *Ahmet dün   akşam   şahane   bir pasta ye-di.*
             Ahmet yesterday evening fantastic a   cake   eat-PAST
             'Ahmed ate a fantastic cake yesterday evening.'

        d.   **Ahmet (bir) pasta dün   akşam   ye-di.*
             Ahmet a   cake   yesterday evening eat-PAST
             Intended: 'Ahmed ate (a) cake [–specific] yesterday evening.'

In (55-a), the specific object is case marked and directly adjacent to the verb. In (55-b), the case marked object scrambled. In (55-c), the nonspecific object remains caseless. As (55-d) shows, this unmarked object cannot scramble. Thus, objects that do not bear object case are confined to the immediate left of the verb, while objects that do bear accusative case marking may move around (Kornfilt, 2003, 127). In my analysis, this is explained by the possibility to tell the syntactic function of the case marked object by its case.

Finally, in Hungarian, we find the same kind of variation. Consider the following example:

Hungarian (Nikolaeva, 2002)
(56) a. *Péter-nek a   kalap-ja*
          Peter-DAT the hat-3SG
          'Peter's hat'
      b. *(a) Péter kalap-ja*
          the Peter hat-3SG
          'Peter's hat'

When the possessor is external to the DP dative marking is used. This marking is omitted when the possessor appears prenominally. Again, the relation between the possessor and the possessee is clear from word order in (56-b), but less so in (56-a), hence the case marking in the latter.

In conclusion to this section, also word order can be used as a clue to the argument structure of the clause, because of which case marking can be suspended.

4.6   Conclusion

In this chapter, it was shown how various instances of differential case marking (structural and spatial, subject and object, asymmetrical and symmetrical, local and global, and DCM by markedness, prominence, ambiguity, tense, and structural position) can all be straightforwardly accounted for in the same semi-bidirectional OT model, using the same small number of constraints. In this model, the speaker checks if the utterance of her preference is sufficiently informative. If not, she resorts to a more elaborate form.

Chapter 5

The Structural Use of Spatial Case

I discuss the use of spatial case where one would have expected structural case. I argue that the choice of spatial case in the argument domain is semantically motivated. By forcing a constituent with a human referent into a spatial case construction, the argument has to give up some properties that are especially incompatible with ground meaning. Thus, by using a spatial case on an argument, the speaker suspends animacy inferences like volitionality and sentience.

5.1   Introduction

In this chapter, I discuss the use of spatial case as an alternative for structural case. At first sight, such use is unexpected as structural case already is the perfect strategy to express argument structure. As can be expected then, the use of a more elaborate alternative is semantically motivated. Consider the following example:

Guugu Yimidhirr (Haviland, 1979, 125)

(1)   a.   *Ngayu   galga   nhanu   dumbi.*
                1SG.NOM spear.ABS 2SG.GEN.ABS break.PAST
                'I broke your spear [on purpose].'

    b.   *ngayu*   *ngamu-ugal*   *nhin.gaalngga-y biu-u(y)nh-gu.*
             1SG.NOM mother-ADES sit.REDUP-PAST hip-SUPER-*gu*
             'I was sitting with my mother on/by [her] hip.'

    c.   *Ngadhun.gal galga*   *nhanu*   *dumbi-idhi.*
             1SG.ADES   spear.ABS 2SG.GEN.ABS break-REF.PAST
             'I broke your spear [by accident].'

In (1-a) structural case is used. In (1-b) adessive case is used properly, to express spatial meaning. In (1-c) this spatial case is used instead of structural case. This change in form goes together with a change in meaning, the breaking being done purposefully in (1-a) but accidentally in (1-c).

     I will argue that the use of spatial case in the structural domain is to cancel animacy inferences or expected argument properties. For example, Agents are expected to act on purpose and to cancel this expectation, spatial case is used in (1). The choice for spatial case is semantically motivated and does not simply follow from markedness principles for which any non-structural case would do. I will argue that spatial case inherently signals inanimacy.

     This chapter is organized as follows. In Section 5.2, I will first show that spatial case is more generally used for non-spatial purposes and that there are different types of its use in the structural domain. In Section 5.3 I will argue that spatial constructions are used to cancel animacy inferences and to mark demoted Agents. Among other things, I will account for the fact that it is mostly subjects that are involved in this alternation. In Section 5.4, I will show how the different types of the structural use of spatial case can all be understood as instances of *paradigmatic selection*. I will end with a short discussion of localist grammar in Section 5.5.

5.2   The Extended Use of Spatial Case

Spatial language is not only used for spatial purposes. A very common extension of spatial markers is to the domain of time. According to Heine and Kuteva (2002, 205) this is even one of the most frequently employed conceptual metaphors. An example from English is given in (2):

(2)   a.   *Lucas is still lying in bed.*
        b.   *In a few days, he will fly to Australia.*

In (2-a) *in* is used to express spatial meaning. In (2-b) the same morpheme is used to express temporal meaning. In both cases, some event or event

participant is located. In the first case, it is located in space; in the second case, it is located in time. According to Haspelmath (1997), such spatial expression of temporal notions is extremely widespread in the world's languages, being limited neither genetically (e.g. to Indo-European), nor geographically (e.g. to Europe), nor typologically (e.g. to languages with SVO word order).

Another frequently attested extension of spatial meaning is the expression of possession (Heine & Kuteva, 2002; Stassen, 2009), illustrated in (3).

Agul (Ganenkov, Maisak, & Merdanova, 2008, 174)

(3) *Za-q   ʔu   ruš=na   sa   gada   qa-a.*
     I-POST two daughter.ABS=and one son.ABS POST.be-PRES
     'I have two daughters and one son.'

The literal translation of this example would be 'two daughters and a son are behind me', or more generally for such constructions 'X is at Y'. Such a spatial relation is argued to be at the core of the semantics of possession by many authors (in addition to being in control; see Stassen, 2009, 11-12).

For more complete overviews of language-specific extensions of spatial cases, I refer to the studies of Creissels (2009a) on Northern Akhvakh and Forker (2010) on Tsezic.

The use of spatial case beyond the expression of spatial meaning can be motivated both by its form and meaning. As explained in Chapter 2, economical forms like morphological case acquire new meanings and functions more easily than costly forms (Zipf, 1965). Since spatial case is among the most frequent expressions, it is hardly a surprise that it is used for other meanings too.

In addition however, spatial meaning is a factor of relevance in the extension of its use. Spatial reasoning is often thought to be at the basis of our thinking (see, among others, J. Anderson, 1971; Jackendoff, 1990; O'Keefe, 1996; Haspelmath, 1997; Talmy, 2000). From an evolutionary perspective, we needed some understanding of the space around us way before we started thinking, for example, in terms of possession. This does not necessarily mean that we understand abstract meaning in spatial terms. For example, Jackendoff (1983, 188-189) acknowledges the use of spatial concepts for organizing domains that lack perceptual counterparts. However, according to Jackendoff, there is a more abstract, more general organization that can be applied to any field. The spatial field is primary only (if at all) because of the strong nonlinguistic cognitive support (Jackendoff, 1983, 210). In contrast, Haspelmath (1997, 3) argues that, for the temporal domain, spatial

thinking is really basic. Cross-linguistically, time expressions can be shown to be based on spatial ones by synchronic data. Haspelmath concludes that this cannot be explained by a general abstract organization, only by the use of spatial metaphor (in which a metaphor is understood as a conceptualization of target domain in terms of a source domain; Haspelmath, 1997, 140). Whereas Haspelmath is concerned with the temporal domain only, localist theories make a similar claim more generally. In localist theories, all thinking is based on concrete (spatial) metaphor (J. Anderson, 1971, 2009; Croft & Cruse, 2004). Below, I will show how the mapping between structural arguments and specific directionality distinctions can be explained by localist reasoning. Nevertheless, I choose to remain neutral in the discussion about the exact nature of spatial conceptualization. In either case, spatial meanings are among the most frequently mentioned sources in *The world lexicon of grammaticalization* (Heine & Kuteva, 2002), which summarizes the most salient cross-linguistic generalizations on grammaticalization paths. Heine and Kuteva (2002, 5) neutrally summarize their findings as follows: "[U]nderlying human behavior there appears to be a strategy of linguistic processing whereby more abstract functions are expressed in terms of forms of concrete concepts."

Surprisingly, spatial language is also used in a domain in which there already is a perfect alternative expression. That is, sometimes spatial case is used instead of structural case. We can discern four types of such extensions of its primary use. The first is the obligatory use of spatial case on the arguments of specific classes of verbs. For example, according to Forker (2010), the subject argument of 'to find' in Hinuq is marked with spatial case, as illustrated in (4).

Hinuq [Tsezic; Nakh-Daghestanian] (Forker, 2010)

(4) *Hadze-qo   hago uži   ∅-aši-yo   gom.*
     they.OBL-AD this boy(I) I-find-PRS be.NEG
     'They do not find the boy.'

In (4), the argument *hadze-qo* is marked with a spatial case that normally denotes Place. In the English translation however, it is just a transitive subject, having the form *they*. Other examples of such obligatory use are arguments of verbs of speech, perception and emotion in different languages, like illustrated for Tsez and its English translation in (5).

Tsez [Tsezic; Nakh-Daghestanian] (Forker, 2010)

(5) *K'et'u-ƛor-no b-ezu-n   zir-a   ʔesir-no.*
     cat-SUPERL-and III-look-CVB fox(III).OBL-ERG ask-UWPAST
     'The fox looked at the cat and asked.'

The object of 'to look' in (5) is marked with superlative, standardly used
to express motion to a surface. Here, English behaves alike, also marking
the object argument as an oblique. As discussed in Section 2.4, cross-
linguistically the standard transitive construction that makes use of struc-
tural case is generally used with prototypical transitive verbs only (Tsunoda,
1985; Malchukov, 2005). Less prototypical transitive verbs assign oblique
case to their arguments. In principle, my account only motivates the use of
spatial case in these alternations. However, in Section 5.5, I will discuss a
proposal that actually motivates the directionality meaning of this spatial
marker.

Secondly, the use of spatial case can be obligatory in causative construc-
tions. This is illustrated for Guechua in (6).

Imbabura Guechua [Quechua] (Rice & Kabata, 2007)

(6) a. *Maria ñuca-man pata-ta   yanu-chi-rca.*
         Maria 1SG-ALL   potato-ACC cook-CAUS-3.PAST
         'Maria let me cook potatoes.'
     b. *Wasi-man-mi   ri-ju-ni.*
         house-ALL-VALIDATOR go-PROG-1SG
         'I am going to the house.'

Normally, structural case is used for the arguments of the predicate *to cook*.
In the causative construction in (6-a) however, the allative case is used,
which normally expresses Goal meaning, as (6-b) shows.

Thirdly, the use of spatial case on the arguments of a given verb can
be optional. This is illustrated in the by now familiar example from Lezgian:

Lezgian (Haspelmath, 1993, 292)

(7) a. *Zamira.di   get'e xana.*
         Zamira.ERG pot   break.AOR
         'Zamira broke the pot.'
     b. *Zamira.di-waj get'e xana.*
         Zamira-ABL   pot   break.AOR
         'Zamira broke the pot accidentally/involuntarily.'

In (7-b) the ablative, normally expressing Source, is used instead of ergative case. As can be expected from the discussion in the previous chapter, the change in form goes together with a change in meaning. The Agent in (7-a) broke the pot, but she did this *accidentally* in (7-b).

Finally, spatial case can be used on arguments that are demoted. In a standard transitive clause, the Agent is subject. In a passive construction, the objects becomes the subject and the Agent an oblique, if expressed at all. In many languages, this demoted Agent is marked with a spatial form, as illustrated for West Greenlandic in (8-a).

West Greenlandic (Fortescue, 1984, 212)

(8)   a.   *Qimmi-mit aupan-niqar-puq.*
            dog-ABL   attack-PASSIVE.3S-INDIC
            'He was attacked by the dog.'
    b.   *Nuum-mit*
            Nuuk-ABL
            'from Nuuk'

As (8-b) shows, the proper use of this marker is to express Source.

The four types of extension of the use of spatial case seem to differ in the meaning contribution that spatial case makes. In the first type, it may seem hard to speak of a meaning contribution, spatial case being the only choice. We can only compare different construction pairs in the latter two types, in which spatial case is used as an alternative form on an argument that is otherwise assigned structural case. In (7), volitionality is canceled, whereas in (8) prominence is lowered. In spite of these apparent differences between the four types, I will argue that all these uses of spatial case can be explained in the same terms of *paradigmatic selection*.

In the next section, I will first discuss the optional use of spatial case in the structural domain, which will be explained by the suspension of structural inferences.

5.3   The Suspension of Structural Expectations

In standard transitive clauses, structural case is used to express the argument structure. This is a perfectly viable strategy, encoding the argument structure unambiguously and economically. In principle then, there is no need to use spatial language here. So why would languages use spatial

case instead of structural case? In addition to an explanation in terms of
markedness, as for example proposed by (Ackerman & Moore, 2001; Kittilä,
2009; Hopper & Thompson, 1980; Malchukov & de Swart, 2009; de Hoop
& Malchukov, 2007, 2008; Ganenkov, 2006; Ganenkov et al., 2008), I want
to argue that the use of spatial case as an alternative for structural case is
semantically motivated. In my account, semantic markedness and formal
markedness naturally go together. If some meaning is unexpected (seman-
tic markedness), the speaker needs to make this meaning explicit (formal
markedness) to make sure the hearer will get the right interpretation. Cru-
cially differently from the other approaches, I propose that this marked form
is not just more marked (which would assume predefined meaning pairs),
but inherently expresses the meaning aspects involved. By the use of spatial
case prototypical argument properties are suspended. Note however that
spatial case is not the only way to do so. Other markers that prototypically
involve inanimate performers can have a similar function. For example, the
use of instrumental case for demoted Agents, illustrated for Russian in (9),
is attested in different, nonrelated languages.

Russian (Palancar, 2002, 4)

(9)   a.   *On byl prinjat   minstr-om.*
           he   was received.M minister-INSTR:M
           'He was received by the minister.'
      b.   *Ona udarila ego   palk-oj.*
           she   hit.F   him:ACC stick-INSTR:F
           'She hit him with a stick.'

In this sense, I fully agree with Palancar (2002) who warns against the
overgeneralization of a spatial link between Agent and Source as proposed
by localist grammar, to be discussed below. Using spatial markers is only
one way to suspend animacy expectations, other markers that are typically
used with inanimates may serve this purpose as well.

   I will first propose an account for case alternations that concern voli-
tionality. Subsequently, I will explain the use of spatial case for demoted
arguments.

5.3.1   Disabled Agents

Consider the following example from Agul in which adelative case is used
instead of ergative case.

Agul (Ganenkov et al., 2008, 177)

(10)   a.   *Baw.a   nek̄   at̄uzu-ne*
                mother.ERG milk.ABS pour.out-PST
                'Mother poured out the milk.'
    b.   *Baw.a-fas   nek̄   at̄uzu-ne*
                mother.ERG-ADEL milk.ABS pour.out-PST
                'Mother accidentally spilled the milk.'

In the standard transitive construction (10-a), the Agent is volitional; in the spatial argument construction (10-b), the Agent is unintentionally doing something. By the use of adelative case, normally expressing Source, the volitionality expectation for Agents is canceled.

Typically, such volitionality alternations concern Agents. This follows logically from Dowty's (1991) argument selection principle and proto-properties. The argument selection principle states that in predicates with a grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject, the argument having the greatest number of Proto-Patient properties will be lexicalized as the direct object of the predicate (Dowty, 1991, 576). Dowty's lists of semantically independent proto-properties are repeated in (11) and (12):[1]

(11)   Proto-Agent properties

    a.   volitional involvement in the event or state
    b.   sentience (and/or perception)
    c.   causing an event or change of state in another participant
    d.   movement (relative to the position of another participant)
    e.   (independent existence)

(12)   Proto-Patient properties

    a.   undergoes change of state
    b.   incremental theme
    c.   causally affected by another participant
    d.   stationary relative to movement of another participant
    e.   (no independent existence)

Note that according to these proto-properties, only typical As are humans. Animate properties like volitionality and sentience are only entailed for the Agent, not for the Patient. Therefore, if one wants to cancel animacy

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[1] Some parts of this chapter have been discussed in the previous chapters already. However, I think the different context warrants some repetition.

expectations like volitionality, one needs a Proto-Agent to do so. There are no animacy features to cancel for Proto-Patients. The use of spatial case instead of structural case is thus mostly expected for subjects.

However, instead of entailments from Proto-Agent properties to humans there also are inferences from humans to Proto-Agent properties. According to Primus (2010) animacy is (unilaterally) implied by most of the Proto-Agent properties. Only animates can be volitional and sentient. She explains the reverse inference from Agents to animacy by abductive reasoning (see Levinson, 2000b, discussed in Chapter 1). By pragmatic inferencing, the informativity of the utterance is increased by strengthening the meaning to a stereotypical exemplification. For example, unless explicitly marked otherwise, if a human is doing something, (s)he probably is doing so volitionally. For Primus (2010), this abductive reasoning explains why animacy is used as a cue for agentivity in language performance. Human arguments are strengthened with Proto-Agent inferences. If an argument is human, (s)he will probably act volitionally, on purpose, etc. Now, why is spatial case used to cancel these? Grounds prototypically are inanimates (animates inconveniently walking away and therefore being rather useless for localization purposes) and spatial case inherently expresses grounds. I propose that spatial case is used to cancel Proto-Agent properties precisely because of the incompatibility of the properties of ground and Agent. Prototypical grounds are not sentient and cannot act purposefully. As I will argue below, by using spatial case on an Agent, the speaker intends to reach a compromise between Agent and ground properties.

As discussed in Section 4.1, according to Aristar (1996, 1997), cases exhibit typing behavior. Spatial cases preferably combine with inanimates and are dispreferred with human referents. On the other hand, other cases, like dative, may prefer humans and disprefer nouns with inanimate referents. This is illustrated in the following example from Kuvi.

Kuvi (Aristar, 1996, 215)

(13)   a.   *āyana-ki*
                woman-DAT
                'to the woman'

          b.   *ilu   ta-ki*
                house P-DAT
                'to the house'

          c.   *āyani   taŋ-a*
                woman.GEN P-LOC
                'at the woman's place'

    d.   *ilut-a*
        house-LOC
        'at the house'

One of the strategies that languages may apply if an object does not fit the selection criteria of its case frame is to use a bridging morpheme. In (13-b), the inanimate 'house' does not fit the selection criteria for the dative case. Therefore, a bridging morpheme *ta* is used. This bridging morpheme is not necessary for a typical dative case argument like 'woman' (13-a). The other way around, humans are nontypical arguments of a locative case and therefore a bridging morpheme, the adposition *taŋ*, is used in (13-c). Clearly, this is not necessary for locative case arguments that are typical places (13-d).

De Hoop and de Swart (2009) argue that these bridging morphemes are really the overt expression of a type shift operation (see Partee, 1986). Combining spatial case with a human NP results in a type mismatch which is resolved by a type shift. Whereas humans are animate entities e_a, spatial cases select for inanimate entities e_i. Bridging morphemes are of type $\langle e_i, e_a \rangle$. They take an inanimate entity and map that onto an animate entity, or take an animate entity and map that onto an inanimate one. By using a bridging morpheme, the animacy features of some entity change in such a way that it fits its function. This is illustrated in Figure 5.1.[2]
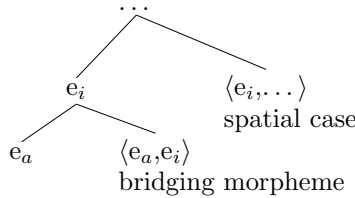
Figure 5.1: Type shifting (predicate modification)

The bridging morpheme in Figure 5.1 takes an animate entity and turns it into an inanimate one. The argument now fits the selection criteria for spatial case, a function $\langle e_i, \ldots \rangle$ which takes an inanimate entity (and generally maps that onto a predicate or argument modifier). In addition to such overt marking of a type shifting operation, arguments may undergo a

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[2]I treat constituents like 'the woman' and 'the house' as being of type e here.

type shift covertly. Then, a function forces its argument to give or take up some properties without this being explicitly encoded (see Partee, 1986).

As an alternative to a complete type shift, I propose that a type mismatch may result in a compromise. As discussed above, most Proto-Agent properties are restricted to humans, which are type incongruent with spatial (case) constructions. Humans are out of place in combination with spatial case, which normally combines with inanimates and expresses ground meaning. However, instead of changing completely from an animate to an inanimate entity, the animate entity only gives up some of its most salient animacy features, most probably the ones that are inappropriate in a spatial function. Thus, by using a spatial case on a constituent with a human referent, the speaker suspends standard Proto-Agent implicatures that are especially inappropriate for grounds.

Most examples that I will discuss below to illustrate this type of extended use of spatial case come from Nakh-Daghestanian languages. The only examples I found from other languages are from Guugu Yimidhirr, Imbabura Guechua (discussed above), and Finnish (to be discussed below). On the basis of their genealogical, geographical, and typological unrelatedness, however, I expect that there are more languages with this strategy; the pattern simply is not well-described yet.

Ganenkov et al. (2008) discuss noncanonical Agent encoding in the Nakh-Daghestanian language Agul. Agul is an ergative language with SOV basic word order. Standardly, the Agent of a transitive verb (A) is marked with ergative case (14-a), the Patient of a transitive verb (P) and subject of an intransitive verb (S) are unmarked:

Agul (Ganenkov et al., 2008, 173)
(14)　　a.　*Dad-a　　　guni　ʔut'nu-ne*
　　　　　　　father-ERG bread eat-PAST
　　　　　　　'Father ate bread.'
　　　　b.　*Ze dad　　mask̄aw.di-as χab　aldarkunaa.*
　　　　　　　my father Moscow-INEL back return
　　　　　　　'My father has come back from Moscow.'

The standard spatial use of the adelative case is to express source meaning:

Agul (Ganenkov et al., 2008, 177)
(15)　　*Cil.i-fas　hat̄-u　　　čuwal!*
　　　　　wall-ADEL take.away-IMP sack.ABS
　　　　　'Take away the sack from the wall!'

This adelative case can be used instead of ergative case to mark what Ganenkov et al. (2008) call *non-canonical agents.* They discern different types and subtypes of non-canonical Agent constructions, of which the precise labels are of no importance here. All of these variants have in common that Proto-Agent properties are canceled.

Since the use of spatial case cancels animacy entailments, there must be an animacy entailment in the standard transitive construction to cancel. But also, the resulting reading must be possible. Whereas it is easily conceivable that someone spills milk accidentally, it is much harder to think of someone accidentally writing a letter. It is not possible to use a spatial argument here, as illustrated in (16):

Agul (Ganenkov et al., 2008, 179)

(16) a. *Ruš.a   k'eǯ   lik'i-ne*
          girl.ERG letter.ABS write-PAST
          'The girl wrote a letter.'
      b. **Ruš.a-fas k'eǯ   lik'i-ne*
          girl.ADEL letter.ABS write-PAST
          'The girl accidentally wrote a letter.'

It is possible again to mark reduced animacy on the Agents of such verbs in causative constructions:

Agul (Ganenkov et al., 2008, 188)

(17) *Baw.a   gada.ji-fas šurpa   ʔut'as-s q'u-ne*
      mother.ERG boy-ADEL soup.ABS eat-INF do-PAST
      'Mother made the boy eat the soup.'

In (17), the independence of the subordinate Agent is restricted by the Agent of the matrix verb, which is marked by spatial case.

Ganenkov et al. (2008) argue that the causative construction with spatial case is only allowed for subordinate verbs denoting controlled actions or human causees. This is precisely what we would expect if spatial case is used to cancel Proto-Agent properties, in this case, something like independent involvement. Other causative constructions maintain ergative case in the subordinate clause. If the causative construction with spatial case is possible, Ganenkov et al. (2008, 188) note a semantic contrast for humans between the causative construction in which a structural case is used and that in which spatial cases are used. Whereas the use of the ergative case leaves the opportunity for the autonomous acting of the causee open, the

use of spatial case reduces its indepence of acting and underlines its subordination to the superordinate Agent. Thus, the choice of spatial case is motivated by the goal of canceling Proto-Agent properties.

All examples of noncanonical Agent marking in Agul discussed by Ganenkov et al. (2008) can be understood in this light. For example, in (18), the spatial case marked Agent deliberately but mistakenly takes part in the event, which is also a case of reduced agentivity.

Agul (Ganenkov et al., 2008, 183)

(18)   a.   *Dad.a-fas   kurušк̄a arʔu-b   xu-ne.*
              Father-ADEL mug.ABS breakMSD become-PAST
              'Father (deliberately) broke the cup.'
              (it turned out later that another cup should have been broken,
              but father did not know that)

        b.   *Za-fas ušu-b   xu-ne   ge-wur.i-n   χul.a-s.*
              I-ADEL go-MSD become-PAST that-PL-GEN house-DAT
              'I went to their place.'
              (I knew that I should not visit them, but it so happened that
              I had to do this)

Note that this construction exclusively allows agentive verbs, which entail volitionality for the Agent. This is illustrated by the ungrammaticality of the next examples:

Agul (Ganenkov et al., 2008, 183-184)

(19)   a.   **Gada.ji-fas alurq'u-b   xu-ne.*
              boy-ADEL   fall.down-MSD become-PAST
              'It so happened that the boy fell down.' (although he was not
              supposed to do so)

        b.   **Ruš.a-fas p̄adarк̄a agu-b   xu-ne.*
              girl-ADEL gift.ABS see-MSD become-PAST
              'It so happened that the girl saw a gift.'

As (19) shows, it is not possible to use adelative case on the subjects of a verb like 'to fall' or 'to see'. These predicates do not entail volitionality for their subject and therefore volitionality cannot be canceled.

The only construction in which it is slightly more difficult to claim that animacy entailments are canceled is the possibilitive construction. This construction may express both participant internal (20) and participant external possibility (21).

Agul (Ganenkov et al., 2008, 186)

(20) *Ze gada.ji-fas was-s   kümek   ag'a-s xa-se.*
      my son-ADEL   you.SG-DAT help.ABS do-INF become-FUT
      'My son will be able to help you.'

(21) *Ilsan.di-fas   allah.t̄.i-qaj dua-s   xa-fe-wa?*
      person-ADEL Allah.COMIT compete-.INF become-GENER-Q
      'Is it possible (permitted) for a human being to compete with Al-
      lah?'

In these examples, it is the actuality of the event rather than the animacy
entailments for the Agent that is modified. The use of spatial case here
probably is an extension of the use described above. Indeed, this con-
struction is only allowed with animates, suggesting that it has to do with
decreased agentivity originally.

   According to Ganenkov et al. (2008), canonical agentivity is encoded
by ergative case, whereas adelative covers an additional, coherent semantic
domain of noncanonical agentivity. They explicitly say that spatial cases in
these noncanonical Agent constructions "do not seem to show clear traces of
original locative semantics" (Ganenkov et al., 2008, 175). Thus, Ganenkov
et al. (2008) do not relate the use of a spatial case in the argument domain to
its original spatial meaning. Above, I have shown this *can* be done. Spatial
case is used because of its incompatibility with Proto-Agent properties.
Because of the type mismatch, a compromise is reached in which some
Proto-Agent properties are suspended.

   Instead, explaining the structural use of spatial case as being a marked
alternative form that expresses a marked meaning, as Ganenkov et al. (2008)
propose for the examples above, seems to be the standard way to deal with
these case alternations. Following Horn (1984), the maxim generally is that
the marked (oblique) form goes with the marked meaning. This is also the
approach Hopper and Thompson (1980, discussed in Chapter 2) and de
Hoop and Malchukov (2008) adopt.

   Consider again the example from Lezgian in (22). De Hoop and Malchukov
(2008, 574) explain this pattern with Bidirectional Optimality Theory.

Lezgian (Haspelmath, 1993, 292)

(22) a. *Zamira.di   get'e xana.*
          Zamira.ERG pot   break.AOR
          'Zamira broke the pot.'

      b.   *Zamira.di-waj get'e xana.*
            Zamira-ABL   pot   break.AOR
            'Zamira broke the pot accidentally/involuntarily.'

Both constructions violate the constraint ECONOMY that says to avoid morphological marking (see Kiparsky, 2004), as both involve morphological case. The constraint ID, discussed in the previous chapter, says that "strong" subjects should be marked with ergative case. Because of this, both the combination of ergative case with a non-volitional A and the combination of oblique case with a volitional A violate the constraint ID. Thus, the combinations of volitional A with Ergative case and non-volitional A with the oblique case both become optimal in the first round of optimization.

In another, actually subsequent but earlier published, paper, de Hoop and Malchukov (2007) analyze (22) in terms of a difference in markedness of form. Following Woolford (2001), adelative case, or any non-structural case, is said to be more marked than ergative case, or any other structural case, which is illustrated by ranking *ADEL higher than *ERG in Tableau 18.

	Subject	*ADEL	*ERG	ID
☞	[ERG, +volitional]		*	
	[ERG, -volitional]		*	
	[ADEL, +volitional]	*		*
☞	[ADEL, -volitional]	*		

Tableau 18: More advanced BiOT analysis of symmetrical DSM in Lezgian

The optimal form can combine with either a volitional or a non-volitional reading from a unidirectional point of view. It seems impossible to decide what the first super-optimal pair is in a bidirectional perspective, since there are two equally optimal candidates now. However, it is possible to determine the first super-optimal pair in a different way, by the mechanism of "backwards bidirectional reasoning" (Lestrade, 2006). By taking into consideration the other two candidate pairs with the suboptimal form, de Hoop and Malchukov (2007, 1649) determine the preferred interpretation for the suboptimal form. Of the two candidate pairs with the adelative form, the one expressing a non-volitional meaning is better. The adelative case prefers to be linked to the non-volitional reading because a volitional reading would violate the identification constraint of de Hoop and Malchukov (2007) that states that a volitional reading must be expressed by Ergative case. Thus,

if the ergative form is really indifferent with respect to its interpretation, we can let the adelative form choose. By bidirectional reasoning applied backwards we can now determine the interpretation of the preferred form.

Thus, de Hoop and Malchukov (2007) use markedness to explain the use of spatial case in the argument domain.[3] All nonstructural cases are more marked than structural cases and therefore their corresponding markedness constraints will always be ranked higher than the constraint that penalizes the use of structural case.

Note that in such approaches the use of *spatial* case remains unmotivated and that volitional-nonvolitional meaning pairs have to be assumed. That is, any nonstructural case could have been used to express the marked meaning. In my approach, however, the spatial case in (22) inherently cancels human Proto-Agent inferences because of the incompatibility of Proto-Agent and ground properties. In other words, I do not have to assume predefined meaning pairs.

Now, consider the example of Finnish. The normal use of Finnish ablative case is the expression of source meaning, as in (23):

Finnish (Kracht, 2003)

(23)   *Hän menee laiva-lta.*
        He   walks ship-ABL
        'He is going/walking from the ship.'

However, in (24) it is used to mark a nonvolitional Agent.

Finnish (Kittilä, 2009, 359)

(24)   *Minu-lta puto-si   kuppi.*
        1SG-ABL drop-3SG.PAST cup.NOM
        'I (accidentally) dropped a/the cup.'

The default way of expressing a transitive event in Finnish is to use nominative case on the subject and partitive on the object. For Kittilä (2009), the use of any other case indicates a lower degree of transitivity. He explicitly says that "[e]ven though semantic cases are usually more intimately associated with the expression of semantic content (such as location or instrument), it is hard to associate them directly with the expression of any specific transitivity feature." (Kittilä, 2009, 364). For him then, the use of

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[3]In fact, de Hoop and Malchukov (2008) do not argue that an oblique case marks non-prominent arguments in this example, but use the constraint ID to argue that structural case preferably combines with prominent arguments.

ablative case in (24) is just the Finnish instance of a cross-linguistic strategy to formally mark what is semantically marked. Needless to say, I think ablative case is selected on purpose here, to mark the unvolitionality of the Agent.

As explained above, spatial case is used to cancel Proto-Agent properties and is therefore expected to apply to (transitive) subjects mostly. Sometimes however, human properties can be canceled at the Patient too. Consider the following example from Diyari (Australian). According to Austin (1981, 155-156), the meaning difference between this transitive construction and its antipassive counterpart is not always clear and the two constructions seem to have the very same meaning.[4]

Diyari (Austin, 1981, 153)

(25) a. *Ŋaṯu   naṉa   wiḻa   kaḻka-yi.*
1SG.ERG 3SG.NONFEM.O woman.ABS wait.for-PRES
'I wait for the woman.'

b. *Ŋaṉi   kaḻka-ṯadi-yi   naŋkaŋu   wiḻa-ṉi.*
1SG.NOM wait.for-AP-PRES 3SG.NONFEM.LOC woman-LOC
'I wait for the woman.'

Nevertheless, I think it can be explained by the suspension of animacy properties. The theme of a waiting predicate may not be aware of the fact that she is being waited for. As we have seen for Proto-Agent entailments above, this lack of sentience can be expressed by spatial case. Probably, the alternation in (25) is not a real-time alternation that expresses differences in awareness but a predicate that is at the border of the set of predicates that are encoded with transitive constructions (cf. the Hindi example (25) in Section 2.4). This type of non-optional use will be discussed in Section 5.4. In the next section, I will first discuss the optional use of spatial case on arguments to mark lower prominence.

5.3.2 Demoted Agents

In the examples in the previous section, the properties under discussion concerned characteristics for an Agent. Proto-Agent properties that are especially inappropriate for grounds are canceled by the use of spatial constructions. However, recall from the definition of Comrie (1981, 107) that

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[4]Dependent on their combinatorial possibilities with a set of transitivers, main verbs in Diyari are classified into five mutually exclusive groups (Austin, 1981). The alternation described here holds for class 2B verbs.

subject is a multifactorial notion, the second part to it being that it typically is topic. As I will show now, also topicality is hard to reconcile with spatial constructions. Consider the following example:

Spanish (adapted from Palancar, 2002, 34-35)

(26) a. *El   escalador salt-ó   d-el   pico*
          the.MASC climber   jump-3SG.PAST Source-the.MASC peak
          más   alto.
          more high
          'The climber jumped from the highest peak.'
      b. *Pedro i-ba   acompañ-ado   de   su*
          Peter go-3SG:IMPF accompany-PAST.PRT Source 3POSS
          madre.
          mother
          'Peter was accompanied by his mother.'

The marker *de* that normally expresses Source (26-a) is used in (26-b) to mark the demoted Agent, i.e. an Agent that is no longer the subject of the sentence.

Comrie (1981, 107) proposes a multifactorial definition of subject that says that subjects prototypically represent the intersection of Agent and topic. That is, the clearest examples of subjects are Agents which are also topics. The definition is stated in terms of prototypes rather than necessary and sufficient criteria for identification, allowing for non-agentive, non-topical subjects. Now consider again the definitions of figure and ground by Talmy, discussed in Section 3.2.

(Talmy, 2000, 312):

(27) a. The *figure* is a moving or conceptually movable entity whose path, site, or orientation is conceived as a variable, the particular value of which is the relevant issue.
      b. The *ground* is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the figure's path, site, or orientation is characterized.

As these definitions show, the relation between figure and ground is asymmetrical: The location of the ground should be known to the hearer to successfully locate the figure. The inequality in status of the two is made explicit by the following list of properties they may have:

Talmy (2000, 183)

(28)   *figure*
– has unknown spatial (or temporal) properties to be determined
– more movable
– smaller
– geometrically simpler (often pointlike) in its treatment
– more recently on the scene/in awareness
– of greater concern/relevance
– less immediately perceivable
– more salient, once perceived
– more dependent

(29)   *ground*
– acts as a reference entity, having known properties that can characterize the primary object's unknown
– more permanently located
– larger
– geometrically more complex in its treatment
– earlier on the scene/in memory
– of lesser concern/relevance
– more immediately perceivable
– more background, once primary object is perceived
– more independent

For grounds, Svorou (1993, 11) adds the properties of having cultural significance and being frequently encountered, which, in practice, often turn out to be related. Levinson and Wilkins (2006b, 515) show that for a sample of languages the figure prototypically is indeed a relatively small, manipulable, inanimate, movable and independent object in close contiguity with a relatively large, relatively stationary (fixed or immobile) ground object.

Grounds are very much the opposite of subjects. Grounds typically are backgrounded, inanimate referents entities of less concern, whereas subjects typically are human and in the center of attention. By giving subjects the form of a ground, that is, by marking them with the spatial case, subjects become more like grounds. The resulting demoted Agent meaning is of course precisely the intended meaning of the speaker. Again, in this view, the choice for a spatial case is motivated semantically, not just by formal markedness.

The semantic motivation for the use of spatial case as a marker of demotion can actually be tested. Palancar (2002) studies the origin of

Agent markers (not case markers *per se*), comparing *functional syncretisms* between the marker for the transitive subject (*Ergative*) and the passive Agent. That is, he describes which other functions the markers for the two functions may have. Like me, Palancar takes a, what he calls, *semantic position* in the study of these markers. He argues for a conceptual and semantic motivation for the choice of particular markers to express a demoted Agent, if, of course, it cannot be reduced to coincidence or genetic origin (Palancar, 2002, 3-4). The semantic position contrasts with the *syntactic position* in which the exact marker on the Agent of a passive construction is irrelevant and only its oblique status is considered of interest. The study of Palancar (2002) offers a nice opportunity to compare the syncretism patterns for the markers of demoted Agents with those of the Ergative. If my account is right, we expect more syncretisms with spatial functions for the markers of passive Agents than for the Ergative markers. Although in principle, other markers that typically combine with nonprominent inanimates will do to encode demoted Agents too, by my account spatial case is expected in syncretisms for markers of demoted Agents rather than in syncretisms for Ergative markers. (Note that spatial case is expected as an *alternative* marker for the Ergative in alternations marking suspension of Proto-Agent properties, as discussed in Section 5.3.1. It is *not* expected, however, in a syncretism.)

Palancar (2002) studies 176 markers from 148 languages. The numbers in Table 5.1 do not add up because syncretisms are not exclusive. That is, the syncretism of passive Agent with Source does not say that there may not be another function, like Cause, involved in a three-way syncretism between Cause, Source, and passive Agent.

As the numbers in Table 5.1 show, we can conclude that indeed spatial case is mostly involved in the syncretism of markers for passive Agents (66, versus 26 Ergative syncretisms). Syncretisms of ergative markers are less frequent in the first place and mostly involve nonspatial functions.

5.4 Paradigmatic Selection

In the introduction to this chapter, I distinguished two kinds of extension of spatial arguments, the obligatory and the optional use. In the previous section, I discussed the latter use only. In this section, I will bring the two together again using the ideas of Ackerman and Moore (2001).

Recall that Dowty's argument selection principle says that of two predicate arguments the one with most Proto-Patient properties will become

	passive agent	Ergative
non-spatial functions		
Cause	46 (33%)	22 (27%)
Causee	18 (13%)	1 (1%)
Dative	19 (14%)	3 (4%)
Instrument	33 (24%)	43 (52%)
other	23 (15%)	14 (17%)
total	139 (100%)	83 (100%)
spatial functions		
Source	31 (47%)	5 (19%)
Goal	8 (12%)	2 (8%)
Place	18 (27%)	17 (65%)
VIA	8 (12%)	2 (8%)
TOWARD	1 (2%)	0 (0%)
total	66 (100%)	26 (100%)

Table 5.1: Functional syncretisms with Agent markers (Palancar, 2002)

O, the one with more Proto-Agent properties will become A. Ackerman and Moore (2001) proposed to oppose this, what they call, *syntagmatic* selection principle with a paradigmatic one. Like the first principle, it compares degrees of proto-agentivity and proto-patientivity and determines the alignment of grammatical encoding. The difference between the two is that syntagmatic selection is concerned with the relative proto-properties of co-arguments of a single predicate, whereas the paradigmatic selection principle compares relative proto-properties of the same argument across related predicates.

Figure 5.2 represents the familiar syntagmatic selection principle of Dowty (Ackerman & Moore, 2001, 61-62). As illustrated for the second predicate only, of the arguments of a predicate, the one that is most Proto-Agentlike will become A, the one that is most Proto-Patientlike will become O.

Figure 5.3 presents the paradigmatic selection principle (Ackerman & Moore, 2001, 61-62). This time, it is not the arguments of a predicate that are compared but it is the predicate itself that is compared to other predicates. According to Ackerman and Moore (2001, 141), a semantic contrast in degree of agentivity within a class of related predicates should correspond to an encoding alternation between canonically marked (e.g. nominative)

pred$_a$	arg$_1$	arg$_2$
pred$_b$	arg$_1$	arg$_2$
	most Proto-Agentlike	most Proto-Patientlike
	→A	→O
pred$_c$	arg$_1$	arg$_2$

Figure 5.2: Syntagmatic selection

subjects and other more oblique encodings. Similarly, and illustrated in Figure 5.3, a semantic contrast in degree of patienthood within a class of related predicates corresponds to an encoding alternation between canonically marked (e.g. accusative) objects and other more oblique encodings.

pred$_a$	arg$_1$	arg$_2$
		most proto-patientlike
	→A	→O
pred$_b$	arg$_1$	arg$_2$
		less proto-patientlike
	→A	→IO
pred$_c$	arg$_1$	arg$_2$
		least proto-patientlike
	→A	→OBL

Figure 5.3: Paradigmatic selection

The idea of Ackerman and Moore (2001) accounts for example for the fact that cross-linguistically, experiencer verbs have a nondefault argument structure, as illustrated in the following examples from Spanish:

Spanish (Trevino 1990, cited in Ackerman & Moore, 2001, 65)

(30) a. Los perros *lo* molestan siempre que llega ebrio.
          'The dogs harass *him (DO)* every time he comes home drunk.'
      b. Los perros *le* molestan (*siempre que llega ebrio.
          'Dogs bother *him (IO)* (*every time he comes home drunk).'

In (30-a) the more Proto-Patientlike experiencer is encoded as a direct object. Its Proto-Patienthood is illustrated by the possibility to combine with a temporal adverbial, illustrating a change of state. This is not possible

for the less Proto-Patientlike experiencer in (30-b). In accordance with the paradigmatic selection principle, this latter experiencer is encoded as an indirect object. (Note that Ackerman and Moore (2001) predict that nonprototypical arguments are marked in a more *oblique* way. That is, any nonstructural case will do and the choice for specific spatial cases remains unmotivated in their account.)

In conclusion, whereas the syntagmatic selection principle makes uses of the proto-properties of the arguments of the same predicate, the paradigmatic selection principle compares the proto-properties of the arguments of different predicates. The four types of spatial argument constructions I distinguished in the introduction can all be explained by the latter principle. Verbs that obligatorily assign spatial case to their arguments must be compared with verbs that assign structural case. Spatial Agents like experiencers have less Proto-Agent properties than structural Agents, and therefore not all Proto-Agent inferences apply. The optional marking of arguments with spatial case almost always goes together with a difference in meaning that can be described as difference in proto-properties too. Here, spatial Agents often lack properties like volitionality. Similarly, the spatial marking of demoted Agents can thus be explained. The Agents become grounds, i.e. backgrounded reference objects, rather than topics. In sum, the obligatory and optional use of spatial case on arguments can be understood by the paradigmatic selection principle. In addition to the proposal of Ackerman and Moore (2001), I think the choice for the nonstructural marker is motivated. Spatial case is used to mark the fact that one of the arguments is less human, or rather, that some human inference does not go through.

5.5 Structural Directionality

My contribution to the structural use of spatial case in this chapter only concerns the suspension of argument expectations as described in the previous sections. However, I am sympathetic toward an account that goes even further in the motivation of the choice for specific spatial case. In this section, I will briefly show how localist thinking may explain some additional variation.

Localist grammar concerns the syntax of relations that are typically expressed by case inflections (but also by adpositions or structural position) in which the relations are motivated semantically (see J. Anderson, 2006, 2009, 1971; Croft & Cruse, 2004). A case is understood as (a form for) a set

of semantic relations, defined by spatial concepts. In fact, all semantic relations are to be interpreted localistically. The only grammatical relation is the subject, which is the neutralization of semantic relations. For example, the Agent is understood as the 'source of the action', that is, as a spatial source without the spatial meaning. Similarly, Patients are understood as the 'goal of the action' (J. Anderson, 2006, 131). In this view, the world is conceptualized by spatial metaphor.

In localist grammar, a transitive event is thought of as an energy flow that goes from an Agent to a Patient. In fact, this relation is also present in the well-known definition of transitivity by Hopper and Thompson (1980).

(31)   "Transitivity can be characterized as an activity which is carried over or transferred from an agent to a patient" (Hopper & Thompson, 1980, 251)

In the definition in (31), a transitive event originates at the Agent, and ends at the Patient. Thus, the "structural" directionality meaning differs between Agents and Patients. Agents are Sources, Patients are Goals. As a result, if spatial marking is used for arguments, Agents are expected to combine with Source markers and Patients are expected to combine with Goal markers. Whatever the exact motivation for the use of spatial case instead of structural case, localist grammar would say that Source cases are chosen for Agents and Goal cases are chosen for Patients simply because Agents *are* Sources and Patients *are* Goals.

Now, we can observe that in most examples discussed above Goal markers are used for Patients and Source markers for Agents (whereas Place can be used for both, leaving structural directionality underspecified). Also the apparent counterexample in the introduction of a Goal Agent in Imbabura Guechua (Quechua) can be accounted for.

Imbabura Guechua [Quechua] (Rice & Kabata, 2007)
(32)   a.   *Wasi-man-mi*   *ri-ju-ni.*
                house-ALL-VALIDATOR go-PROG-1SG
                'I am going to the house.'
         b.   *Maria ñuca-man pata-ta*   *yanu-chi-rca.*
                Maria 1SG-ALL   potato-ACC cook-CAUS-3.PAST
                'Maria let me cook potatoes.'

In (32-a) the standard spatial use of the allative case as a marker of Goal meaning is shown. In (32-b), this goal marker is used on the Agent of 'to cook', going against the supposed identity between Source and Agent.

However, in causative constructions, there could be said to be two predicates semantically and therefore two instances of structural directionality: that of the matrix predicate (DO, LET, MAKE) and that of the subordinate predicate ('to cook', in (32)). The Agent of the subordinate predicate at the same time is the Patient of the matrix predicate. Thus, the subordinate Agent aligns with a Goal at this higher level (cf. also Rice & Kabata, 2007, 491). Differently (and more generally) put, the use of the causative marker licenses the addition of a superagent that causes the (lower) Agent to do something. Because the latter now loses one or more Proto-Agent properties (e.g. instigation, volitionality, control), it no longer qualifies for ergative case (see Ackerman & Moore, 2001).

In addition, localist grammar may explain the use of specific directionality meanings with verbs of emotion and perception. In principle, the structural directionality of a clause is determined by the verb semantics. In standard transitive clauses the energy flow is from the Agent to the Patient. Some verbs however have a different structural directionality.

Structural directionality can be seen as a variant of *fictive motion* (Talmy, 2000). In pure fictive motion, a form expressing a change of place is used in a situation in which there is no actual motion, nor support of actual motion. An example is given in (33-a).

(33)　　a.　That mountain range goes from Canada to Mexico.
　　　　b.　This road goes from Modesto to Fresno.

In (33-a), the mountain range itself of course goes nowhere. In the less pure but more well-known example (33-b), the road itself again does not move but does support motion.

Talmy's *line of sight* is a version of fictive motion that refers to an intangible, directed line emerging from the visual apparatus of an animate or mechanical entity. Examples are *I looked down into the well* and *I slowly looked toward the door*. This is the type of fictive motion that is central in Huumo (2006, 141), who defines it as a dynamic cognitive relationship, i.e., a relationship that consists of a change by a stimulus into or out of the cognitive presence of the experiencer.

Consider the following example from Kolyma Yukaghir.

Kolyma Yukaghir (Maslova, 2003)

(34)　　*Met mēm̩-get　iŋlā-je.*
　　　　I　　bear-ABL　become.afraid-INTR.1SG
　　　　'I became afraid of the bear.'

If we think of fear as an abstract entity that originates at the Stimulus, the bear, and arrives at the Perceiver, we can again understand this use of a source case by fictive motion. An equivalent expression with a "standard" structural directionality would be *the bear scares me*. (Note by the way that the use of spatial case can again be motivated by the cancellation of Proto-Agent inferences. The source of the fear does not have to be aware of its frightfulness.)

Another example of fictive motion is from Chalawal in (35).

Chalawal (Ganenkov, 2006, 190)

(35) a. *Ĩç-da-Xe   w-uR   de: o-w.*
          spring-OBL-ALL MASC-send.PAST I.ERG this-MASC
          'I sent him to the spring.'
      b. *Di-Xe haʔa   di-w   ima.*
          I-ALL see.PAST I-MASC father
          'I saw my father'

The marker *-Xe* that normally expresses Goal and (35-a) is used on the Perceiver in (35-b). The use of exactly this directionality distinction again can be explained by fictive motion.

In a more or less similar account in terms of structural directionality, Stolz (1992) proposes to look at control instead of fictive motion. Stolz (1992, 108) explains the extension from Place/Source cases to ergative case in Australian languages by interpreting the Agent as the place from which the control of an event is performed.

Similarly, Croft (1991) develops a causal order model in which thematic roles are ordered in a causal chain. In this chain, antecedent roles like Cause, Instrument, and Comitative, precede the object; subsequent roles like Benefactive and Recipient follow it. The object itself is the endpoint or result of the causal chain. For example, in a baking event *Sam baked a cake for Jan*, the Agent Jan precedes the object and the creation of the object brings about some benefit that affects Jan (Croft, 1991, 185). One could easily align such causal chains with (spatial) directionality.

Unfortunately, the way in which structural directionality is perceived cannot always be told *a priori*. In (35), the view of my father apparently comes to me. However, we could also analyze such a situation in terms of me looking at my father, that is, with the opposite directionality. As a result, this approach may be considered too strong.

More seriously, Palancar (2002) gives an example of a demoted Agent marked with Goal case with the verb *to eat*.

Nigerian Arabic (Owens 1993, 157-158; cited in Palancar, 2002)

(36) a. *Fi   yérwa mašée-t   le   béet   rafiig-í.*
          Place Yerwa went-1SG Goal house friend-1SG.POSS
          'In Maiduguri (sic.) I went to my friend's house.'

      b. *Al-ákil   ma bin'ákil le-í*
          DEF-food not eaten   Goal-me
          'This food can't be eaten by me.'

We could maybe say that in this example the food 'comes to me' and therefore the structural directionality is toward the Agent. However, as the numbers in Table 5.1 above show, the use of Goal case for demoted Agents is not exceptional. Of course, there is no reason for all languages and all speakers to conceive the structural directionality of some predicate in the same way, and idiosyncratic perceptions in principle should be allowed. Generally, however, to many different *ad hoc* explanations are dispreferred.

5.6   Conclusion

In this chapter, I have discussed the use of spatial case in the argument domain. Most other accounts explain this use in terms of markedness and, as a result, are indifferent with respect to the precise case alternative. Instead, I have argued that the choice for spatial cases is semantically motivated. Spatial case expresses grounds, i.e., inanimate and backgrounded reference objects. By forcing a constituent with a human referent into a spatial case construction, the argument has to give up some properties that are especially inappropriate for grounds. Thus, by using a spatial case on an argument, the speaker suspends animacy inferences and cancels topicality.

Chapter 6

Conclusion

I have given a functionally motivated account of spatial case using empirical evidence from corpus studies and typological comparison. The main objective of this study was to show how the use and development of spatial case and morphological case in general follow from very general principles.

I started this thesis by defining spatial case as a suffix that expresses spatial meaning. In Chapter 2 I have studied the formal side of this definition; in Chapter 3 I looked into the meaning part.

In Chapter 2 I motivated the synchronic use and diachronic development of case by principles of economy, generalization, and cooperativity. It is impossible to capture in language all the semantic details that are out there in the world. Therefore, one of the main tasks of language is to impose an ordering and categorization of our fuzzy world in order to enable us to talk about it. By making generalizations about objects and events the speaker can economically formulate the meaning she wants to communicate. The task for the hearer is to recognize the generalizations and to enrich the interpretation proper of their markers.

Because of the frequent use that follows from their general applicability the markers of these generalizations acquire an even more general and predictable meaning that leads to their phonological and morphosyntactic reduction in a grammaticalization process. Morphological case is the end result of this process. It is among the most frequently used constructions of language, with the shortest form and most general meaning possible.

More specifically, I have argued that this general meaning of a case marker is a semantic role; a language-specific generalization about relations between events and event participants. In a particular event, each event

participant has a very specific meaning. For communicating this event, however, a semantic role is used. By using semantic roles the speaker can economically encode the function of an argument. By enriching the interpretation of the semantic role with the semantics of the predicate the hearer can unpack the information again.

Only when semantic roles are used frequently enough, their markers will develop into case markers. Since the number of semantic roles is inversely related with the frequency of their use, the number of cases is restricted.

Most predicates have a small set of semantic roles with which they typically occur. Because these argument functions are so predictable, they do not have to be identified by a semantic role marker, they only have to be kept apart. The structural use of case discriminates between the semantic roles that are most prominent for a particular predicate. For reasons of economy, it suffices to mark one of these prominent arguments only. Thus what is called *nominative* in an accusative language and *absolutive* in an ergative language is often the absence of case. Structural case is a high-level generalization about the relation of the prominent arguments with respect to their predicate in terms of Proto-Agent properties. Because of the close interpretation relationship between Patient and predicate, the accusative case marker developed into a marker of syntactic dependency.

In Chapter 3 I have discussed the importance of frequency for the use and development of case in the spatial domain. I have decomposed spatial meaning into a dimension of configuration, which expresses the relative position in space between two objects and a dimension of directionality, which expresses the development of this configuration in time. The directionality dimension was shown to consist of only three basic distinctions only, which follows from the analysis of directionality in terms of a change of configuration over time. Place directionality is the absence of a change in configuration; Goal directionality is a change into some configuration, and Source directionality is a change out of some configuration. All other directionality meanings are derived from this basic set. I have shown that this analysis correctly predicts an implicational scale of directionality distinctions in which derived meanings are only expected to be expressed by spatial case if the more basic distinctions are too.

In contrast to the directionality dimension, the configuration domain is much more complex, consisting of different ordering principles that lead to a larger set of language particular configuration contrasts. Because of the higher token frequency of directionality distinctions in comparison with that of the contrasts of configuration, the markers of directionality are expected to develop into case markers before those of configuration. This prediction

was also shown to be correct by a number of studies. Firstly, I have shown that a configuration distinction in spatial case paradigms is secondary to a directionality distinction. That is, a configuration distinction is only expressed by spatial case if directionality is too. Secondly, for languages with two spatial constructions that differ in their degree of grammaticalization, the more grammatical one was shown to express directionality mainly, whereas the more lexical one was shown to express configuration. Within more lexical spatial constructions such a division of labor was also attested. In complex spatial prepositions that are assigned spatial case themselves, it is usually the adposition that expresses configuration and its case form that determines directionality. Finally, in a study of the case forms of spatial adpositions in Finnish and Hungarian I have shown that spatial case does not make a configuration distinction in such constructions. If the spatial case paradigm of a language distinguishes basic configuration meanings, this distinction becomes redundant in the combination with spatial adpositions that are specialized in the expression of configuration.

In Chapter 4 I have shown how differential case marking, which is relatively well-known for the structural use of case, applies in the same way to the spatial domain. I have used insights from the study of the optional use of spatial case to account for the phenomenon in general. I proposed that in principle, all types of differential case marking can be explained by predictability. The use of case can be judged unnecessary, which explains why case marking is sometimes omitted. This economical use is restricted by other rules of grammar, which were shown to be the result of fossilization, which is a process in which the results of optimization processes lead to independent constraints. My account straightforwardly explained lesser known types of differential case marking in which the discourse setting and structural information is taken into account.

Finally, in Chapter 5 I have discussed the extended uses of spatial case, more specifically its use as a marker of structural arguments. Being the result of a grammaticalization process, spatial case is easy to exploit for other purposes too. In most accounts the structural use of spatial case is explained in terms of syntactic markedness only. However, I have argued that the choice of spatial case in the argument domain is semantically motivated. By forcing a predicate argument with a human referent into a spatial case construction, a compromise is reached in which the argument has to give up some properties that are especially incompatible with spatial meaning. Thus, by using spatial case on an argument, the speaker suspends animacy inferences like volitionality and sentience.

Bibliography

Abbott, M. (1991). Macushi. In D. C. Derbyshire & G. K. Pullum (Eds.), *Handbook of Amazonian languages* (Vol. 3, p. 23-160). Berlin and New York: Mouton de Gruyter.

Ackerman, F., & Moore, J. (2001). *Proto-properties and grammatical encoding. A correspondence theory of argument selection*. Stanford: CSLI.

Aikhenvald, A. Y. (2003). *A grammar of Tariana*. Cambridge, etc.: Cambridge University press.

Aissen, J. (2003). Differential object marking: Iconicity versus economy. *Natural Language and Linguistic Theory*, *21*, 435-483.

Ambrazas, V. J. (1997). *Lithuanian grammar*. Lithuania: Baltos Lankos.

Anderson, J. (1971). *The grammar of case: Towards a localistic theory*. Cambridge: Cambridge University Press.

Anderson, J. (2006). *Modern grammars of case*. Oxford: Oxford University press.

Anderson, J. (2009). Case in localist case grammar. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 121-135). Oxford: Oxford University Press.

Anderson, R. E. (1982). Speech imagery is not always faster than visual imagery. *Memory and Cognition*, *10*(4), 371-380.

Anttila, A., & Fong, V. (2000). The partitive constraint in Optimality Theory. *Journal of Semantics*, *17*, 281-314.

Aristar, A. R. (1996). The relationship between dative and locative: Kuryłowicz's argument from a typological perspective. *Diachronica*, *XIII*(2), 207-224.

Aristar, A. R. (1997). Marking and hierarchy. Types and the grammaticalization of case markers. *Studies in Language*, *21*(2), 313-368.

Asbury, A. (2008). *The morphosyntax of case and adpositions.* Ph.D. thesis, University of Utrecht.

Asher, R., & Kumari, T. (1997). *Malayalam.* London and New York: Routledge.

Austin, P. (1981). *A grammar of Diyari, South Australia.* Cambridge, etc.: Cambridge University Press.

Baayen, H. (2008). *Analyzing linguistic data: A practical introduction to statistics using R.* Cambridge: Cambridge University Press.

Barbará, F. (1944). *Manual o vocabulario de la lengua Pampa.* Buenos Aires: Emecé Editores.

Barðdal, J. (2001). *Case in Icelandic – A synchronic, diachronic and comparative approach.* Ph.D. thesis, Lund University.

Barðdal, J. (2009). The development of case in Germanic. In J. Barðdal & S. L. Chelliah (Eds.), *The role of semantic, pragmatic, and discourse factors in the development of case. Studies in language companion series* (Vol. 108, p. 123-159). Amsterdam: John Benjamins.

Beaver, D., & Lee, H. (2004). Input-output mismatches in OT. In R. Blutner & H. Zeevat (Eds.), *Optimality theory and pragmatics* (p. 112-153). Basingstoke, etc.: Palgrave/Macmillan.

van Bergen, G., & de Hoop, H. (Eds.). (2009). *Topics cross-linguistically* (special theme issue). *The Linguistic Review*, *26*(2/3).

van den Berg, H. (1995). *A grammar of Hunzib*. München and Newcastle: Lincom Europa.

Bickel, B. (2008). A refined sampling procedure for genealogical control. *Language Typology and Universals*, *61*, 221-233.

Bickel, B., & Nichols, J. (2009). Case marking and alignment. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 304-321). Oxford: Oxford University Press.

Bielec, D. (1999). *Polish. An essential grammar* (2nd ed.). London: Routledge.

Bierwisch, M., & Schreuder, R. (1992). From concepts to lexical items. *Cognition*, *42*, 23-60.

Blake, B. J. (1977). *Case marking in Australian languages*. Canberra: Australian Institute of Aboriginal studies.

Blake, B. J. (1994). *Case* (2nd ed.). Cambridge: Cambridge University Press.

Blutner, R. (2007). Optimality theoretic pragmatics and the explicature/implicature distinction. In N. Burton-Roberts (Ed.), *Advances in pragmatics* (p. 45-66). Basingstoke, etc.: Palgrave/MacMillan.

Blutner, R., de Hoop, H., & Hendriks, P. (2006). *Optimal communication*. Stanford: CSLI.

Bohnemeyer, J., & Stolz, C. (2006). Spatial reference in Yukatek Maya: A survey. In S. C. Levinson & D. Wilkins (Eds.), *Grammars of space. Explorations in cognitive diversity* (p. 273-310). Cambridge: Cambridge University Press.

Bowerman, M., & Choi, S. (2003). Space under construction: Language-specific spatial categorization in first language acquisition. In D. Gentner & S. Goldin-Meadow (Eds.), *Language in mind* (p. 387-428). Cambridge, Massachusetts and London, England: the MIT press.

Bray, D. (1986). *The Brahui language*. Delhi: Gian Publishing House.

Bresnan, J., Cueni, A., Nikitina, T., & Baayen, H. R. (2007). Predicting the dative alternation. In G. Bouma, I. Krämer, & J. Zwarts (Eds.), *Cognitive foundations of interpretation* (p. 69-94). Amsterdam: Royal Netherlands Academy of Science.

Bruce, L. (1984). *The Alamblak language of Papua New Guinea (East Sepik).* Canberra: Department of Linguistics, Research School of Pacific Studies, Australian National University.

Brunetti, L. (2009). On the semantic and contextual factors that determine topic selection in Italian and Spanish. *The linguistic review*, *26*(2/3), 261-290.

Bulatova, N., & Grenoble, L. (1999). *Evenki.* München and Newcastle: Lincom Europa.

Butt, M. (2006). *Theories of case.* Cambridge, UK: Cambridge University press.

Butt, M. (2007). *Why case?* (Handout, *Workshop on Empirical approaches to morphological case*, Stanford)

Butt, M., & King, T. H. (2003). Case sytems: Beyond structural distinctions. In E. Brandner & H. Zinsmeister (Eds.), *New perspectives on case theory* (p. 53-88). Stanford, California: CSLI Publications.

Butt, M., & King, T. H. (2004). The status of case. In V. Dayal & A. Mahajan (Eds.), *Clause structure in South Asian languages* (p. 153-198). Dordrecht: Springer.

Butt, M., & Poudel, T. (2007). *Distribution of the ergative in Nepali.* (Manuscript, University of Konstanz)

Bybee, J. L. (1985). *Morphology: A study of the relation between meaning and form.* Amsterdam: John Benjamins.

Bybee, J. L. (2008). Formal universals as emergent phenomena. In J. Good (Ed.), *Linguistic universals and language change* (p. 108-121). Oxford: Oxford University press.

Bybee, J. L., Perkins, R., & Pagliuca, W. (1994). *The evolution of grammar. Tense, aspect, modality in the languages of the world.* Chicago: University of Chicago Press.

Carroll, M., Lambert, M., Natale, S., Starren, M., & van Stutterheim, C. (in press). Being specific: The role of aspect in event construal when grounding events in context. A cross-linguistic comparison of advanced second language learners. In S. Haberzettl (Ed.), *Dynamics of learner varieties* (p. xx-xx). Berlin: De Gruyter.

Carstairs, A. (1983). Paradigm economy. *Journal of Linguistics*, *19*, 115-125.

Casasola, M., & Cohen, L. B. (2002). Infant categorization of containment, support and tight-fit spatial relationships. *Developmental Science*, *5*(2), 247-264.

Chafe, W. L. (1976). Givenness, contrastiveness, definiteness, subjects, topics, and point of view. In C. N. Li (Ed.), *Subject and topic* (p. 25-56). New York, San Francisco, and London: Academic Press, Inc.

Chapman, S., & Derbyshire, D. C. (1991). Paumari. In D. C. Derbyshire & G. K. Pullum (Eds.), *Handbook of Amazonian languages* (Vol. 3, p. 161-352). Berlin and New York: Mouton de Gruyter.

Chelliah, S. L. (1997). *A grammar of Meithei.* Berlin and New York: Mouton de Gruyter.

Chomsky, N. (1981). *Lectures on government and binding.* Dordrecht: Foris.

Christiansen, M. H., & Chater, N. (2008). Language as shaped by the brain. *Behavioral and Brain Sciences*, *31*(5), 489-509.

Colarusso, J. (1989). East Circassian (Kabardian dialect). In B. G. Hewitt (Ed.), *The indigenous languages of the Caucasus. The North West Caucasian languages* (Vol. 2, p. 261-355). Delmar, New York: Caravan Books.

Comrie, B. (1981). *Language universals & linguistic typology* (2nd ed.).

Chicago: University of Chicago press.

Comrie, B. (2005). Chapter 98/99. Alignment of case marking. In M. Haspelmath, M. Dryer, D. Gil, & B. Comrie (Eds.), *The world atlas of language structures (CD-ROM version)*. Oxford: Oxford University press.

Comrie, B., & Polinsky, M. (1998). The great Daghestaninan case hoax. In A. Siewierska & J. J. Song (Eds.), *Case, typology and grammar* (p. 95-114). Amsterdam and Philadelphia: John Benjamins.

Creissels, D. (2006a). Encoding the distinction between location, source and destination. A typological study. In M. Hickmann & S. Robert (Eds.), *Space in languages: Linguistic systems and cognitive categories* (p. 19-28). Amsterdam and Philadelphia: John Benjamins.

Creissels, D. (2006b). Suffixes casuels et postpositions en hongrois. *Bulletin de la société de linguistique de Paris*, *101*(1), 225-272.

Creissels, D. (2009a). *Non-spatial functions of spatial forms in Northern Akhvakh.* (handout, *Non-spatial functions of spatial forms in East Caucasian*, Helsinki, August 29)

Creissels, D. (2009b). Spatial cases. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 609-625). Oxford: Oxford University Press.

Croft, W. (1991). *Syntactic categories and grammatical relations. The cognitive organization of information.* Chicago and London: University of Chicago press.

Croft, W., & Cruse, D. A. (2004). *Cognitive linguistics*. Cambridge: Cambridge University Press.

Dahl, O. (2008). Animacy and egophoricity: Grammar, ontology and phylogeny. *Lingua*, *118*(2), 141-150.

Davidson, D. (2001). The logical form of action sentences (1967). In *Essays on actions and events* (p. 105-122). Oxford: Clarendon Press.

DeLancey, S. (1981). An interpretation of split ergativity and related patterns. *Language*, *57*(3), 626-657.

den Dikken, M. (2006). *On the functional structure of locative and directional PPs.* (Manuscript, CUNY)

Dixon, R. (1972). *The Dyirbal language of North Queensland.* Cambridge: Cambridge University Press.

Dixon, R. (1979). Ergativity. *Language*, *55*(1), 59-138.

Dixon, R. (1994). *Ergativity.* Cambridge, UK: Cambridge University press.

Dowty, D. (1991). Thematic proto-roles and argument selection. *Language*, *67*(3), 547-619.

Dryer, M. S. (2005). Chapter 85. Order of adposition and noun phrase. In M. Haspelmath, M. Dryer, D. Gil, & B. Comrie (Eds.), *The world atlas of language structures (CD-ROM version).* Oxford: Oxford University Press.

Ernestus, M., Baayen, R. H., & Schreuder, R. (2002). The recognition of reduced word forms. *Brain and Language*, *81*(1-3), 162-173.

Éva, H. (1990). Grammatical relations in Gamo: a pilot sketch. In R. J. Hayward (Ed.), *Omotic language studies* (p. 356-405). London: University of London, School of Oriental and African studies.

Fillmore, C. J. (1968). The case for case. In E. bach & R. T. Harms (Eds.), *Universals in linguistic theory* (p. 1-88). New York etc.: Holt, Rinehart and Winston, Inc.

Fong, V. (1997). *The order of things: What directional locatives denote.* Ph.D. thesis, Stanford University.

Forker, D. (2010). Non-local uses of local cases in the Tsezic languages. *Linguistics*, *48*(5), 1083-1110.

Fortescue, M. (1984). *West Greenlandic.* London, Sydney, and Dover: Croom Helm.

Frank, P. (1985). *A grammar of Ika.* Ph.D. thesis, University of Pennsylvania.

Ganenkov, D. (2006). Experiencer coding in Nakh-Daghestanian. In L. Kulikov, A. Malchukov, & P. de Swart (Eds.), *Case, valency, and transitivity* (p. 179-202). Amsterdam and Philadelphia: John Benjamins.

Ganenkov, D., Maisak, T., & Merdanova, S. (2008). Non-canonical agent marking in Agul. In H. de Hoop & P. de Swart (Eds.), *Differential subject marking* (p. 173-198). Dordrecht: Springer.

Gentner, D., & Bowerman, M. (2009). Why some spatial semantic categories are harder to learn than others: The typological prevalence hypothesis. In J. Guo, E. Lieven, N. Budwig, S. Ervin-Tripp, K. Nakamura, & S. Ozcaliskan (Eds.), *Crosslinguistic approaches to the psychology of language: Research in the tradition of Dan Isaac Slobin* (p. 465-480). New York: Psychology Press.

Givón, T. (1976). Topic, pronoun, and grammatical agreement. In C. N. Li (Ed.), *Subject and topic* (p. 149-188). New York, San Francisco, and London: Academic Press, Inc.

Givón, T. (1985). Ergative morphology and transitivity gradients in Newari. In F. Plank (Ed.), *Relational typology* (p. 89-108). Berlin, New York, and Amsterdam: Mouton Publishers.

Goldberg, A. E. (1995). *Constructions. A construction grammar approach to argument structure.* Chicago: University of Chicago press.

Goldberg, A. E. (2006). *Constructions at work. The nature of generalization in language.* Oxford: Oxford University press.

Gordon, L. (1986). *Maricopa morphology and syntax.* Berkeley and Los Angeles and London: University of California press.

Grice, P. (1989). *Studies in the way of words.* Cambridge, Mass. and London: Harvard University Press.

Gries, S. T. (2008). *Statistik für Sprachwissenschaftler.* Göttingen: Vandenhoeck & Ruprecht.

Gries, S. T. (2009). Dispersions and adjusted frequencies in corpora: further explorations. In S. T. Gries, S. Wulff, & M. Davies (Eds.), *Corpus linguistic applications: current studies, new directions.* Amsterdam: Rodopi.

Grimm, S. M. (2005). *The lattice of case and agentivity.* Unpublished master's thesis, Universiteit van Amsterdam.

Gruzdeva, E. (1998). *Nivkh.* München: Lincom Europa.

Guirardello, R. (1999). *A reference grammar of Trumai.* Houston: Rice University.

Haiman, J. (1980). *Hua: A Papuan language of the Eastern Highlands of New Guinea.* Amsterdam: John Benjamins.

Hale, A., & Shrestha, K. P. (2006). *Newar (Nepal Bhasa).* München and Newcastle: Lincom Europe.

Hansson, G. O. (2007). Productive syncretisms in Saami inflectional morphology. In I. Toivonen & D. Nelson (Eds.), *Saami linguistics* (p. 91-135). Amsterdam and Philadelphia: John Benjamins.

Hardman, M. (2000). *Jaqaru.* München and Newcastle: Lincom Europe.

Harris, A. C., & Campbell, L. (1995). *Historical syntax in cross-linguistic perspective.* Cambridge: Cambridge University Press.

Haspelmath, M. (1993). *A grammar of Lezgian.* Berlin and New York: Mouton de Gruyter.

Haspelmath, M. (1997). *From space tot time. Temporal adverbials in the world's languages.* München: Lincom Europa.

Haspelmath, M. (2003). The geometry of grammatical meaning: Semantic maps and cross-linguistic comparison. In M. Tomasello (Ed.), *The new psychology of language* (Vol. 2, p. 211-243). New York: Lawrence Erlbaum Associates Publishers.

Haspelmath, M. (2007). Pre-established categories don't exist: conse-

quences for language description and typology. *Linguistic Typology*, *11*(1), 119-132.

Haspelmath, M. (2008). Creating economical morphosyntactic patterns in language change. In J. Good (Ed.), *Linguistic universals and language change* (p. 185-214). Oxford and New York: Oxford University press.

Haviland, J. B. (1979). Guugu Yimidhirr. In R. Dixon & B. Blake (Eds.), *Handbook of Australian languages* (p. 27-180). Canberra: ANU Press.

Hawkins, J., & Cutler, A. (1988). Processing factors in morphological asymmetry. In J. Hawkins (Ed.), *Explaining language universals* (p. 280-317). Oxford: Blackwell.

Hegedűs, V. (2008). Hungarian spatial PPs. *Nordlyd: Tromsø Working Papers in Linguistics*, *33*(2), 220-233.

Heine, B., Claudi, U., & Hünnemeyer, F. (1991). *Grammaticalization. A conceptual framework.* Chicago and London: University of Chicago Press.

Heine, B., & Kuteva, T. (2002). *World lexicon of grammaticalization.* Cambridge, UK: Cambridge University press.

Herskovits, A. (1986). *Language and spatial cognition. An interdisciplinary study of the prepositions in English.* Cambridge etc.: Cambridge University press.

Hewitt, B. (1995). *Georgian: a structural reference grammar.* Amsterdam: John Benjamins.

Hoekstra, T. (1988). Small clause results. *Lingua*, *74*(2/3), 101-139.

Hoffmann, J. (1903). *Mundari grammar.* Calcutta: Bengal Secretariat Press.

Hogeweg, L. (2009). *Word in process. On the interpretation, acquisition, and production of words.* Ph.D. thesis, Radboud University Nijmegen.

de Hoop, H. (1996). *Case configuration and noun phrase interpretation.*

New York and London: Garland Publishing.

de Hoop, H., & de Swart, P. (2009). *Not quite my type: A comparison of type shifting involving animacy and definiteness.* (Paper presented at workshop on Cases, animacy and semantic roles, Helsinki (Finland), August 26.)

de Hoop, H., & Lamers, M. (2006). Incremental distinguishability of subject and object. In L. Kulikov, A. Malchukov, & P. de Swart (Eds.), *Case, valency and transitivity* (p. 269-287). Amsterdam and Philadelphia: John Benjamins.

de Hoop, H., & Malchukov, A. (2007). On fluid differential case marking: A bidirectional OT approach. *Lingua, 117*, 1636-1656.

de Hoop, H., & Malchukov, A. (2008). Case-marking strategies. *Linguistic Inquiry, 39*(4), 565587.

de Hoop, H., & Swart, P. de (Eds.). (2008). *Differential subject marking.* Dordrecht: Springer.

de Hoop, H., & Zwarts, J. (2009). Case in formal semantics. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 170-184). Oxford: Oxford University Press.

Hopper, P. J., & Thompson, S. A. (1980). Transitivity in grammar and discourse. *Language, 56*(2), 251-299.

Hopper, P. J., & Traugott, E. C. (2003). *Grammaticalization* (2nd ed.). Cambridge: Cambridge University Press.

Horn, L. (1984). Toward a new taxonomy for pragmatic inference: Q-based and R-based implicature. In D. Schiffrin (Ed.), *Meaning, form, and use in context: Linguistic applications* (p. 11-42). Washington, D.C.: Georgetown University Press.

Hovdhaugen, E. (2004). *Mochica.* München and Newcastle: Lincom Europe.

Hualde, J., & Urbina, J. O. de. (2003). *A grammar of Basque.* Berlin and

New York: Mouton de Gruyter.

Huumo, T. (2006). "I woke up from the sofa": Subjective directionality in Finnish expressions of a spatio-cognitive transfer. In M.-L. Helasvuo & L. Campbell (Eds.), *Grammar from the human perspective. Case, space and person in Finnish* (p. 41-66). Amsterdam and Philadelphia: John Benjamins.

Iggesen, O. A. (2005). Chapter 49. Number of cases. In M. Haspelmath, M. Dryer, D. Gil, & B. Comrie (Eds.), *The world atlas of language structures (CD-ROM version).* Oxford: Oxford University Press.

Iwasaki, S. (2002). *Japanese.* Amsterdam and Philadelphia: John Benjamins.

Jackendoff, R. (1983). *Semantics and cognition* (8th ed.). Cambridge: MIT Press.

Jackendoff, R. (1990). *Semantic structures.* Cambridge: MIT Press.

Jäger, G. (2007). Evolutionary game theory and typology: A case study. *Language*, *83*(1), 74-109.

Jäger, G., & van Rooij, R. (2007). Language structure: Psychological and social constraints. *Synthese*, *159*(1), 99-130.

Karlsson, F. (1986). Frequency considerdations in morphology. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung*, *39*, 19-28.

Kenesei, I., Vago, R. M., & Fenyvesi, A. (1998). *Hungarian.* London: Routledge.

Kimball, G. (1985). *A descriptive grammar of Koasati.* Ph.D. thesis, Tulane University.

Kiparsky, P. (2001). Structural case in Finnish. *Lingua*, *111*, 315-376.

Kiparsky, P. (2004). Blocking and periphrasis in inflectional paradigms. In G. Booij & J. van Marle (Eds.), *Yearbook of morphology* (p. 113-135).

Dordrecht: Springer.

Kiss, K. E. (1998). Identificational focus versus information focus. *Language*, *74*(2), 245-273.

Kittilä, S. (2008). Animacy effects on differential Goal marking. *Linguistic Typology*, *12*, 245-268.

Kittilä, S. (2009). Case and the typology of transitivity. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 356-365). Oxford: Oxford University Press.

Koopman, H. (2000). Prepositions, postpositions, circumpositions and particles: The structure of Dutch PPs. In H. Koopman (Ed.), *The syntax of specifiers and heads* (p. 204-260). London: Routledge.

Kornfilt, J. (1997). *Turkish.* London: Routledge.

Kornfilt, J. (2003). Scrambling, subscrambling, and case in Turkish. In S. Karimi (Ed.), *Word order and scrambling* (p. 125-155). Malden, MA/Oxford: Blackwell.

Kracht, M. (2002). On the semantics of locatives. *Linguistics and Philosophy*, *25*(2), 175-232.

Kracht, M. (2003). Against the feature bundle theory of case. In E. Brandner & H. Zinsmeister (Eds.), *New perspectives on case theory* (p. 165-190). Stanford: CSLI.

Kracht, M. (2008). The fine structure of spatial expressions. In A. Asbury, J. Dotlačil, B. Gehrke, & R. Nouwen (Eds.), *The syntax and semantics of spatial P [Linguistik Aktuell/Linguistics today 120]* (p. 35-62). Amsterdam: John Benjamins.

Kratzer, A. (1996). Severing the external argument from its verb. In J. Rooryck & L. Zaring (Eds.), *Phrase structure and the lexicon* (p. 109-138). Dordrecht, Boston, and London: Kluwer.

Krifka, M. (1998). The origins of telicity. In S. Rothstein (Ed.), *Events and grammar* (p. 197-235). Dordrecht: Kluwer.

Kulikov, L. (2006). Case systems in a diachronic perspective: A typological sketch. In L. Kulikov, A. Malchukov, & P. de Swart (Eds.), *Case, valency, and transitivity* (p. 23-48). Amsterdam and Philadelphia: John Benjamins.

Kurby, C., & Zacks, J. (2007). Segmentation in the perception and memory of events. *Trends in Cognitive Sciences*, *12*(2), 72-79.

Kutscher, S. (2010). *When 'towards' means 'away from': The case of directional-ablative syncretism in the Ardeşen variety of Laz (South-Caucasian).* (Manuscript, Humboldt University Berlin)

Lakusta, L., & Landau, B. (2005). Starting at the end: the importance of goals in spatial language. *Cognition*, *96*, 1-33.

Lamers, M. J. A. (2001). *Sentence processing: Using syntactic, semantic, and thematic information.* Ph.D. thesis, University of Groningen.

Landau, B., & Lakusta, L. (2009). Spatial representation across species: geometry, language, and maps. *Current opinion in neurobiology*, *19*, 12-19.

Langacker, R. (1991). *Descriptive application* (Vol. 2). Stanford: Stanford University press.

Leavitt, R. M. (1996). *Passamaquoddy Maliseet.* München and Newcastle: Lincom Europa.

Leer, J. A. (1991). *The schetic categories of the Tlingit verb.* Ph.D. thesis, University of Chicago.

Lehmann, C. (1985). Grammaticalization: Synchronic variation and diachronic change. *Lingua e stile a*, *XX*(3), 303-318.

Lehmann, W. (1976). From topic to subject in Indo-European. In C. N. Li (Ed.), *Subject and topic* (p. 445-456). New York, San Francisco, and London: Academic Press, Inc.

Lemmens, M. (2002). The semantic network of Dutch posture verbs. In J. Newman (Ed.), *The linguistics of sitting, standing, and lying*

(p. 103-139). Amsterdam and Philadelphia: John Benjamins.

Lestrade, S. (2006). *Adpositional case.* Unpublished master's thesis, Radboud University Nijmegen.

Lestrade, S. (2008). The correspondence between directionality and transitivity. In A. Asbury, J. Dotlačil, B. Gehrke, & R. Nouwen (Eds.), *The syntax and semantics of spatial P [Linguistik Aktuell/Linguistics today 120]* (p. 149-174). Amsterdam and Philadelphia: John Benjamins.

Lestrade, S. (2010). Finnish case alternating adpositions: A corpus study. *Linguistics, 48*(3), 603-628.

Lestrade, S., & de Hoop, H. (2009). *Case and tense.* (Manuscript, Radboud University Nijmegen)

Lestrade, S., de Schepper, K., Westelaken, S., & de Hoop, H. (2009). *Preposition stranding everywhere.* (Manuscript, Radboud University Nijmegen)

Lestrade, S., de Schepper, K., & Zwarts, J. (2009). *The space within the PP.* (Manuscript, Radboud University Nijmegen)

Lestrade, S., & de Swart, P. (to appear). *Individuation and semantic role interpretation in the adpositional domain.* (To appear in Marco Garcia and Patrick Brandt (Eds), *Transitivity. Form, Meaning, Acquisition, and Processing*)

Levelt, W. J. M. (1989). *Speaking. From intention to articulation.* Cambridge, Massachusetts and London, England: The MIT Press.

Levin, B. C. (1993). *English verb classes and alternations: a preliminary investigation.* Chicago, Illinois: University of Chicago press.

Levinson, S. C. (1983). *Pragmatics.* Cambridge and New York: Cambridge University Press.

Levinson, S. C. (2000a). H.P. Grice on location on Rossel Island. In S. S. Chang, L. Liaw, & J. Ruppenhofer (Eds.), *Proceedings of the*

25th annual meeting of the Berkeley linguistic society (p. 210-224). Berkeley: Berkeley linguistic society.

Levinson, S. C. (2000b). *Presumptive meanings. The theory of generalized conversational implicature.* Cambridge: MIT Press.

Levinson, S. C. (2003). *Space in language and cognition: Explorations in cognitive diversity.* Cambridge: Cambridge University Press.

Levinson, S. C., Meira, S., & the Language and Cognition Group. (2003). 'Natural concepts' in the spatial topological domain. Adpositional meanings in crosslinguistic perspective: an exercise in semantic typology. *Language*, *79*, 485-516.

Levinson, S. C., & Wilkins, D. P. (2006a). The background to the study of the language of space. In S. C. Levinson & D. Wilkins (Eds.), *Grammars of space. Explorations in cognitive diversity* (p. 1-23). Cambridge: Cambridge University Press.

Levinson, S. C., & Wilkins, D. P. (2006b). Patterns in the data: towards a semantic typology of spatial description. In S. C. Levinson & D. Wilkins (Eds.), *Grammars of space. Explorations in cognitive diversity* (p. 512-552). Cambridge: Cambridge University Press.

Li, C. N., & Thompson, S. A. (1976). Subject and topic: A new typology of language. In C. N. Li (Ed.), *Subject and topic* (p. 457-490). New York, San Francisco, and London: Academic Press, Inc.

Liberman, A. M., Harris, K. S., Hoffman, H. S., & Griffith, B. C. (1957). The discrimination of speech sounds within and across phoneme boundaries. *Journal of Experimental Psychology*, *54* (5), 358-368.

Lieber, R. (2006). The category of roots and the roots of categories: What we learn from selection in derivation. *Morphology*, *16*, 247-272.

van Lier, E. (2009). *Parts of speech and dependent clauses: A typological study.* Ph.D. thesis, Universiteit van Amsterdam.

Lorimer, D. (1935). *The Burushaski language.* Oslo: H. Aschehoug & Co.

Lukas, J. (1937). *A study of the Kanuri language.* London, etc.: Oxford University Press for the International Institute of African Languages & Cultures.

MacKenzie, J. L. (1978). Ablative-locative transfers and their relevance for the theory of case-grammar. *Journal of Linguistics*, *14*, 129-156.

Maienborn, C. (2001). On the position and interpretation of locative modifiers. *Natural Language Semantics*, *9*, 191-240.

Malchukov, A. (2005). Case pattern splits, verb types and construction competition. In M. Amberber & H. de Hoop (Eds.), *Competition and variation in natural languages. The case for case* (p. 73-118). Amsterdam etc.: Elsevier.

Malchukov, A. (2006). Transitivity parameters and transitivity alternations. Constraining co-variation. In L. Kulikov, A. Malchukov, & P. de Swart (Eds.), *Case, valency, and transitivity* (p. 329-357). Amsterdam and Philadelphia: John Benjamins.

Malchukov, A., & de Hoop, H. (to appear). *Tense, aspect and mood based differential case marking.* (to appear in *Lingua*)

Malchukov, A., & de Swart, P. (2009). Differential case marking and actancy variations. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 339-355). Oxford: Oxford University Press.

Malchukov, A., & Narrog, H. (2009). Case polysemy. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 518-534). Oxford: Oxford University Press.

Maling, J. (2009). The case tier: A hierarchical approach to morphological case. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 72-87). Oxford: Oxford University Press.

Mallinson, G., & Blake, B. J. (1981). *Language typology: Cross-cultural studies in syntax.* Amsterdam: North-Holland.

Mansveld, F. R., & Waleson, R. (1970). *Latijnse leergang. Grammatica.* Groningen: Wolters-Noordhof.

Marantz, A. (1984). *On the nature of grammatical relations.* Cambridge, Massachusetts: MIT press.

Maslova, E. (2003). *A grammar of Kolyma Yukaghir.* Berlin and New York: Mouton de Gruyter.

McMurray, B., Aslin, R., Tanenhaus, M., Spivey, M., & Subik, D. (2008). Gradient sensitivity to within-category variation in words and syllables. *Journal of Experimental Psychology: Human Perception and Performance*, *34*(6), 1609-1631.

Mehler, J., Sebastian-Gallés, N., Altmann, G., Dupoux, E., Christophe, A., & Pallier, C. (1993). Understanding compressed sentences: The role of rhythm and meaning. In A. M. G. P. Tallal, R. R. Llinas, & C. von Euler (Eds.), *Temporal information processing in the nervous system: Special reference to dyslexia and dysphasia. Annals of the new york academy of sciences* (Vol. 682, p. 272-282). New York: The New York Academy of Sciences.

Meinhof, C. (1930). *Der Koranadialekt des Hottentottischen.* Berlin: Dietrich Reimer.

Mel'čuk, I. A. (1986). Toward a definition of case. In R. Brecht & J. Levine (Eds.), *Case in Slavic* (p. 35-85). Columbus OH: Slavica Publishers.

Merlan, F. (1982). *Mangarayi.* Amsterdam: North-Holland Publishing Company.

Moravcsik, E. A. (2009). The distribution of case. In A. Malchukov & A. Spencer (Eds.), *The Oxford handbook of case* (p. 231-245). Oxford and New York: Oxford University Press.

Moshinsky, J. (1974). *A grammar of Southeastern Pomo.* Berkeley, Los Angeles, and London: University of California Press.

Mous, M. (1992). *A grammar of Iraqw.* Ph.D. thesis, University of Leiden.

Müller, G. (2002). Free word order, morphological case, and sympathy theory. *Resolving Conflicts in Grammar [Linguistische Berichte 11].*

Næss, Å. (2003). *Transitivity: from semantics to structure.* Ph.D. thesis, Radboud University Nijmegen.

Nedjalkov, I. (1997). *Evenki.* London and New York: Routledge.

Nettle, D. (2002). *Linguistic diversity.* Oxford: Oxford University press.

Nikitina, T. (2008). Pragmatic factors and variation in the expression of spatial goals: The case of *into* vs. *in.* In A. Asbury, J. Dotlačil, B. Gehrke, & R. Nouwen (Eds.), *The syntax and semantics of spatial P [Linguistik Aktuell/Linguistics today 120]* (p. 175-196). Amsterdam: John Benjamins.

Nikitina, T. (2009). Subcategorization pattern and lexical meaning of motion verbs: A study of the source/goal ambiguity. *Linguistics*, *47*(5), 1113-1141.

Nikolaeva, I. (2002). The Hungarian external possessor in a European perspective. In C. Hasselblatt & R. Blokland (Eds.), *Finno-Ugrians and Indo-Europeans: Linguistic and literary contacts* (p. 272-285). Maastricht: Shaker.

Noonan, M. (2008). Patterns of development. Patterns of syncretism of relational morphology in the Bodic languages. In J. Barðdal & S. Chelia (Eds.), *The role semantics and ethics in the development of case* (p. 261-282). Amsterdam: John Benjamins.

O'Keefe, J. (1996). The spatial prepositions in English, vector grammar, and the cognitive map theory. In P. Bloom, M. A. Peterson, L. Nadel, & M. F. Garrett (Eds.), *Language and space* (p. 277-316). Cambridge: MIT Press.

Owens, J. (1985). *A grammar of Harar Oromo.* Hamburg: Buske.

Palancar, E. L. (2002). *The origin of agent markers. Studia typologica* (Vol. 5). Berlin: Akademie Verlag.

Pandharipande, R. V. (1997). *Marathi.* London: Routledge.

Pantcheva, M. (2010). The syntactic structure of locations, goals, and

sources. *Linguistics*, *48*(5), 1043-1082.

Parsons, T. (1994). *Events in the semantics of English: A study in sub-atomic semantics.* Cambridge, MA and London: MIT press.

Partee, B. H. (1986). Noun phrase interpretation and type-shifting princi-ples. In J. Groenendijk, D. de Jongh, & M. Stokhof (Eds.), *Studies in discourse representation theory and the theory of generalized quanti-fiers* (p. 115-143). Dordrecht: Foris. (Reprinted in Paul Portner and Barbara H. Partee (Eds.) *Formal semantics. The essential readings* (p. 289-323). Oxford, UK: Blackwell Publishing (2002))

Pederson, E. (2006). Spatial language in Tamil. In S. C. & D. Wilkins (Eds.), *Grammars of space. Explorations in cognitive diversity* (p. 400-436). Cambridge: Cambridge University Press.

Plank, F. (Ed.). (1995). *Double case. Agreement by Suffixaufnahme.* New York and Oxford: Oxford University press.

Poudel, T. (2007). *Ergativity and stage/individual level predications in Nepali and Manipuri.* (Manuscript, University of Konstanz)

Primus, B. (1998). The relative order of recipient and patient in the lan-guages of Europe. In A. Siewierska (Ed.), *Constituent order in the languages of Europe* (p. 421-473). Berlin: de Gruyter.

Primus, B. (1999). *Cases and thematic roles. Ergative, accusative and active.* Tübingen: Max Niemeyer Verlag.

Primus, B. (2003). Protorollen und Verbtyp: Kasusvariaton bei psychischen Verben. In M. Hummel & R. Kailuweit (Eds.), *Semantische Rollen* (p. 377-401). Tübingen: Narr.

Primus, B. (2010). *Animacy, generalized semantic roles, and differential object marking.* (Manuscript, University of Cologne)

Prince, A., & Smolensky, P. (1993/2004). *Optimality Theory: Constraint interaction in generative grammar.* Oxford: Blackwell.

Pullum, G. K., & Scholz, B. C. (2007). Systematicity and natural language

syntax. *Croatian Journal of Philosophy*, *7*(21), 375-402.

Pustejovsky, J. (1995). *The generative lexicon.* Cambridge, MA and London: The MIT Press.

R Development Core Team. (2005). R: A language and environment for statistical computing [Computer software manual]. Vienna, Austria. Available from `http://www.R-project.org` (ISBN 3-900051-07-0)

Ramchand, G. (2002). Aktionsart, L-syntax and selection. In H. Verkuyl (Ed.), *Perspectives on aspect* (p. 1-15). Utrecht: OTS. (online proceedings)

Rice, S., & Kabata, K. (2007). Crosslinguistic grammaticalization patterns of the ALLATIVE. *Linguistic Typology*, *11*, 451-514.

van Riemsdijk, H., & Huijbrechts, R. (2007). Location and locality. In S. Karimi, V. Samiian, & W. K. Wilkins (Eds.), *Phrasal and clausal architecture* (p. 339-364). Amsterdam and Philadelphia: Benjamins.

Romero-Figeroa, A. (1997). *A reference grammar of Warao.* München and Newcastle: Lincom Europe.

Rosch, E. (1978). Principles of categorization. In E. Rosch & B. B. Lloyd (Eds.), *Cognition and categorization* (p. 28-49). Hillsdale, New Jersey: Lawrence Erlbaum.

Rude, N. (1987). *Studies in Nez Perce grammar and discourse.* Ph.D. thesis, University of Oregon.

Saffran, J. R., Newport, E. L., & Aslin, R. N. (1996). Word segmentation: The role of distributional cues. *Journal of memory and language*, *35*, 606-621.

Saltarelli, M. (1988). *Basque.* London, New York, and Sydney: Croom Helm.

Schanidse, A. (1982). *Grammatik der altgeorgischen Sprache* (H. Fähnrich, Trans.). Tbilissi: Staatsuniversität Tbilissi.

Scott, G. (1978). *The Fore language of Papua New Guinea*. Canberra: Pacific Linguistics.

Seiler, H. (1977). *Cahuilla grammar*. Banning, CA: Malki Museum Press.

Seiler, W. (1985). *Imonda, a Papuan lanuage*. Canberra: Department of Linguistics, Research School of Pacific Studies, Australian National University.

Senft, G. (Ed.). (2004). *Deixis and demonstratives in Oceanic languages*. Canberra: Pacific Linguistics.

Sinha, C., & Kuteva, T. (1995). Distributed spatial semantics. *Nordic journal of linguistics*, *18*, 167-199.

Smolensky, P., & Legendre, G. (2006). *The harmonic mind*. Cambridge: MIT press.

Sohn, H.-M. (1994). *Korean*. London and New York: Routledge.

Stassen, L. (2009). *Predicative possession*. Oxford: Oxford University Press.

Stefanowitsch, A., & Gries, S. T. (2003). Collostructions: Investigating the interaction of words and constructions. *International Journal of Corpus Linguistics*, *8*(2), 209-243.

Stefanowitsch, A., & Rohde, A. (2004). The goal bias in the encoding of motion events. In G. Radden & K.-U. Panther (Eds.), *Studies in linguistic motivations. Cognitive linguistic research 28* (p. 249-268). Berlin: Mouton de Gruyter.

Stiebels, B. (2002). *Typology des Argumentlinkings. Ökonomie und Expressivität. Studia grammatica* (Vol. 54). Berlin: Akademie Verlag.

Stolz, T. (1992). *Lokalkasussysteme. Aspekte einer strukturellen Dynamik*. Wilhemlsfeld: Gottfried Egert Verlag.

Sulkala, H., & Karjalainen, M. (1992). *Finnish*. London: Routledge.

Svenonius, P. (2006). The emergence of axial parts. *Nordlyd, Tromsø Working Papers in Language & Linguistics*, *33*(1), 49-77.

Svenonius, P. (2008). Projections of p. In A. Asbury, J. Dotlačil, B. Gehrke, & R. Nouwen (Eds.), *The syntax and semantics of spatial P [Linguistik Aktuell/Linguistics today 120]* (p. 63-84). Amsterdam: John Benjamins.

Svorou, S. (1993). *The grammar of space.* Amsterdam and Philadelphia: John Benjamins.

de Swart, P. (2007). *Cross-linguistic variation in object marking.* Ph.D. thesis, Radboud University Nijmegen.

de Swart, P. (in prep.). Sense and simplicity: Bidirectionality in differential case marking. In A. Benz & J. Mattausch (Eds.), *Bidirectional Optimality Theory.* Amsterdam: John Benjamins.

de Swart, P., Lamers, M., & Lestrade, S. (Eds.). (2008). *Animacy, Argument Structure, and Argument Encoding* (special issue). *Lingua*, *118*.

Sweep, J. (2009). Metonymy without a referential shift. In B. Botma & J. van Kampen (Eds.), *Linguistics in the Netherlands 2009* (p. 103-114). Amsterdam and Philadelphia: John Benamins.

Talmy, L. (1975). Semantics and syntax of motion. In J. P. Kimball (Ed.), *Syntax and semantics* (Vol. 4, p. 181-238). New York and London: Academic Press.

Talmy, L. (1985). Lexicalizations patterns: Semantic structure in lexical forms. In T. Shopen (Ed.), *Language typology and syntactic description* (Vol. 3). Cambridge: Cambridge University press.

Talmy, L. (2000). *Toward a cognitive semantics.* Cambridge and London: MIT Press.

Trask, R. (1979). On the origin of ergativity. In F. Plank (Ed.), *Ergativity: Toward a theory of grammatical relations* (p. 269-311). New York: Academic press.

Tsunoda, T. (1985). Remarks on transitivity. *Journal of Linguistics*, *21*, 385-396.

Vainikka, A. (1993). The three structural cases in Finnish. In A. Holmberg & U. Nikanne (Eds.), *Case and other functional categories in Finnish syntax.* Berlin: Mouton de Gruyter.

Vajda, E. J. (2004). *Ket.* München and Newcastle: Lincom Europe.

Wheeldon, L. R., & Levelt, W. J. (1995). Monitoring the time course of phonological encoding. *Journal of memory and language*, *34*, 311-334.

Williams, E. (1981). Argument structure and morphology. *The Linguistic Review*, *1*(1), 81-114.

Williams, J. (1932). *Grammar notes and vocabulary of the language of the Makuchi indians of Guiana.* St. Gabriel-Mödling near Vienna: Anthropos.

Woolford, E. (2001). Case patterns. In G. Legendre, J. Grimshaw, & S. Vikner (Eds.), *Optimality-theoretic syntax* (p. 509-545). Cambridge, MA: MIT press.

Woolford, E. (2007a). *Aspect splits as contextual faithfulness.* (Manuscript, University of Massachusetts)

Woolford, E. (2007b). Lexical case, inherent case, and argument structure. *Linguistic Inquiry*, *37*, 1-20.

Wunderlich, D. (1997). Cause and the structure of verbs. *Linguistic Inquiry*, *28*(1), 27-68.

Wunderlich, D., & Lakämper, R. (2001). On the interaction of structural and semantic case. *Lingua*, *111*, 377-418.

Yang, N., & van Bergen, G. (2007). Scrambled objects and case marking in Mandarin Chinese. *Lingua*, *117*, 1617-1635.

Yip, M., Maling, J., & Jackendoff, R. (1987). Case in tiers. *Language*, *63*,

217-250.

Zacks, J., Braver, T., Sheridan, M., Donaldson, D., Snyder, A., Ollinger, J., et al. (2001). Human brain activity time-locked to perceptual event boundaries. *Nature neuroscience*, *4*(6), 651-655.

Zacks, J., & Tversky, B. (2001). Event structure in perception and conception. *Psychological bulletin*, *127*(1), 3-21.

Zaenen, A., Maling, J., & Thráinsson, H. (1985). Case in grammatical functions: the Icelandic passive. *Natural language and linguistic theory*, *3*, 441-483.

Zeevat, H. (2000). The asymmetry of Optimality Theoretic syntax and semantics. *Journal of Semantics*, *17*, 243-262.

Zeevat, H. (2007). Simulating recruitment in evolution. In G. Bouma, I. Krämer, & J. Zwarts (Eds.), *Cognitive foundations of interpretation* (p. 175-194). Amsterdam: Royal Netherlands Academy of Arts and Sciences.

Zipf, G. K. (1965). *Human behavior and the principle of least effort. An introduction to human ecology.* New York and London: Hafner publishing company.

Zúñiga, F. (2000). *Mapudungun.* München and Newcastle: Lincom Europe.

Zwarts, J. (1997). Vectors as relative positions: A compositional semantics of modified PPs. *Journal of Semantics*, *14*, 57-86.

Zwarts, J. (2004). Competition between word meanings: The polysemy of *(A)Round.* In C. Meier & M. Weisgerber (Eds.), *Proceedings of SuB8* (p. 349-360). Konstanz: University of Konstanz Linguistics Working Papers.

Zwarts, J. (2005a). *The case of prepositions: Government and compositionality in German PPs.* (Paper presented at the 21st Annual Meeting of the Israel Association for Theoretical Linguistics, Haifa, June 23, 2005)

Zwarts, J. (2005b). Prepositional aspect and the algebra of paths. *Linguistics and Philosophy*, *28*, 739-779.

Zwarts, J. (2008a). Aspects of a typology of direction. In S. Rothstein (Ed.), *Theoretical and crosslinguistic approaches to the semantics of aspects* (p. 79-106). Amsterdam: John Benjamins.

Zwarts, J. (2008b). Priorities in the production of prepositions. In A. Asbury, J. Dotlačil, B. Gehrke, & R. Nouwen (Eds.), *The syntax and semantics of spatial P [Linguistik Aktuell/Linguistics today 120]*. Amsterdam: John Benjamins.

Zwarts, J. (2010). A hierarchy of locations: Evidence from the encoding of direction in adpositions and cases. *Linguistics*, *48*(5), 983-1010.

Zwarts, J., Hogeweg, L., Lestrade, S., & Malchukov, A. (2009). Semantic markedness in gender opposition, blocking and fossilization. *Language Typology and Universals*, *62*(4), 325-343.

Zwarts, J., & Winter, Y. (2000). Vector space semantics: A model theoretic analysis of locative prepositions. *Journal of logic, language and information*, *9*, 169-211.

Appendix

A. Spatial Case Inventories

A1. Spatial case markers in my sample

Notes:

1. *a* only with animates, *i* only with inanimates, *l* only on locational nouns or place names, *np* not productive

2. in case of (phonological) variants only one series is represented

3. if the language has different markers for singular and plural only singular is represented

lng	case	form	dir	config
Alamblak	adessive[i]	-kor	place	at
Alamblak	adessive[i]	-kor	goal	at
Alamblak	allative[i]	-ko	goal	at
Alamblak	referent	-pn(ë)	place	at
Alamblak	referent	-pn(ë)	source	at
Alamblak	referent	-pn(ë)	goal	at
Alamblak	specific-setting	-n	place	at
Alamblak	specific-setting	-n	place	on
Alamblak	specific-setting	-n	place	in
Alamblak	general-setting	-nan(ë)	place	at
Alamblak	general-setting	-nan(ë)	place	in
Alamblak	via	-oha	via	at
Basque	locative	-(t)an	place	
Basque	allative	-(ta)ra	goal	

lng	case	form	dir	config
Basque	ablative[i]	-tik	source	
Basque	ablative[a]	-gantik	source	
Basque	ablative[i]	-tik	via	
Basque	ablative[a]	-gantik	via	
Basque	directional	-rantz	toward	
Basque	terminative	-raino	up to	
Burushaski	elative	-ulum	source	in
Burushaski	inessive	-ʋlo	place	in
Burushaski	inessive	-ʋlo	goal	in
Burushaski	ablative	-tsʋm	source	at
Burushaski	dative	-ər	goal	at
Burushaski	locative	-Δlε	place	at
Burushaski	locative	-Δlε	goal	at
Burushaski	superessive	-Δtε	place	on/at/in
Burushaski	superessive	-Δtε	goal	on
Burushaski	approximative	-xa(šiɳər)	goal	on
Burushaski	superessive2	-tsε	place	on/at
Burushaski	superessive2	-tsε	goal	on (+contact)
Dyirbal	ablative	-ŋunu	source	
Dyirbal	locative	-(ŋ)ga	place	
Dyirbal	allative	-gu	goal	
Evenki	ablative	-duk	source	
Evenki	elative	-gi:t	source	
Evenki	locative	-(du)la	goal	
Evenki	allative	-t(i)ki	direction	
Evenki	allative/-locative[np]	-klV	place	near
Evenki	allative/-prolative[np]	-kli	via	along
Evenki	prolative	-(du)li	via	
Harar Oromo	dative	*lengthening*	source	
Harar Oromo	locative	-tti, *lengthening*	place	
Harar Oromo	locative	-tti, *lengthening*	goal	
Hua	inessive	-vi',-vina	place	in
Hua	inessive	-vi',-vina	goal	in

lng	case	form	dir	config
Hua	ablative	-vi'ri',-vingari	source	in
Hua	locative	-ro',-roga	place	
Hua	locative	-ro',-roga	goal	
Hua	elative	-ro'ri', -rogari'	source	at
Hua	locative[l]	-kaiga	place	
Hua	locative[l]	-kaiga	goal	
Hungarian	ablative	-tól	source	at
Hungarian	adessive	-nál	place	at
Hungarian	allative	-hoz	goal	at
Hungarian	elative	-ból	source	in
Hungarian	inessive	-ban	place	in
Hungarian	illative	-ba	goal	in
Hungarian	delative	-ról	source	on
Hungarian	superessive	-(o)n	place	on
Hungarian	sublative	-ra	goal	on
Hungarian	terminative	-ig	up to	
Hunzib	dative	-V	place	in
Hunzib	dativeelative	-V-s	source	in
Hunzib	dative-translative	-V-ƛ'	via	in
Hunzib	approximative-dative[a]	-g(o)	to	at
Hunzib	addesive[a]	-g(o)		at
Hunzib	superessive	-ƛ'o	place	above
Hunzib	subessive[np]	-ƛ	place	under
Hunzib	contactive	-λ	place	contact
Hunzib	allative[a]	-dər	goal	at
Hunzib	comitative	-ğur-s	place	next to
Ika	locative	-se	source	
Ika	locative	-se	place	
Ika	allative	-ekɨ	goal	
Ika	allative	-ekɨ	place	far away
Imonda	source	-ianéi	source	
Imonda	locative[i]	-ia,-m	place	
Imonda	locative[a]	-naia,-m	place	
Imonda	goal	-m	goal	

lng	case	form	dir	config
Kanuri	locative	-mben	place	at
Kanuri	locative	-mben	via	at
Kanuri	ablative	-(nyi)n,-lan	place	in/on
Kanuri	dative	-ro	goal	
Koasati	locative	-fa	place	
Koasati	allative	-fon	goal	
Koasati	inessive	-hayó		in
Lithuanian	locative	-(j)e		
Highland	inessive	-é	place	
Highland	illative	-añ	goal	
Lowland	inessive	-é,-je,-se	place	in
Lowland	illative	-añ	goal	in
Lowland	adessive	-íep(i)	place	at
Lowland	allative	-óp(i)	goal	at
Malayalam	locative	-il,-ttə	place	
Malayalam	locative	-il,-ttə	goal	
Malayalam	toward	-oottə	toward	
Malayalam	dative	-kkə	goal	
Malayalam	allative	-ileekkə	goal	
Mangarayi	ablative	-gana	source	
Mangarayi	locative	-yan	place	
Mangarayi	locative	-yan	goal	
Mangarayi	allative	-ḷama	goal	
Mangarayi	pergressive	-(yi)wa	via	
Meithei	ablative	-tə	source	
Meithei	locative	-təgi	place	
Mundari	ablative	-ate	source	
Mundari	locative	-re	place	
Mundari	allative	-te	goal	
Mundari	delative	-táte	source	
Mundari	approximative	-ta(re)	place	
Mundari	directional	-táte	goal	
Nez Perce	ablative	-(p)kin'ix	source	
Nez Perce	locative	-pe	place	
Nez Perce	allative	-(p)x	goal	
Passama-quoddy	locative	-(ihku)k		
Amur Nivkh	locative	-(u/i)n(e)	place	

lng	case	form	dir	config
Amur Nivkh	ablative	-(u)γe	source	
Amur Nivkh	ablative	-uγe	place	
Amur Nivkh	dative	-(to)χ	goal	
Amur Nivkh	limitative	-toγo	up to	
West Green-landic (WG)	ablative	-mi(i)t	source	
WG	locative	-mi	place	
WG	allative	-mut	goal	
WG	prosecutive	-kutt	place	
WG	prosecutive	-kutt	source	
WG	prosecutive	-kutt	goal	
WG	prosecutive	-kutt	via	

A2. Stolz (1992)

language	case label	form	dir	config
Inuktitut	locative	-mē	place	
Inuktitut	terminative	-mūn	goal	
Inuktitut	vialis	-kun	path	
Quechua	allative	-maṅ	goal	
Quechua	ablative	-pita	source	
Quechua	locative	-ču	goal	
Quechua	limitative	-kama	upto	
Basque	inessive	-an	place	
Basque	ablative	-atik	source	
Basque	directional	-ara	goal	
Basque	allative1	-arantz	toward	
Basque	allative2	-araino	upto	
Yukaghir	lative	-(ŋ)in	goal	
Yukaghir	locative	-ge	place	
Yukaghir	prosecutive	-gen		along
Yukaghir	ablative	-get	source	
Dhargari	locative	-da	place	
Dhargari	allative	-kuḍa	place	
Dhargari	ablative	-waḍi	place	
Romani	locative	-e	place	
Romani	locative	-e	goal	
Romani	ablative	-ïr	source	
Turkish	dative	-e	goal	
Turkish	locative	-de	place	
Turkish	abltive	-den	source	
(Old) Lituanian	inessive.sg	-è	place	in/at
(Old) Lituanian	inessive.pl	-uosè	place	in/at
(Old) Lituanian	illative.sg	-añ(a)	goal	in/at
(Old) Lituanian	illative.pl	-úosn(a)	goal	in/at
(Old) Lituanian	adessive.sg	-íep(i)	place	on
(Old) Lituanian	adessive.pl	-úosemp(i)	place	on
(Old) Lituanian	allative.sg	-ó(i)	goal	on
(Old) Lituanian	allative.pl	-ump(i)	goal	on
Osttocharisch (G)	perlative	-n-ā	path	
Osttocharisch (G)	allative	-n-ac	goal	
Osttocharisch (G)	ablative	-n-äṣ	source	

language	case label	form	dir	config
Osttocharisch (G)	locative	-n-aṃ	place	
Hungarian	inessive	-bVn	place	in
Hungarian	illative	-bV	goal	in
Hungarian	elative	-bV́l	source	in
Hungarian	superessive	-Vn	place	on
Hungarian	sublative	-rV	goal	on
Hungarian	delative	-rV́l	source	on
Hungarian	adessive	-nVl	place	at
Hungarian	allative	-hVz	goal	at
Hungarian	ablative	-tV́l	source	at
Hungarian	terminative	-ig	goal	
Awar	case	-t'	place	in
Awar	case	-t'e	goal	in
Awar	case	-t'a	source	in
Awar	case	-t'an	path	in
Awar	case	-t'exun	goal2	in
Awar	case	-t'axun	source2	in
Awar	case	-ḵ	place	at
Awar	case	-ḵe	goal	at
Awar	case	-ḵa	source	at
Awar	case	-ḵan	path	at
Awar	case	-ḵexun	goal2	at
Awar	case	-ḵaxun	source2	at
Awar	case	-k°	place	under
Awar	case	-k°e	goal	under
Awar	case	-k°a	source	under
Awar	case	-k°an	path	under
Awar	case	-k°exun	goal2	under
Awar	case	-k°axun	source2	under
Awar	case	-da	place	on
Awar	case	-de	goal	on
Awar	case	-dasa	source	on
Awar	case	-dasan	path	on
Awar	case	-dexun	goal2	on
Awar	case	-dasaxun	source2	on
Ingush	inessive-illative	-e	place	
Ingush	inessive-illative	-e	goal	
Ingush	ablative	-γ	source	

language	case label	form	dir	config
Ingush	allative	-ga	goal	
Ingush	elative	-ēra	source	
Ingush	ablativeIII	-gara	source	
Ingush	directional	-gaḥa		
Ingush	delative	-gaḥara		
Tabassaran	inessive1	-f	place	in
Tabassaran	elative1	-fan	source	in
Tabassaran	illative1	-fna	goal	in
Tabassaran	in1	-findi	toward	in
Tabassaran	inessive2	-'	place	at/next to
Tabassaran	elative2	-'an	source	at/next to
Tabassaran	illative2	-'na	goal	at/next to
Tabassaran	in2	-'indi	toward	at/next to
Tabassaran	adessive1	-'	place	at
Tabassaran	ablative1	-'an	source	at
Tabassaran	allative1	-'na	goal	at
Tabassaran	at1	-'indi	toward	at/next to
Tabassaran	adessive2	-h	place	at/next to
Tabassaran	ablative2	-han	source	at/next to
Tabassaran	allative2	-hna	goal	at
Tabassaran	atdi2r	-hindi	toward	at/next to
Tabassaran	subessive	-k	place	under
Tabassaran	sublative	-kan	source	under
Tabassaran	sublative	-kna	goal	under
Tabassaran	sub	-kindi	toward	under
Tabassaran	postessive	-ḵ	place	behind
Tabassaran	postlative	-ḵan	source	behind
Tabassaran	postlative	-ḵna	goal	behind
Tabassaran	post	-ḵindi	toward	behind
Tabassaran	interessive	-ḳ	place	between
Tabassaran	interlative	-ḳan	source	between
Tabassaran	interlative	-ḳna	goal	between
Tabassaran	inter	-ḳindi	toward	between
Tabassaran	superessive	-'il	place	on
Tabassaran	superlative	-'ilan	source	on
Tabassaran	superlative	-'ilna	goal	on
Tabassaran	super	-'ēlindi	toward	on

A3. Blake (1977, Australian languages)

Notes:

1. *NPN* Non-Pama-Nyungan, *DR* Daly River languages, *K* Kimberleys languages, *PN* Pama-Nyungan

2. Blake (1977) distinguishes between case forms for PN and case suffixes for the other families

family	lng	locative	allative	ablative
NPN	Tiwi	kaɣi,kapi	LOC	
NPN	Yiwaɨdja	uka		
NPN	Maung	tuka		
NPN	Gunwinggu	kore	LOC	peʔ
NPN	Ngandi	gi	giç	kuñŋ,wala
NPN	Rembarnga	tjtja	ʔ kaʔ	wala
NPN	Dalabon (Ngalkbon)	kaʔ	haʔ/pul	waluŋ,yen
NPN	Nunggubuyu	rutj,tutj	DAT	kala wala
NPN	Warndarang	yaŋa	nyiji	wala
NPN	Alawa	ERG	ru	ryunu
NPN	Yanyula	la ŋka (n)ta	lu	
NPN	Djingili	mpili	ŋka	ŋkami
NPN	Wambaya	ERG	nmantji	nŋa
NPN	Murinjbada	ŋaʌa	DAT	
NPN	Nungali	ERG		
NPN	Djamindjung	ERG		
NPN	Ngaliwuru	ERG		
DR	Malag-Malag	yinŋa	an,na	many
DR	Djeraid	unŋen		tiny
DR	Madngala	yente		tiny
DR	Gamor	yente	LOC	
DR	Maridhiel	naŋa		ŋanan
DR	Maranunggu	yena	LOC	yaŋana
DR	Ami	yena	LOC	
DR	Manda		LOC	
DR	Bungu-Bungu	pene	LOC	meke
DR	Wadjingi	pene		meke
DR	Ngangikurrunggur	nide		nimbi
DR	Ngengomeri			nimpi
K	Yawdjibara	nanja	ŋuru	ka

family	lng	locative	allative	ablative
K	Worora	nanja	ŋuru	alp,njine
K	Unggumi	wiren	ŋuru giya	alma,walu
K	Umida		ŋuru	naka
K	Ngarinjin	ra	ŋu,yu	naŋaka walu wula
K	Munumburu	ra	gu	naŋaka walu
K	Woljamidi	re	gu	naŋaka walu
K	Wunambal	ŋuntalu	gu	laŋa
K	Gambere	ŋuntalu	gu	yaŋa
K	Gunan	ŋuntalu	gu	yaŋa
K	Forrest river	ŋuntalu	gu	naŋka
PN	Ngarla	ŋka	kaṇi kaṭi	ŋuṛa
PN	Njamal	la ŋka	kaṇi kaṭi	
PN	Bailgo (baljgu)	ŋka	wali waṭayi	tja ṇi
PN	Bandjima	la ŋka	wali kaṭa kuṛa	ŋuru
PN	Yindjibarndi	La ŋka Ta	wali waṭa kaṭa	ŋu ṇu yaŋu
PN	Ngarluma	La ŋka Ta	ṭaṭa kaṭi kuru	ŋuru ṇi
PN	Dhalandji	ŋa	kuruna warala	ŋuru paṇṭi
PN	Bayungu	ŋura	kuruna la	paṇṭi
PN	Thargari	ka Ta ra	ku(ḍa)	aṭi aḍi
PN	Yinggarda	la ŋka ta	kurunu yitja	paṇṭi ŋuṛu
PN	Nhanda	la ŋkaʔ	(ŋ)kuʔwuṛa	ŋu
PN	Wadjuk	ak aŋ		
PN	Nyungar	ak	a	
PN	Mirninj			
PN	Warnman		kaṭi	
PN	Gugada	ŋka Ta	(ku)(tu)	ŋuṇi
PN	Bidjandjadjara	ŋka Ta la	(ku)(tu)	ŋuṛi tjanu tja maṭatji
PN	Bindubi	ŋka	ku tu	tjanu ŋuru
PN	Yulbaridja	ŋka la tja	kaṭi kuṭi wara	tja(nu)
PN	Njangumarda	ŋV tji(ri)	kaṭi kuṇu wara	ŋu(lu) ṇi
PN	Garadji	ŋka	kati	ŋuru

family	lng	locative	allative	ablative
PN	Walbiri	l̩a ŋka	kura	ŋul̩u
PN	Djaru	la ŋka	kura wura	
			lawu	
			ŋkawu	ŋulu
PN	Walmadjiri	ŋa l̩a		ŋuṇi
PN	Adjnjamadhanha	ŋa	DAT	ŋuṇi
PN	Wayaga	ERG	ṭ	aṇ
PN	Bularnu	ka	lu (k)al̩u	ŋul̩u
PN	Warluwara	ka	lu (k)al̩u	ŋul̩u
PN	Aljawara	ERG	uwala	iṭtiya
PN	Aranda	ERG	una ula	ŋa
PN	Andegerebinha	ERG	waṇa wal̩a	iṭiya
PN	Galgadungu	pia ṭi	kuṇa yaṇa	LOC + ŋu
PN	Yalarnnga	ya ŋka	wampa	LOC + ŋu
PN	Wangga-Yudjuru	na	nuŋu	minya
PN	Bidha-Bidha	ina	inu	inya
PN	Arabana	ŋa,ra	ruku	
PN	Wangganguru	ŋa,ra	ruku	
PN	Dieri	ṇi	ya	nru
PN	Yanruwantha	yi	DAT	ŋura
PN	Yawarawarga	nyi	DAT	ŋura
PN	Ngamini	mu	DAT	ŋuntu
PN	Wangkumara	laŋa	DAT	anru
PN	Badjiri	la	DAT	mani
PN	Baagandji	na		
PN	Narinyari	uŋai	DAT	anmant
PN	Djadjala	ata	k(a)	aŋ
PN	Madi-Madi	(k)aŋ (k)ata	k(a)	(k)uŋa
PN	Wemba-Wemba	(k)aŋ (k)ata	k(a)	(k)aŋ
PN	Awabagal	kinpa	taku kaku	ta + piruŋ
PN	Gadhang	ka ta	DAT	akai
PN	Dhangadi	ya ra ta	DAT	akai
PN	Gumbainggir	a ra ya wa	DAT	(i)n(y)a
PN	Gidabal	Ta ya la	pa:	Nu
PN	Bandjalang	Ta ya	ku	ŋu
PN	Minjung	pa ma	e, al	kal tjil paya
		paima		
PN	Duungidjawu			
PN	Wiradjuri	la ta tja ra		li tji ri

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family	lng	locative	allative	ablative
PN	Wangaybuwan	ka	DAT	
PN	Yuwaaliyaay			mi
PN	Muruwari	(ŋ)ka,Ta	DAT	ŋa
PN	Kunggari	ŋa	ṯari	paṛi
PN	Gugu-Badhun	ŋka Ta	DAT	ŋumay
PN	Warungu	ŋka Ta	DAT	ŋumay
PN	Djirbal	ŋka ka Ta	DAT	ŋunu
PN	Djaabugai	la NTa	LOC	ŋu(num)
				mu(ntu)
PN	Yidiɲ	la Ta	LOC	mu
PN	Gugu-Yimidhir	pi wi	LOC	ŋan
PN	Gugu-Yalandji	nta mpa ŋu		mun
PN	Kuku-Yaˀu	ŋuna,la		
PN	Gundjen	ERG	DAT	ŋand,am
PN	Lardil	ŋe	((k)i)ya-ṯur	ŋand,am
PN	Yugulda	ERG	(ki)ḷu	inapa,walitja
PN	Wik Munkan	ERG	ant	(ant)am
PN	Kurtjar	ERG	DAT	nam(aŋ)
PN	Ritharngu	ŋaṛa	liˀ	ŋuṛuˀ,
				kuŋua

B. Language samples

B1. Languages in the PCaseBase (Lestrade, de Schepper, & Zwarts, 2009)

language (family)	reference
Alamblak (Sepik (Hill))	Bruce (1984)
Basque (isolate)	Hualde and Urbina (2003)
Brahui (Dravidian (Northern))	Bray (1986)
Burushaski (isolate)	Lorimer (1935)
Cahuilla (Uto-Aztecan (Tacic))	H. Seiler (1977)
Evenki (Altaic (Tungusic))	Nedjalkov (1997)
Finnish (Uralic (Finnic))	Sulkala and Karjalainen (1992)
Gamo (Afro-Asiatic (Omotic))	Éva (1990)
Georgian (Kartvelian)	Hewitt (1995)
Harar Oromo (Afro-Asiatic (E Cushitic))	Owens (1985)
Ika (Chibchan (Aruak))	Frank (1985)
Jaqaru (Aymaran)	Hardman (2000)
Kabardian (Northwest Caucasian)	Colarusso (1989)
Ket (Yeniseian)	Vajda (2004)
Kolyma Yukaghir (Yukaghir)	Maslova (2003)
Korana (Khoisan (Central))	Meinhof (1930)
Lezgian (Nakh Daghestanian (Lezgic))	Haspelmath (1993)
Macushi (Cariban)	Abbott (1991); J. Williams (1932)
Malayalam (Dravidian (Southern))	Asher and Kumari (1997)
Mapudungun (Araucanian)	Zúñiga (2000)
Marathi (Indo-European (Indic))	Pandharipande (1997)
Meithei (Sino-Tibetan (Kuki-Chin-Naga))	Chelliah (1997)
Mochica (isolate)	Hovdhaugen (2004)
Newar (Sino-Tibetan (Bodic))	Hale and Shrestha (2006)
Paumarí (Aruan)	Chapman and Derbyshire (1991)
Polish (Indo-European (Slavic))	Bielec (1999)
Puelche (isolate)	Barbará (1944)
SE Pomo (Hokan (Pomoan))	Moshinsky (1974)
Tlingit (Na-Dene (Tlingit))	Leer (1991)
Trumai (isolate)	Guirardello (1999)
Turkish (Altaic (Turkic))	Kornfilt (1997)
Warao (isolate)	Romero-Figeroa (1997)

B2. Languages in my spatial case sample

language (family)	reference
Alamblak (Sepik)	Bruce (1984)
Basque (Basque)	Hualde and Urbina (2003)
Burushaski (Burushaski)	Lorimer (1935)
Dyirbal (Australian)	Dixon (1972)
Evenki (Altaic)	Bulatova and Grenoble (1999)
Harar Oromo (Afro-Asiatic)	Owens (1985)
Hua (Trans-New Guinea)	Haiman (1980)
Hungarian (Uralic)	Kenesei, Vago, and Fenyvesi (1998)
Hunzib (Nakh-Daghestanian)	van den Berg (1995)
Ika (Chibchan)	Frank (1985)
Imonda (Border)	W. Seiler (1985)
Kanuri (Nilo-Saharan)	Lukas (1937)
Koasati (Muskogean)	Kimball (1985)
Lithuanian (Indo-European)	Ambrazas (1997)
Malayalam (Dravidian)	Asher and Kumari (1997)
Mangarayi (Austronesian)	Merlan (1982)
Meithei (Sino-Tibetan)	Chelliah (1997)
Mundari (Austro-Asiatic)	Hoffmann (1903)
Nez Perce (Penutian)	Rude (1987)
Nivkh (Nivkh)	Gruzdeva (1998)
Passamaquoddy-Maliseet (Algic)	Leavitt (1996)
West Greenlandic (Eskimo-Aleut)	Fortescue (1984)

C. Case and Region (see Iggesen, 2005)

Table 6.6: Case inventory size of languages per region

region	inventory size	number of languages
Africa	0	7
	2-4	26
	5-9	7
	10+	0
Eurasia	0	22
	2-4	17
	5-9	28
	10+	14
North America	0	17
	2-4	7
	5-9	12
	10+	1
Pacific	0	28
	2-4	3
	5-9	14
	10+	6
South America	0	9
	2-4	5
	5-9	11
	10+	2

Samenvatting
(Summary in Dutch)

Bekijk het volgende Hongaarse voorbeeld:

Hongaars

(1) *A   könyv-et   az asztal-ra   teszem.*
     het boek-ACCUSATIEF de tafel-SUPERLATIEF ik.leg
     'Ik leg het boek op de tafel.'

In dit voorbeeld worden twee naamvallen gebruikt. De accusatief *-et* en de superlatief *-ra*. In hoofdstuk 2 van dit proefschrift leg ik uit dat beide naamvallen, of beter gezegd, beide *gebruiken* van naamval, eenzelfde verklaring kennen. De accusatieve naamval wordt meestal structureel gebruikt, wat wil zeggen dat het de syntactische functie van het woord aangeeft ten opzichte van een ander woord, het *hoofd*. In dit geval is het hoofd de persoonsvorm *teszem* '(ik) leg'. De accusatief geeft aan dat het boek direct object van dit werkwoord 'leggen' is. Naamval heeft in dit gebruik vrijwel geen betekenis. Veel talen gebruiken bijvoorbeeld zowel voor het directe object van 'helpen' als dat van 'slaan' dezelfde accusatieve naamval, terwijl de rol van de objecten in de gebeurtenissen die beschreven worden natuurlijk compleet anders is. Ruimtelijke naamval heeft daarentegen vaak wel een duidelijke betekenis. De superlatief in het Hongaars betekent 'naar op'. Deze naamval is bepaald niet zo onbepaald als de accusatief. Voor 'naar in' heeft het Hongaars bijvoorbeeld de inessief *-ba*, en voor 'van op' de superelatief *-ról*. De superlatief kan deze betekenissen niet uitdrukken.

Omdat het structurele gebruik zo van het ruimtelijke gebruik verschilt, worden de twee vaak gescheiden in verschillende soorten. Ik laat zien dat beide het resultaat zijn van hetzelfde grammaticalisatieproces en eigenlijk

alleen maar gradueel verschillen. In een grammaticalisatieproces worden veelgebruikte woorden steeds korter en algemener. Korte en algemene woorden zijn gemakkelijker in het gebruik (vergelijk het honderd keer zeggen van *woonvereniging* met het honderd keer zeggen van *die*) en vaker van toepassing (vergelijk het aantal keer dat je op een dag naar iets kunt verwijzen met *woonvereniging* met het aantal keer dat je *die* kunt gebruiken). Omdat deze woorden vaker gebruikt worden, worden ze nog korter en algemener. Uiteindelijk worden ze zelfs zo kort en algemeen dat ze niet meer zelfstandig gebruikt kunnen worden, maar alleen nog maar in combinatie met andere woorden, die wél zelf verwijzen. Merk op dat het generalisatieproces dat onderdeel uitmaakt van dit grammaticalisatieproces eigenlijk al veel eerder begint. De wereld kent een oneindige variatie aan objecten en gebeurtenissen waar wij alleen maar zinnig over kunnen praten door te categoriseren. In die zin is een naamval niets bijzonders.

Dat woorden korter worden komt door een combinatie van twee principes: Economie ("zeg dingen zo kort mogelijk") en Voorspelbaarheid ("begrijp ook wat niet gezegd hoeft te worden"). We kunnen de dingen die we willen zeggen sneller bedenken dan uitspreken en de dingen die we horen sneller begrijpen dan ze uitgesproken worden. Dat maakt het uitspreken de langzaamste kameel van de communicatiekaravaan. Het hele proces kan het best versneld worden door de woorden die we het meest gebruiken zo kort mogelijk te maken. Dat levert uiteindelijk de grootste winst op. Maar alle veelgebruikte woorden zomaar inkorten maakt natuurlijk onverstaanbaar. Dat kan alleen met die woorden die door hun context of algemene betekenis voorspelbaar zijn. Omdat de hoorder zo ongeveer al weet wat er gezegd gaat worden heeft hij bij deze woorden voldoende aan minder aanwijzingen.

De betekenis die naamval uitdrukt is inderdaad voorspelbaar. Naamval drukt de rol van een deelnemer in de beschreven gebeurtenis uit. De functie van het boek in (1) is 'het ding dat door mij op tafel wordt gelegd'. Als een naamval functies echt zo specifiek zou uitdrukken zou hij maar zelden worden gebruikt en dus niet snel grammaticaliseren. Daarbij, als we alle functies zo specifiek zouden moeten benoemen zouden we nooit aan een fatsoenlijk gesprek toekomen. Daarom worden deze functies door talen gecategoriseerd in *semantische rollen*, generalisaties over veel specifiekere functies. Voorbeelden van semantische rollen zijn 'degene die de handeling uitgedrukt door het werkwoord ondergaat' (*Patiens*) en 'het ding dat je gebruikt om de handeling uitgedrukt door het werkwoord uit te voeren' (*Instrument*). De accusatief is – in de meeste gebruiken en bijvoorbeeld in (1) – een zeer algemene naamval die alleen nog maar zegt dat zijn drager de minst actieve van de standaardrollen die bij het werkwoord horen vervult.

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De superlatief is een minder abstracte generalisatie en drukt een van de meestvoorkomende *ruimtelijke betekenissen* uit.

Voor mijn onderzoek, en in hoofdstuk 3, gaat het bij ruimtelijke betekenis steeds om een relatief beweeglijk ding dat in de ruimte wordt geplaatst ten opzicht van een ander, stabieler ding. Er zijn vele andere vormen van ruimtelijke betekenis en taal, maar naamval is, zoals hierboven gezegd, een markeerder van relaties. Ik laat zien dat ruimtelijke betekenis uit twee dimensies bestaat. *Configuratie* betreft de relatieve positie van een object ten opzichte van een ander object en *directionaliteit* de verandering van deze positie in de loop van de tijd. Door directionaliteit op deze manier te definiëren doe ik recht aan de intuïtie dat een verandering van plaats altijd een verandering van tijd inhoudt. Maar belangrijker nog: op deze manier zijn er maar drie basisbetekenissen mogelijk. Terwijl talen enorm blijken te verschillen in de soort ruimtelijke relaties die zij markeren, is het aantal mogelijke veranderingen van die relaties beperkt. Als er niets verandert hebben we te maken met Plaats; als iets eerst in een bepaalde relatie tot iets anders stond maar daarna niet meer hebben we Bron, en het tegenovergestelde van Bron is Doel. Deze analyse doet allerlei voorspellingen. Zo zijn er bijvoorbeeld meer onderscheidingen in configuratie dan in directionaliteit en daarom worden de laatste vaker gebruikt en met verder gegrammaticaliseerde middelen uitgedrukt. Verder drukt ruimtelijke naamval altijd eerst een onderscheid in directionaliteit uit en pas daarna configurationele betekenis. Deze voorspellingen blijken na toetsing inderdaad te kloppen.

De volgende twee hoofdstukken gaan over het optionele gebruik van naamval en het gebruik van ruimtelijke naamval om niet-ruimtelijke betekenis uit te drukken. Een verhaal over naamval is eigenlijk niet compleet als het deze gebruiken niet kan verklaren. In hoofdstuk 4 laat ik zien dat ruimtelijke naamval in sommige talen weggelaten kan worden als de betekenisbijdrage die het zou maken te verwaarlozen is. Vergelijkbare analyses zijn al eerder voorgesteld voor structurele naamval, maar het principe blijkt algemener. In hoofdstuk 5 tenslotte bespreek ik het gebruik van ruimtelijke naamval op argumenten met menselijke referenten. Omdat mensen van nature erg beweeglijk zijn, zijn het onhandige objecten om andere objecten mee te lokaliseren. De combinatie van een ruimtelijke uitdrukking en een mens is dan ook ongebruikelijk, en kan ongepast en in sommige talen zelfs ongrammaticaal zijn. Wanneer zo'n combinatie toch gebruikt wordt, kan daarmee een specifieke betekenis uitgelokt worden. Wanneer bijvoorbeeld het onderwerp van de zin niet met de normale structurele naamval is gemarkeerd maar in plaats daarvan met een ruimtelijke

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naamval, ontstaat de interpretatie dat de handeling niet expres maar per ongeluk wordt uitgevoerd. Daarmee wordt als het ware een compromis bereikt tussen de ruimtelijke naamval die gewoonlijk is voorbehouden aan stabiele, levenloze objecten en de verwijzing naar een mens met een eigen wil.

Kortom, naamval is een veelgebruikte, betekenisvolle generalisatie over functies en ruimtelijke betekenis bestaat altijd uit twee dimensies, een die de relatieve positie van een object ten opzichte van een ander object beschrijft (configuratie) en een die de verandering van deze positie in de loop van de tijd beschrijft (directionaliteit), waarbij deze tweede dimensie drie basiswaarden kent: Plaats, Bron en Doel. Een lange zin, maar wel een die de essentie van mijn proefschrift weergeeft.

Curriculum Vitae

Sander Lestrade was born in 's-Hertogenbosch in 1981. He studied *Applied Communication Studies* at the University of Twente (propaedeutics 2001), and *Greek and Latin Languages and Cultures* (propaedeutics 2002), *Literature Studies* (BA 2006), and *General Linguistics* (BA 2006; MA 2006, *cum laude*) at the Radboud University Nijmegen. He was research assistant of the NWO PIONIER project *Case cross-linguistically* from 2004 until August 2006. In 2006, he received a VSB scholarship for a research stay at the Stanford University Department of Linguistics.

In January 2007, Sander started his Ph.D. project *Cross-linguistic use and interpretation of spatial case* at the Centre for Language Studies of the Radboud University Nijmegen. During this project, he taught several BA and MA courses and was involved in the Nijmegen Ph.D. council (PON) and the PR committee of the Linguistics Department Nijmegen.

Currently, he holds a postdoctoral position on the semantics and ontology of spatial language, at the Department of Linguistics of the University of Bremen.