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Aspect, Situation Types and Nominal Reference

by

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1993

**Aspect, Situation Types and Nominal Reference**

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**Hana Filip**

## Table of Contents

<b>Chapter 1: Introduction</b> .....	<b>1</b>
1.1 The Interplay between NP Semantics, Situation Types and Aspectual Markers: A Proposal .....	1
1.2 Data .....	4
1.3 Situation Types and Aspect .....	8
1.3.1 Situation Types .....	8
1.3.2 The Prototype View of Aspect .....	11
1.3.3 Independence of Situation Types and Aspect .....	16
1.4 Telicity .....	18
1.4.1 Syntactic and Semantic Factors in Telicity .....	18
1.4.1.1 Syntactic Factors in Telicity: Tenny (1987, 1989, 1992) .....	21
1.4.1.2 Semantic Factors in Telicity: Krifka (1986, 1992) and Dowty (1988, 1991) .....	23
1.4.2 The Contribution of Non-Subcategorized Arguments to the Telic and Atelic Interpretation of Clauses .....	25

1.5 Verbal Morphology and Nominal Reference in Czech .....	28
1.5.1 Previous Research on Verbal Morphology, (In)Definiteness and Quantification .....	31
1.5.2 Verbal Morphology and Nominal Reference in Czech: Incremental Theme Hypothesis .....	33
1.6 Aspect and Nominal Reference in German and Finnish .....	38
1.7 Informational Load and Informational "Flow" .....	40
<b>Chapter 2: Situation Types .....</b>	<b>43</b>
2.1 Introduction .....	43
2.2 Vendler's Classification (1957/1967) .....	46
2.3 Classifications Based on Temporal Criteria .....	57
2.3.1 Bennett and Partee (1972/1978), Taylor (1977) .....	59
2.3.2 Dowty (1972, 1979) .....	66
2.4 Classifications within Event-Based Approaches .....	75
2.5 Parallels between the Linguistic Structuring of Space and Time: Parts and Wholes .....	82
2.5.1 Semantic Parallels .....	84
2.5.2 Syntactic Parallels .....	89
2.5.3 The 'Part-of' Relation and its Limits in Natural Language Semantics .....	96
2.6 Problems for Classifications into Situation Types .....	99
2.6.1 The Scope of the Classification .....	99
2.6.2 'Shifts' between Classes of Verbal Expressions .....	103
2.7 Conclusion .....	118

<b>Chapter 3: Telicity and Noun Phrase Semantics</b> .....	<b>120</b>
3.1 Introduction .....	120
3.2 Syntactic Factors in Telicity: Tenny (1987, 1989, 1992) .....	122
3.3 Semantic Factors in Telicity: Krifka (1986, 1992) and Dowty (1988, 1991) .....	136
3.3.1 Lattice Analysis of Objects and Events .....	136
3.3.2 Gradual Patient and Incremental Theme .....	140
3.3.3 A Comparison of Tenny's and Krifka's Approach and Remaining Problems .....	147
3.4 Alternative Proposal .....	158
3.4.1 Telicity and Frame-Creating Adjuncts .....	158
3.4.1.1 Incremental Event Type and Incremental Theme Participant .....	162
3.4.1.2 Approaches to Frame-Creating Adjuncts .....	167
3.4.1.3 The English Resultative Constructions .....	174
3.4.2 A Revised Typology of Basic Situation Types .....	189
3.4.2.1 Telicity .....	194
3.4.2.2 The Mereological Approach to Situation Types .....	197
3.4.2.3 Grammatical Tests for the Distinctions among the Situation Types .....	207
3.4.2.4 Lexical Entries .....	222
3.5 Conclusion .....	232
<b>Chapter 4: Aspect</b> .....	<b>234</b>
4.1 Introduction .....	234

4.2 Perfective and Imperfective Aspect .....	237
4.2.1 Aspectual Meaning .....	237
4.2.2 Formal Expression of Perfective and Imperfective Aspect .....	244
4.3 Aspect in English: The Progressive .....	246
4.3.1 Temporally-Based Descriptions of the English Progressive .....	248
4.3.2 Event-Based Descriptions of the English Progressive .....	252
4.3.2.1 Vlach (1981) .....	252
4.3.2.2 Bach (1981, 1986) .....	257
4.3.2.3 A Modified Approach to the Progressive Aspect .....	259
4.3.3 Independence of Aspect and Situation Types .....	264
4.4 Aspect in Czech .....	268
4.4.1 Basic Morphological Facts .....	268
4.4.2 Grammatical Tests for the Distinction between the Perfective and Imperfective Aspect .....	272
4.4.3 The Semantics of Aspect .....	276
4.4.3.1 Perfective Aspect .....	276
4.4.3.2 Imperfective Aspect .....	279
4.4.3.3 Aspect, Parts and Wholes .....	283
4.4.3.4 Aspect and Markedness .....	283
4.4.4 Aspect as a Lexical-Derivational Category .....	285
4.4.5 Aspect and Situation Types .....	295



4.4.6	Argument Structure and Lexical Entries .....	312
4.5	Conclusion .....	319
<b>Chapter 5:</b>	<b>Verbal Morphology and Nominal Reference in Czech .....</b>	<b>323</b>
5.1	Introduction .....	323
5.2	Data: Parallels between Determiner Quantifiers and Verbal Morphology .....	325
5.2.1	Measure, Proportion and Distributivity .....	325
5.2.1.1	NP Quantification .....	325
5.2.1.2	Verbal Affixes as Modifiers and Quantifiers in the Domain of Situations .....	328
5.2.1.3	Verbal Affixes as Modifiers and Quantifiers in the Domain of Individuals .....	330
5.2.1.4	Aspect: Parts and Wholes .....	334
5.2.2	Definiteness .....	336
5.2.3	Summary: Parallels between Verbal Morphology and Determiners .....	340
5.3	Previous Approaches .....	342
5.3.1	Krifka (1986, 1989, 1992) .....	345
5.3.2	D-quantification and A-quantification: Partee, Bach and Kratzer (1987), Partee (1991a, 1991b) .....	349
5.4	Suggested Analysis .....	355
5.4.1	Incremental Theme Hypothesis .....	355
5.4.2	Perfective Aspect and the Semantics of Nominal Arguments .....	357
5.4.2.1	Perfective Aspect and Undetermined Mass and	

Plural Noun Phrases .....	358
5.4.2.2 Perfective Aspect and Singular Count Noun Phrases .....	363
5.4.3 Imperfective Aspect and the Semantics of Nominal Argu- ments .....	364
5.4.3.1 Imperfective Aspect and Undetermined Mass and Plural Noun Phrases .....	364
5.4.3.2 Imperfective Aspect and Singular Count Noun Phrases .....	366
5.4.4 Aspect and (In)Definiteness .....	367
5.4.4.1 Perfectivity and Definiteness .....	367
5.4.4.2 Perfectivity and Indefiniteness .....	371
5.4.4.3 Imperfectivity and Definiteness .....	373
5.4.4.4 Aspect and Subject .....	373
5.4.4.5 Independence of Definiteness and Boundedness .....	375
5.4.5 Supporting Evidence: Interaction between Aspect and Determiners .....	376
5.4.5.1 Imperfective Aspect .....	377
5.4.5.2 Perfective Aspect .....	386
5.4.6 Verbal Affixes as Expressions of Quantity and Measure .....	390
5.4.6.1 The Prefix NA- .....	390
5.4.6.2 The Prefix PO- .....	401
5.4.7 Quantificational Force .....	408

5.5 Conclusion .....	411
<b>Chapter 6: Aspect and Nominal Reference in German and Finnish .....</b>	<b>414</b>
6.1 Introduction .....	414
6.2 Aspect in German .....	415
6.2.1 The Partitive <i>an</i> -Construction .....	415
6.2.2 Constraints .....	418
6.2.3 Lexicon .....	429
6.3 Aspect in Finnish .....	431
6.4 Summary and a Proposal for a Unification Analysis .....	439
6.4.1 Summary .....	439
6.4.2 A Proposal for a Unification Analysis .....	443
References .....	468

## **Chapter 1**

### **Introduction**

#### **1.1 The Interplay between NP Semantics, Situation Types and Aspectual Markers: A Proposal**

This dissertation concerns the interplay between noun phrase semantics, situation types and various markers of aspect. The topic is divided into three main domains. The first concerns the systematic contribution of nominal arguments and adjuncts to the telic and atelic interpretation of verbal predicates. The second concerns the structure and interpretation of various expressions of perfective and imperfective aspect. Two main strategies can be distinguished within a particular language and across languages. The perfective and imperfective aspect can be expressed by means of verbal morphemes or various periphrastic verbal constructions. They can also be expressed at the level of nouns (by cases suffixes) or prepositional phrases (various constructions with an originally locative and/or partitive meaning), for example. The third domain, which has not been systematically investigated yet, concerns the influence of verbal morphology on the interpretation of nominal arguments. The influence seems to be two-fold, discharged by the aspect associated with a given verb form and by specific derivational affixes within a given verb form. Verbal morphology often seems to stand in a similar relation to noun phrases as determiner quantifiers, such as *the*, *all*, *every*, *some* and various measure expressions, do to the nouns with which they are combined.

## Chapter 1. Introduction: 2

The main goal is to formulate hypotheses about cross-linguistic and language-specific generalizations in these domains. The comparative material includes data from English, Czech, German and Finnish. Since the purpose of this study is to provide a general account of the three phenomena, the results should carry over to other languages, to Slavic languages and other Germanic languages, in particular. I concentrate on the following central questions:

- (1) What is the most appropriate theoretical framework for describing the systematic contribution of nominal arguments on the telic and atelic interpretation of verbal predicates?
- (2) What are the similarities and differences in the expression of aspect by means of verbal morphemes and verbal constructions and by means of case morphology on nouns, various linguistic forms that contain no verbs? When can operators on nouns, noun phrases, for example, extend their effects over a whole sentence and convey aspect?
- (3) What are the conditions under which verbal morphology extends its semantic effects over a nominal argument? Which argument(s) does verb morphology target? How do we account for our observation that aspect and derivational verbal affixes seem to behave with respect to noun phrases as determiner quantifiers do with respect to nouns? What are the differences and similarities between the expression of quantificational notions and definiteness by means of verbal affixes and by means of determiners?

The domains of investigation concern the interaction between nominal and verbal predicates. Except for this obvious commonality, they may not at first sight appear to be related. I will show that the interaction between nominal and verbal predicates in the three domains can be motivated by the same general principles.

My method of exploring the semantic phenomena in the three domains outlined above combines empirical cross-linguistic study and theoretical work done within the framework of event semantics. It is directly related to the research on syntax-semantics interface in the domain of argument structures and in the domain of quantification.

Following the suggestions in event-semantics, I assume a semantics that includes a set of primitive situation types: states, processes and events. At least some of the properties of situation types and individuals can be understood in terms of their 'part' structure. This view is inspired by the theories of *mereology*, or the logic of part-whole relations. The first main thesis is that the systematic interaction of nominal and verbal predicates investigated here is to be treated as a manifestation of the interplay of cross-categorial semantic notions that bridge the syntactic distinction between nominal and verbal expressions as well as the ontological distinction between situations (time-occupying entities) and individuals (space-occupying entities).

The second main ingredient comes from the syntax-semantics interface in the domain of argument structures, and the theory of thematic roles, in particular. Thematic roles are characterized by sets of verbal entailments (see Dowty 1988 and 1991). They represent linguistic schematizing of situations into very general patterns. Specifically, I propose that in the core cases the rules governing the interaction between verbal and nominal predicates in English, Czech, German and Finnish make reference to the Incremental Theme (see Dowty 1988 and 1991). The second main thesis is that the Incremental Theme is syntactically realized as the nominal argument that carries a grammatical marking that is crucial to the expression of aspect and telicity or that "acquires" semantic restrictions from the verbal predicate, restrictions which derive from its aspectual properties and other lexical semantic properties. The use of the Incremental Theme role presupposes an explicit account of the parallels between the linguistic structuring of space and time within lattice theory (see Krifka

1986, 1989, 1992). The lattice analysis presupposes that there are two non-overlapping sorts of entities, objects and events, characterized by a predicate *O* and *E*, respectively, whose extensions have the structure of a (complete) join semi-lattice (without a bottom element).

The study of verb morphology in connection with quantification is the focus of the current research on quantification, syntax-semantics interface and semantic typology. It has been pursued since the seminal research proposal in Partee, Bach and Kratzer (1987) and some of its findings can be found in Bach, Jelinek, Kratzer and Partee (1995). With regard to the influence of verbal morphology on nominal arguments in Slavic languages I propose the following Incremental Theme Hypothesis: In Slavic languages verbal morphology constrains the interpretation of the Incremental Theme argument. Perfective and imperfective aspectual operators as well as specific verbal affixes stand in a similar relation to the Incremental Theme argument as determiner quantifiers do to the nouns with which they are combined.

## 1.2 Data

I will discuss three cases in which the Incremental Theme argument interacts with the meaning of verbal predicates. First, the boundedness property of the Incremental Theme argument determines the boundedness (telicity) of a complex verbal predicate. This holds generally across languages. The systematic contribution of nominal arguments to the telic and atelic interpretation of verbal predicates is illustrated by the following familiar examples from English:

- (1-a)      *He drank wine (all day).*                      atelic  
(1-b)      *He drank a glass of wine (?? all day).*      telic

These examples show that the telicity of a complex verbal predicate depends on the direct object argument: a bounded argument *a glass of wine* contributes to the telic interpretation of the complex verbal predicate, while an unbounded argument *wine* to the atelic interpretation. This difference is reflected in the different behavior with the durative adverbial *all day*.

Second, the partitive and holistic meaning of the Incremental Theme argument determines the imperfective and perfective aspect in German and Finnish. The German alternation 'accusative direct object vs. partitive *an*-phrase' is used to signal the aspect of a whole sentence, as is shown in the following examples:

(2-a)

<i>Alex</i>	<i>baute</i>	<i>ein</i>	<i>Haus.</i>
Alex	built	a-SG-ACC	house-SG-ACC
'Alex built a house.'			
('Alex was building a house.')			

(2-b)

<i>Alex</i>	<i>baute</i>	<i>an</i>	<i>einem</i>	<i>Haus.</i>
Alex	built	on-PREP	a-SG-DAT	house-SG-DAT
'Alex was building a house.'				

Similarly, in Finnish the 'partitive vs. accusative' case alternation on nouns is exploited to convey differences in aspect of a whole sentence:

(3-a)

<i>Join</i>	<i>kahvia.</i>
drank-1SG	coffee-PART
'I was drinking coffee.'	

(3-b)

<i>Join</i>	<i>kahvin.</i>
drank-1SG	coffee-ACC
'I drank up (all) the coffee.'	

Third, the aspectual meaning, partitive and holistic, marked on the verb determines the partitive and holistic (universal) interpretation of the Incremental Theme argument. This holds for Slavic languages like Czech, but also for English (see



Dowty 1977, 1979, among others, for the partitive reading of the Incremental Theme argument and the problems it raises, e.g., the 'imperfective paradox'). The influence of verbal morphology on the interpretation of nominal arguments can be illustrated by the following Czech examples:

(4-a)

<i>Pil<sup>I</sup></i>	<i>víno.</i>
drank-3SG-MASC	wine-SG-ACC
'He was drinking (the/some) wine.'	
'He drank wine.'	

(4-b)

<i>Vypil<sup>P</sup></i>	<i>víno.</i>
PREF-drank-3SG-MASC	wine-SG-ACC
'He drank up (all) the wine.'	

In general, undetermined mass noun phrases are unbounded. However, the undetermined mass noun phrase in the scope of perfective aspect, as in (b) above, is interpreted as bounded, universally quantified and often as referentially specific. By contrast, this is not the case in the corresponding imperfective sentence (a). At least in some of its uses, (a) asserts that some 'wine-drinking' event took place, whereby the exact identity and quantity of wine is irrelevant for the purpose of communication. The function of the noun phrase 'wine' is primarily to supply a further specification to the identity of the denoted drinking event. The noun phrase 'wine' in (a) can be best represented as being existentially quantified. If (a) has a progressive interpretation ('*at that moment* he was drinking wine'), the denoted situation concerns only a subportion out of a larger quantity of wine. This amounts to a partitive interpretation of 'wine'.

The fact that sentences (a) and (b) minimally differ in aspect, indicated by their main verbs, suggests that the difference in the interpretation of their direct object noun phrases stems from verb morphology.

In addition to the partitive and universal effect, the interpretation of nominal arguments is constrained by specific verbal affixes that serve to derive perfective and

imperfective verbs. These constraints are directly related to the idiosyncratic lexical semantic properties of verbal affixes. Consider the following examples:

- (5-a)
- |  |                           |                |
|--|---------------------------|----------------|
| <i>Pekař</i>   | <i>napekl<sup>P</sup></i> | <i>housky.</i> |
| baker-SG-NOM   | PREF-baked                | rolls-PL-ACC   |
| 'The baker baked a lot of / a large batch of / quite a few rolls.' |                           |                |

The above sentence entails that as a result of the denoted event, there was a sufficiently large quantity of rolls. That is, the sentence makes the following assertion: 'The baker made a lot of / many rolls'. Such a sentence cannot be felicitously uttered in a situation in which the baker made only two or three rolls. Although the prefix *na-* is directly attached to the verb, its semantic import is similar to that of determiner quantifiers like *a lot (of)* or *many*. Semantically, the prefix *na-* behaves with respect to the undetermined noun phrase 'rolls' as a quantifier like *many*, for example, would with respect to the common noun 'rolls'.

If we replace *na-* with the prefix *u-*, the whole sentence does not tell us anything about the amount of entities denoted by the direct object:

- (5-b)
- |                              |                          |                |
|------------------------------|--------------------------|----------------|
| <i>Pekař</i>                 | <i>upekl<sup>P</sup></i> | <i>housky.</i> |
| baker-SG-NOM                 | PREF-baked               | rolls-PL-ACC   |
| 'The baker baked the rolls.' |                          |                |

Since the prefix *u-* here does not contribute any distinct notion of quantity or measure, the undetermined plural noun phrase 'rolls' here simply has a bounded and a definite interpretation. (Since the perfective sentence makes an assertion about the set of rolls baked by the baker, it is true only if it is also true of all the rolls making up the set that they were baked by the baker, in this sense, the above sentence also has a universal entailment.) Given that the only formal difference between the above sentences (a) and (b) is in the particular prefix used, we may conclude that the

difference in the interpretation of the direct object noun phrases derives from the idiosyncratic lexical semantic properties of the prefixes.

### 1.3 Situation Types and Aspect

#### 1.3.1 Situation Types

There seems to be a relatively small set of situation types that are crucial to the semantic representation of verbs, verb phrases and sentences. They represent certain conventional ways in which languages divide the numerous states of affairs into categories. Following mainly Bach (1981 and 1986b), who in turn draws on Vendler (1957/1967), Mourelatos (1978; 1981), Dowty (1979, 1988 and 1991), L. Carlson (1981), among others, I distinguish three main categories, *states*, *processes* and *events*. They are further subdivided as follows:

(6)

<b>SITUATION TYPES</b>	→ <b>STATES</b>   non-states
states	→ static   episodic
non-states	→ <b>PROCESSES</b>   <b>EVENTS</b>
events	→ incremental   momentaneous
momentaneous	→ culminative   happenings

#### **STATES**

**static states:** *be in New York, love, intelligent;*

**episodic states:** *sit, stand, lie+LOC; drunk;*

**PROCESSES:** *walk, push a cart, rain, sleep;*

#### **EVENTS**

**incremental events:** *build (a cabin), eat a sandwich, polish a shoe, walk to Boston; grow into an adult, melt; arrive;*

**culminations:** *take off, lose, win, attack;*

**happenings:** *blink, knock, clap, recognize, realize; find (a penny), lose (one's watch); burst, explode.*

I use the term 'situation type' for various types of states of affairs, or 'eventualities' (as Bach 1986b calls them). I prefer the term 'situation type' over 'event type', because it has the advantage that it does not connote dynamicity and hence the exclusion of states, as the term 'event type' does.

Building on the well-known parallels between the nominal and verbal expressions, the situation types (static and episodic states, processes, incremental events, culminations and happenings) fall into two main classes, telic and atelic. This is shown in the following table:

ATELIC	TELIC
static state	culmination
episodic state	happening
process	
unbounded incremental event	bounded incremental event

Complex verbal predicates that express incremental events are bounded or unbounded, depending on the boundedness of their nominal arguments and various optional adjuncts, among other contextual factors. Verbs associated with incremental events are indeterminate with respect to boundedness or telicity. This is recorded as '[telic [ ]]' in their lexical entries.

The main criterion for the telic-atelic distinction is the way in which a situation as a whole stands in relation to any of its parts. This idea draws on the basic concepts of theories of mereology. The most basic and intuitive mereological concept is that of **the relation of part to whole**. It allows us to characterize the properties of divisibility (Quine's 1960 distributivity) and cumulativity. A given predicate *P* (verbal or nominal) has the divisibility property, if parts of the interpretation of *P* are describable by the same predicate *P*. For any divisible predicate *P* it holds that (i) any part of something which is *P* is also *P* (*divisibility*); and also (ii) any sum of parts which

are  $P$  is also  $P$  (*cumulativity*).

For example, undetermined mass and plural noun phrases have a divisive reference: parts of the interpretation of the noun phrase expression *water* are describable by the same expression *water*. The cumulative property is defined in terms of the semantic operation for joining two individuals to form a new sum individual. As Link (1983) points out "If  $a$  is water and  $b$  is water, then the sum of  $a$  and  $b$  is water" and "[i]f the animals in this camp are horses, and the animals in that camp are horses, then the animals in both camps are horses" Link (1983:303). Hence, undetermined mass and plural noun phrases also have a cumulative reference.

By contrast, count noun phrases like *an/the/one apple*, *five apples*, and measure constructions, like *a glass of wine*, do not pass the divisibility and cumulativity tests. We cannot divide *five apples* into proper parts each of which can be denoted by *five apples*. If we add two sets of entities denoted by *five apples*, their sum will be a set of entities denoted by *ten apples*.

A predicate  $P$  that is both cumulative and divisible is unbounded. A predicate  $P$  that is not cumulative and divisible is bounded. The notions 'bounded' and 'unbounded' belong to a finite set of primitives that characterizes parts of conceptual structure. These are cross-categorial notions that apply to both situations and individuals. The terms 'telic' and 'atelic' are reserved for the bounded and unbounded *verbal* expressions and their denotata, respectively.<sup>1</sup> From this it follows that I use the

---

<sup>1</sup> The term 'telic', coined by Garey (1957), is not the most suitable term. The reason is that it is derived from the Greek word *télos* that means 'goal', 'purpose'. Gary's (1957) examples of telic verbs are those denoting goal-oriented actions with human agents. He characterizes telic verbs as follows: "... a category of verbs expressing an action tending towards a goal envisaged as realized in a perfective tense, but as contingent in an imperfective tense" (Garey 1957:106). Atelic verbs, on the other hand, do not involve any such goal or boundary in their semantic structure. They can be characterized as verbs denoting actions that "are realized as soon as they begin" (Garey 1957:106). However, I will use the term 'telic', because it is now well-established (cf. Hopper and Thompson 1980, Rappaport and Levin 1988, Dowty 1991, Zaenen 1991, among many others) in its broad sense for all kinds of verbal expressions (that have animate and inanimate, human and non-human subjects).

notion 'bounded' or telic for any well-demarcated situation. The division of situation types into telic and atelic and the parallels between nominal and verbal expressions with respect to the boundedness property is shown in the following table:

UNBOUNDED	BOUNDED
<p>UNDETERMINED PLURAL AND MASS NP</p> <p><i>apples</i></p> <p><i>wine</i></p>	<p>SINGULAR COUNT NP</p> <p><i>an/the/one apple</i></p> <p><i>five apples</i></p> <p><i>a glass of wine</i></p>
<p>ATELIC</p> <p>static state</p> <p>episodic state</p> <p>process</p> <p>unbounded incremental event</p>	<p>TELIC</p> <p>culmination</p> <p>happening</p> <p>bounded incremental event</p>

The principles of individuation and identification that are operative in the domain of situations, *time*-occupying entities, and in the domain of individuals, *space*-occupying entities, have been described in the linguistic and philosophic literature. They have recently been studied by Talmy (1986), Langacker (1987a, 1987b) and Jackendoff (1990, 1991), whose work focuses on the cognitive underpinnings of the grammar of natural languages, and within event-based semantics by Hinrichs (1985), Krifka (1986, 1989, 1992) and Bach (1981, 1986a, 1986b), who are concerned with showing connections to the theories of mereology and the representation of these parallels within lattice theory.

### 1.3.2 The Prototype View of Aspect

The term 'aspect' is traditionally used for the perfective-imperfective distinction expressed by some morpheme on the verb or by a special periphrastic verb construction.

(7)

**classification of aspectual oppositions**

aspect → perfective | imperfective

imperfective → non-progressive | progressive

According to the traditional linguistic view, nouns name or describe individuals, while verbs typically denote or express situations or events. Given that the category of 'aspect' concerns distinctions in the domain of situations, the natural locus for its expression is the verb or some verbal construction. This situation can be found in English and Czech, for example.

However, the perfective and imperfective aspect is not uniquely tied to verbs (or verbal constructions), but it is also conveyed by case markings on the noun (cf. Finnish) or by various construction with a locative and/or partitive origin (cf. the German *an*-NP construction), for example. In terms of its formal expression, we need to distinguish between 'verb-centered' and 'noun-centered' expressions of aspect. Examples of noun-centered means for the expression of aspect can be found in a number of languages belonging to various genetic and geographical families. These two formal types each fall into two further types according to whether the relevant distinctions are morphologically (synthetically) or syntactically (analytically) expressed. The languages that are investigated here in some detail illustrate these four main types:

<b>primary expression of aspect</b>	<b>language</b>
verb-centered and syntactic	English
verb-centered and morphological	Czech
noun-centered and syntactic	German
verb-centered and morphological	Finnish

Aspectual systems, both in terms of their formal expression and semantic distinctions they encode, dramatically differ across languages (cf. Comrie 1976; Dahl 1985; Binnick 1991, for example). There is no single set of universal concepts that is equally applicable to all languages (cf. Dahl 1985) and no single concept (a single semantic 'invariant') or a set of concepts that the aspect category in a given language is necessarily reducible to. Building on the vast literature on aspect in linguistics, and also on some recent findings in the first language acquisition (Slobin 1985), I propose a prototype view of aspect with two extremes of aspectual meaning, which may be labeled as 'on-going situation' and 'result'. They are abbreviations for clusters of particular of properties, rather than discrete categories.

- Some of the contributing properties of 'on-going situation':
  - 'part-of' relation (or 'partitivity')
  - extension along the temporal axis
  - dynamicity
  - temporary, contingent, potentially changeable situation
  - expression of a situation without regard to its boundaries
- Some of the contributing properties of 'result':
  - 'whole-of' relation (or 'closure')
  - limited duration (short or punctual event)
  - completed transition from one state to another state

Contributing properties that characterize the aspectual prototypes 'on-going situation' and 'result' form clusters that are associated with the grammatical expression of imperfective and perfective aspect in natural languages. The systematic expression of aspect in any given language can be understood as realizing at least some of the properties that contribute to the prototypes 'on-going situation' and 'result'. The more of these properties are grammaticalized in a given language-specific aspectual category, the closer it is to the prototype 'on-going situation' or 'result'.



The 'on-going situation' prototype involves partitivity and the 'result' prototype the holistic meaning as one of the contributing properties. This reflects the long-standing intuition that perfective and imperfective verbs allow us to make an assertion about all and a part of a situation, respectively. I propose that the semantic core of many, possibly all, aspectual systems can be characterized in terms of the partitive-holistic distinction in the domain of situations.

If we assume that the partitive-holistic distinction constitutes the semantic core of aspectual systems in natural languages, then we can also describe in a straightforward way the semantic parallels between various aspectual systems regardless whether they express aspect by means of verbs or some periphrastic verbal constructions or by means of nouns, noun phrases and various constructions that contain no verbs, for example. The differences across various aspectual systems in typologically disparate languages can be characterized in terms of the difference in their morpho-syntactic encoding of the partitive-holistic distinction.

For example, the English progressive instantiates one extreme category of aspectual meaning, namely the 'on-going situation' prototype. One of its contributing features is partitivity. A progressive sentence like *Irv was building a cabin in Nova Scotia last August* describes a situation that is a proper part of a situation described by the corresponding non-progressive sentence: *Irv built a cabin in Nova Scotia last August*. The progressive operator is treated here as expressing a 'proper-part' relation in the domain situations. The reason is that in asserting *Irv was building a cabin* the speaker explicitly excludes the final part of the situation, namely, that subpart of the situation that includes the existence of the completed house. In traditional terms, *Irv was building a cabin in Nova Scotia last August* describes an ongoing situation, without regard to its beginning or outcome. A speaker can utter felicitously *Irv was building a cabin in Nova Scotia last August* even if the building of a cabin was never completed.

The Czech perfective aspect is situated close to the opposite extreme of aspectual meaning, namely the 'result' prototype. In contrast to English, in Czech and other Slavic languages, for example, there are no special markers on the verb to indicate that the denoted situation is to be viewed as on-going. However, perfective verbs specifically indicate that the denoted situation is to be viewed in its entirety, as a single whole. In mereological terms, the perfective has a holistic entailment.

- (8)
- |   |                |
|---|----------------|
| <i>Namaloval</i> <sup>P</sup>                           | <i>obraz.</i>  |
| PREF-drew-3SG   | picture-SG-ACC |
| 'He drew a/the picture.' [i.e., he finished drawing it] |                |

The perfective sentence entails that the whole painting came into existence as a result of the event. The final boundary of the temporal frame imposed by the perfective operator coincides with the inherent boundary of the telic predicate 'write the/a letter'.

This view of the progressive and perfective operator as expressing partitive and holistic meaning in the domain of situations fits well with the observation that many typologically different languages tend to transfer partitive and holistic operations from the domain of individuals to the domain of situations in order to convey aspect. This may be illustrated with the 'partitive vs. accusative' case alternation on nouns in Finnish.

- (9-a)
- |                          |                |
|--------------------------|----------------|
| <i>Join</i>              | <i>kahvia.</i> |
| drank-1SG                | coffee-PART    |
| 'I was drinking coffee.' |                |
- (9-b)
- |                                |                |
|--------------------------------|----------------|
| <i>Join</i>                    | <i>kahvin.</i> |
| drank-1SG                      | coffee-ACC     |
| 'I drank up (all) the coffee.' |                |

The accusative suffix marks the object for a whole quantity or a definite quantity. This amounts to making an assertion about the entirety of the situation in which the participant that is syntactically realized in the accusative noun phrase takes part. The semantic import of a whole sentence is comparable to that of a perfective sentence in such languages as Czech. The partitive suffix marks the object for an indefinite, non-limited quantity (with undetermined mass and plural noun phrases) or for an indefinite part of a bounded object. This amounts to asserting that only a part, but not all, of the situation in which the referent of the partitive noun phrase takes part transpired. The meaning of the whole sentence amounts to what the corresponding progressive sentence in English conveys.

### 1.3.3 Independence of Situation Types and Aspect

My account presupposes that we draw a clear line between aspect and situation types, the telic-atelic distinction in particular. This distinction is not always clearly drawn. It is blurred in those accounts of aspectual semantics that characterize aspect in terms of situation types (cf. Mourelatos 1981; Bennett 1981; Vlach 1981; Taylor 1977; Saurer 1984; Parsons 1990). For example, the semantic import of the English progressive has been characterized in terms of Vendlerian activities, states or atelic situations in general. If we blur the line between situation types and aspect, it is not clear how we can provide an adequate account for the systematic interaction between the two without running into contradictions, inconsistencies or unnecessary complications in our descriptive apparatus.

It has been observed that the telic-atelic distinction concerns the representation of situations as bounded or unbounded. The aspectual perfective-imperfective distinction allows us to make an assertion about all or a part of a given situation. The way in which telicity and aspect are clearly distinct from each other can be illustrated

by drawing parallels to the domain of individuals. We distinguish between bounded and unbounded objects. Moreover, we can talk about objects in terms of their parts and wholes.

[BOUNDED +]	[PART +] a part of a letter	[WHOLE +] a whole letter
[BOUNDED -]	There was sand on the floor	(does not occur)

By analogy, in the domain of situations, we distinguish between bounded or telic and unbounded or atelic situations. Orthogonal to telicity is the category aspect which allows us to talk about situations in terms of their parts and wholes.

	[PART +]	[WHOLE +]
[BOUNDED +]	a part of a letter I was writing a letter	a whole letter I wrote a (whole) letter (up)
[BOUNDED -]	There was sand on the floor I was running on the beach (I ran on the beach)	(does not occur)

The above tables contain one systematic gap: \*[whole+, bounded -]. It is motivated by the general constraint that an entity, an individual or a situation, which is viewed in its entirety must be bounded. It would be impossible to assert something about a whole object or a situation, if we did not view it as an individuated entity, as an entity with boundaries.

The partitive-holistic distinction that constitutes the semantic core of aspect lends itself naturally to a description within the theories of *mereology*, or the logic of part-whole relations. It has been proposed that at least some of the properties of the telic and atelic verbal predicates can be described in mereological terms (cf. Bach 1981). Such a mereologically-based characterization of aspect and telicity has the advantage that it allows us to describe in a straightforward way the integration of aspect and telicity in sentence's semantics.

The mereological basis for the characterization of situation types and aspect also has the advantage that it permits us to motivate the transposition from space to time, which seems to underlie the expression of aspect by various noun-centered expressions as well as the systematic contribution of nominal arguments to the telic and atelic interpretation of verbal predicates. It may also be seen as motivating the transposition from time to space that operates in those cases in which verbal morphology, in particular aspect, restricts the interpretation of nominal arguments.

## 1.4 Telicity

### 1.4.1 Syntactic and Semantic Factors in Telicity

Most previous approaches to the description of telicity focused on the way in which subcategorized nominal arguments determine the telic and atelic interpretation of simple clauses.<sup>2</sup> This is illustrated by the following examples:

(10-a) *Mary ate a sandwich in an hour / ?for an hour.*

(10-b) *Mary ate blueberries ?in an hour / for an hour.*

With such verbs as *eat*, *print* and *drink*, the telicity of a verbal predicate depends on its direct object noun phrase: a bounded object (*a sandwich*) yields a telic predicate, while an unbounded object (*blueberries*) an atelic predicate. This difference is reflected in the different behavior with durative *for*-PPs and time-span *in*-PPs.

In the same way the subject noun phrase contributes to the telic and atelic interpretation of a sentence:

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<sup>2</sup> Cf. Garey 1957; Verkuyl 1972-1989; Dowty 1972, 1979, 1991; Hinrichs 1985; Krifka 1986, 1989; Tenny 1987, 1992, 1993; Tenny and Henny 1993; Van Voorst 1988; among many others.

- (11-a) *The paper was printed on the VAX in ten minutes / ?for ten minutes.*  
 (11-b) *Beer was drunk all day / ?in one day.*

By contrast, complex verbal predicates headed by such verbs as *watch*, *carry*, *push*, *browse* are atelic, regardless whether their direct object arguments are bounded or unbounded:

- (12) *Mary liked the documentary on Kafka / five documentaries / (these) documentaries ?in an hour / for an hour.*

How do we explain the systematic contribution of nominal arguments to the telic and atelic interpretation of verbal predicates and sentences? The answer to this question is directly related to the current research in syntax and semantics. The phenomenon plays an important role in the syntax-semantics interface in the domain of argument structures, as has been shown by Van Valin (1987, 1990), Van Voorst (1986 and 1988), Dowty (1988, 1991) and Zaenen (1987, 1988, 1993). It is relevant to the choice of verb auxiliaries in Dutch (Zaenen 1993), and to the unaccusativity-unergativity distinction proposed by Perlmutter (1978) in Relational Grammar and adapted in GB Theory by Burzio (1981, 1983, 1986).

Two radically different strategies have recently been proposed for the description of this phenomenon. One strategy is to explain it in terms of a particular *syntactic* position in the d-structure. This is the essence of Tenny's (1987, 1992, 1993) *Aspectual Interface Hypothesis*. The second strategy is to relate it to the thematic structure of verbs. This *lexical* strategy was proposed by Krifka (1986, 1989, 1992) and Dowty (1988, 1991).

Both proposals are based on the intuition that the description of such sentences as *John ate an apple* involves the notion of 'cumulative' or 'gradual change'. The participant denoted by *an apple* gradually changes during the eating event, when there is no apple left, the event necessarily ends. This is related to the intuition that the participant denoted by *an apple* stands in a one-to-one relation to the denoted event. *John ate an apple* is telic, because *an apple* denotes an entity with a definite

extent.

Clearly, any adequate analysis of the influence of nominal arguments on the telic and atelic interpretation of verbal predicates must characterize the relevant notion of 'gradual change'. Only Krifka and Dowty, but not Tenny, provide an explicit characterization of this notion.

Tenny's and Dowty's goal is to capture certain regularities in the domain of the syntax-semantics interface. The systematic contribution of nominal arguments to the telic and atelic interpretation of verbal predicates constitutes one crucial type of data they focus on. Nonetheless, they arrive at radically different regularities and they draw different conclusions for the organization of grammar.

The fundamental differences between these two approaches stem from the theoretical frameworks they assume. Tenny works within the Government and Binding Theory. It relies on a multistratal syntax and the transformational movement between d-structure and s-structure. Tenny's Aspectual Interface Hypothesis (AIH) is motivated by the *autonomy of syntax* hypothesis, one of the basic tenets of the Government and Binding Theory. The AIH attempts to reconcile two conflicting goals: to specify correspondences between lexical conceptual structure and syntactic structure without compromising the autonomy of syntax. The strategy that Tenny pursues is to distinguish several layers of lexical representation (LCS) and allow only one of them to be "visible" to syntactic and morphological processes. The privileged layer of the LCS that syntax can "see" is the aspectual structure. Non-aspectual elements of the LCS, in particular thematic roles like Agent and Patient, have no significance for mapping and no status in syntactic theory.

Dowty and Krifka presuppose a mono-stratal syntactic framework. Their model-theoretic approach is couched within an event semantics that is enriched with lattice structures. Their account is based on certain fine-grained lexical semantic properties of verbs. Krifka's (1986, 1989, 1992) and Dowty's (1988 and 1991) proposal

buttresses the status of thematic roles in the grammar and it has important consequences for the general theory of thematic roles. They propose that the nominal argument responsible for the telic and atelic interpretation of verbal predicates and sentences is associated with a particular thematic role, which Krifka (1986, 1992) labels 'Gradual Patient' or 'Successive Patient' and Dowty (1988, 1991) 'Incremental Theme'. In Dowty's Proto-Role system, the Incremental Theme role is one of the contributing properties of the Patient Proto-Role. The content of thematic roles, the contributing properties that characterize the Patient and Agent Proto-Role is directly associated with syntactic arguments.

#### 1.4.1.1 Syntactic Factors in Telicity: Tenny (1987, 1989, 1992)

The Aspectual Interface Hypothesis advanced by Tenny is based on the *measuring-out constraint on the internal direct object argument*. It says that the internal direct object argument in the d-structure of verbs of change or motion is associated with the argument in the lexical conceptual structure that aspectually delimits or "measures out" an event.

Three main objections can be raised against Tenny's syntactic account. The claim that the internal direct object argument is associated with the participant in the conceptual structure that measures out the event seems to have the status of a stipulation, rather than of an empirical hypothesis. Second, the mapping between the LCS and the syntactic structure cannot be constrained by a *single* property, regardless whether it is related to telicity, or to some other single property. Third, since the AIH tries to keep syntax and lexical semantics maximally separate (in the interest of the autonomy of syntax), it crucially hinges only on one semantic notion, namely the notion of 'gradual' or 'cumulative change', in Tenny's terms the 'measuring out (the event)'. However, this notion is not explicitly defined and Tenny uses it in an



informal sense, "as a convenient metaphor for uniform and consistent change, such as change along a scale" (Tenny 1989:7). How can the Aspectual Interface Hypothesis provide a rigorous connection between lexical semantics and syntax, if it depends on the 'measuring out' notion that is not clearly characterized?

To illustrate the first point consider the following examples:

(13-a) *Martha pushed John into the pool.*

(13-b) *John dove into the pool.*

The relevant argument that 'measures out' the event in (a) is the internal direct object argument *John*, which is predicted by the AIH, but in (b) it is the subject *John*, which contradicts the AIH. Tenny mentions that in similar examples, such as *Martha danced halfway*, "the property which is measuring out the event (location), although it is changing in the external argument (Martha), can only be expressed in its pure form through an internal argument, as in *Martha danced half the distance (home)* (Tenny 1989:19, fn. 8). However, this move cannot be applied to transitive verbs of motion, as in

(14) *John entered the icy water (very slowly).*

Since *enter* has an internal direct object argument, we cannot claim that there is some understood internal direct object argument that measures out the event (see also Dowty 1991: 571, fn. 15).

As far as the influence of nominal arguments on the telic and atelic interpretation of complex verbal predicates is concerned, Tenny's account seems to be inconsistent in the following respect. According to Tenny, "aspectual structure is a structure associated with bounded events" (Tenny, 1992:4); hence "activities or states (in Vendlerian terms) do not have Aspectual Structure" (Tenny, 1992:4). This postulation has an undesirable consequence that *John drank a glass of beer* is telic and associated with Aspectual Structure, while *John drank beer* is atelic (activity) and hence it cannot be associated with Aspectual Structure. This amounts to the claim that the verb

*drink* has different meaning in *John drank a glass of beer* and *John drank beer*. This, however, defies the intuition that the verb *drink* has the same lexical semantic properties regardless of whether it occurs in a telic or an atelic sentence (see also Krifka 1986, 1992; Dowty 1988, 1991, for example). Moreover, it is not clear how we would express the observation that the differences in meaning between the above sentences are due to the different contributions made by the count noun phrase *a glass of beer* and the mass noun phrase *beer*. Their contribution is governed by the same general rule: (un)bounded noun phrase yields an (un)bounded complex verbal predicate. From this it follows that the verb *drink* is associated with two different linking mechanisms, one universal and one language-particular, according to whether it occurs in a telic or an atelic construction.

#### **1.4.1.2 Semantic Factors in Telicity: Krifka (1986, 1992) and Dowty (1988, 1991)**

Unlike Tenny, Krifka (1986, 1989, 1991) and Dowty (1988, 1991) assume that the grammatically significant participant roles are represented by thematic roles in the argument structure of verbs and the content of thematic roles is crucial to the statement of principles that relate semantic and syntactic structure.

On their account, the noun phrase that is responsible for the telic and atelic interpretation of verbal predicates denotes an object that stands in a homomorphic relation to the denoted event. The relevant noun phrase is assigned a specific thematic role, *Gradual Patient* or *Successive Patient* in Krifka (1986, 1992) and *Incremental Theme* in Dowty (1988, 1991). This thematic role plays a crucial role in the statement of the rules that govern the contribution of nominal arguments to the telic or atelic interpretation of verbal predicates. In other words, the influence of nominal arguments on the telic and atelic interpretation of sentences depends on the

thematic relation that the argument bears to its governing verb. The phenomenon ultimately derives from the thematic structure of verbs.

The most important theoretic innovation and improvement on the previous accounts of this phenomenon<sup>3</sup> is the introduction of the mathematical notion of 'homomorphism' into the description of lexical semantics of verbs. This proposal was made by Hinrichs (1985) Krifka (1986) and adapted by Dowty (1988). Hinrichs and Krifka extend Link's (1983) lattice analysis of mass terms and plural noun phrases to events. This move is justified by the well-known parallels between the nominal and verbal expressions, in particular with regard to the way in which an individual or a situation as a whole stands in relation to any of its parts. Krifka's lattice analysis assumes that we have two non-overlapping sorts of entities, objects and events, characterized by a predicate *O* and *E*, respectively. The extensions of *O* and *E* have the structure of a (complete) join semi-lattice without a bottom element.

For example, *a cup of coffee* denotes an entity with a part structure which is modelled as the lattice of objects. In general, the 'part' relation relates any object, which can be a single object, a group of objects or a quantity of matter, to its upper bound(s). Similarly, *Max drank a cup of coffee* denotes an event that has a part structure and we can recognize various drinking subevents (each of which has further subevents), none of which is the event of the same kind as the main event described by *Max drank a cup of coffee*.

This allows us to establish a homomorphic mapping between the parts of the object denoted by the Incremental Theme argument, *a cup of coffee*, and the parts of the event, *drink a cup of coffee*. The mapping then explains the observation that a bounded noun phrase *a cup of coffee* determines a bounded, or telic, reading of the

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<sup>3</sup> See, for example Verkuyl 1972-1989; Platzack 1979; Langacker 1987a and 1987b. Ten-ny 1987.

verb phrase *drink a cup of coffee*. Similarly, an unbounded noun phrase like *coffee* determines an unbounded, or atelic, reading of the verb phrase *drink coffee*.

The homomorphic mapping also allows us to provide a precise characterization of the notion 'gradual change'. We can monitor the progress of the drinking event by checking how much coffee is left in the cup, at each temporally distinct stage of the drinking event, there are successively smaller quantities of coffee left in the cup. This observation is captured in a straightforward way in the lattice theory, because the successive changes in the portion of coffee in a cup are reflected in the parts of the event of drinking it.

In Dowty's and Krifka's account, the homomorphism is a semantic property of a group of predicates that is encoded by a particular thematic role in their thematic structure. In other words, they claim that because of the meaning of *drink* a homomorphic relation holds between the denotation of the verb and the denotation of its Incremental Theme argument.

#### **1.4.2 The Contribution of Non-Subcategorized Arguments to the Telic and Atelic Interpretation of Clauses**

As has been observed above, most previous approaches to the description of telicity focused on the way in which subcategorized nominal arguments determine the telic and atelic interpretation of simple clauses. I extend Krifka's and Dowty's approach to account also for those cases in which a telic and an atelic interpretation of verb phrases and clauses can be assigned in a systematic way, although it is not calculated by compositional rules on the basis of the semantic properties of the lexical head verbs and its subcategorized Incremental Theme argument.

In the following resultative sentences the direct object denotes the participant whose properties are mapped onto the event denoted by the clause. The clause

implies that there is a correlation between the end of some property scale and the necessary end of the denoted event.

- (15-a) *He talked himself hoarse.*  
(15-b) *Tom ran the soles off his shoes.*

The direct objects have the property typical of of the Incremental Theme argument, namely they denote participants that undergo a change in successive stages. The change can be measured on a scale associated with the Incremental Theme participant. When the implied end of the scale is reached, the event necessarily ends. The problem posed for Dowty's and Krifka's by such examples is that the direct object is not an argument of the verb *talk* and *run*, but rather it is an argument of the resultative construction that underlies the above sentences.

As in Krifka (1986 and 1992) and Dowty (1988 and 1991) I use the thematic role 'Incremental Theme' in order to capture the semantic commonality of verbs that are inherently homomorphic. In order to account for non-subcategorized Incremental Theme arguments I introduce a situation type, the 'incremental event type'. The incremental event may be associated by individual verbs, but also with linguistic forms larger than individual verbs, with verb phrases and clauses. This account presupposes that there is a homomorphism between the incremental event and one of its participants, whereby the participant need not be syntactically realized as a single noun phrase. This allows me to account for the fact that the homomorphic mapping may have other sources than just the lexical semantics of individual verbs, it may be associated with the meaning of verb phrases or even whole clauses.

This is consistent with the proposals made in Dowty (1991:609) who observes that "[c]ertain grammatical constructions have certain meanings associated with them (entailments or conventional implicatures) involving Proto-Agent or Proto-Patient properties, ..." (Dowty 1991:608). The possibility of such an analysis "presupposes that a grammatical construction (or some morpheme serving as head of the

construction) can be analyzed as having a meaning and/or conventional implicature of its own ... " (Dowty 1991:609). The proposed account is also in the spirit of Fillmore and Kay (1993) who suggest that just as lexical entries of verbs specify valency requirements and semantics, so constructions can be characterized by their argument structure and associated semantics, including a particular situation type.

This proposal also allows me to describe sentence in which the telic and atelic reading can be clearly motivated by establishing a homomorphism between an object and event, but in which the relevant object is not a syntactically realized argument. This is illustrated by the following examples:

- (16-a) *The earthquake shook a book off the shelf in a few seconds / ?for a few seconds*  
 (16-b) *The earthquake shook books off the shelf ?in a few seconds / for a few seconds.*

In sentences that denote situations involving a directed motion, it is the quantity of the Path and the moving entity that together contribute to the telic or atelic reading of the complex verbal predicate. The directional prepositional phrase *off the shelf* indicates the Path that the moving entity denoted by the Theme *books* traverses. Given that in (a) the Path is bounded and given that the Theme denotes a definite quantity, there is also a finite succession of positional changes, and hence (a) is bounded. This is predicted by the homomorphism hypothesis. In (b) the plural Theme noun phrase 'books' generates reference to a plurality of events, one for each entity in the group of books. In other words, what here counts as the relevant 'incremental object' is the set of pairs of books and events. Since 'books' is an unbounded noun phrase, the homomorphism predicts that the complex verbal predicate is unbounded. The reason is that the pairings of books with the corresponding subevents will give rise to an indefinite number of positional changes.

### 1.5 Verbal Morphology and Nominal Reference in Czech

In Slavic languages like Czech, verbs carry a heavy-informational load. A single verb form is often morphologically complex and contains information about the identity of the denoted situation, information about tense, mood, number, person, gender and aspect, along with possibly indications of manner, intensity, intentionality and information about whether it denotes a single, iterative, distributive situation or a habit.

Traditional accounts focus on the aspectual properties of various verb forms and highlight the function of derivational verbal affixes as aspect and situation type 'shifters' (that is, 'Aktionsart' indicators in standard Slavistic terminology). What has not been enough noticed, let alone systematically investigated, is the systematic impact of verbal morphology on nominal arguments.

There are two ways in which verbal morphology effects the semantics of nominal arguments: one concerns the influence of aspectual operators, perfective and imperfective, on the semantics of nominal arguments. The perfective and imperfective aspect have effects similar to universal and partitive quantification, respectively. I suggest that this triggers the (in)definiteness effect on nominal arguments. The other concerns the way in which particular derivational affixes shape the interpretation of nominal arguments. Derivational verbal affixes contribute various quantificational notions, such as distributivity, vague quantification ('many'), partitivity, and measure.

These two ways seem to be independent of each other and they may co-occur. For example, the prefix *po-* serves to derive a perfective verb from a simple imperfective verb and at the same time it contributes the distributive meaning to the derived verb. To illustrate this point let us compare the following pair of sentences:

(17-a)

*Pozamykal<sup>P</sup> zásuvky.*  
 PREF-locked-3SG drawers-PL-ACC  
 'He locked all the drawers' [gradually, in a distributive fashion]

- (17-b) *Zamykal<sup>1</sup> zászuvky.*  
 locked-3SG drawers-PL-ACC  
 'He was locking (the/some) drawers.'

The perfective sentence (a) entails that the denoted event was completed when *all the drawers* in the relevant domain of discourse were locked. Since the event is directed at the whole contextually determined set of drawers, this gives rise to an effect comparable to universal quantification over individuals at which the event is directed. The noun phrase 'drawers' is here interpreted as a universally quantified noun phrase 'all the drawers', even though it is undetermined, it does not contain any overt determiners.

In the imperfective sentence (b), the universal entailment is lacking. If the imperfective sentence has a progressive interpretation, it approximately means 'be in the process of locking some drawers'. This implies that at some point of reference in the past some drawers were locked and some of them were not. This gives rise to the partitive interpretation of the direct object 'drawers'. Notice also that in such imperfective sentences as (b), the direct object noun phrase need not have a definite interpretation.

In addition, the prefix *po-* is responsible for the distributive reading that concerns the direct object 'drawers'. (a) can be appropriately uttered in a situation in which the drawers were locked in a successive fashion, either individually or in individual groups. This sentence does not sanction a collective interpretation. It would be inappropriate in a situation in which all the drawers were locked simultaneously. By contrast, the imperfective sentence (b), which does not contain the prefix *po-* can have a collective or a distributive interpretation.

The universal entailment does not stem from the prefix *po-*, but rather from the perfective meaning associated with the whole derived verb. The prefix on its own is not responsible for universality. This can be shown by the fact that universality is



absent in the secondary imperfective distributive verb *pozamykávat*<sup>I</sup> 'lock gradually/be gradually closing' which is derived from the perfective distributive verb *pozamykat*<sup>P</sup>. The imperfectivizing suffix *-va-* cancels the universal entailment.

(17-c)

<i>Pozamykával</i> <sup>P</sup>	<i>dveře.</i>
PREF-locked-3SG	doors-PL-ACC
'He was locking (the/some) doors.' [one after the other, successively]	

In the progressive reading, the above sentence has a partitive entailment: only some locking events took place and hence only some doors (but not all of them) were locked.

(17-d)

imperfective	perfective	secondary imperfective
<i>zamykat</i>	<i>po-zamykat</i>	<i>po-zamyká-va-t</i>
'lock', 'be locking'	distributive: 'lock (entirely)' 'finish locking'	distributive: 'lock', 'be locking'

All the above examples differ from each only in their main verbs. Hence, the differences in the interpretation of their undetermined direct object noun phrases must derive from verbal morphology alone. Such examples clearly show that aspect and idiosyncratic lexical semantic properties of derivational verbal affixes stand in a similar relation to nominal arguments as determiners do to the nouns with which they are combined. Simple verbs and derivational verbal affixes give rise to effects similar to (i) determiner quantifiers (universal quantification, partitivity, distributivity, (large) quantity) and to (ii) articles (definite and indefinite interpretation). The most compelling examples for the correlation of perfective aspect with definite and universally quantified nominal arguments can be found in perfective sentences with certain

undetermined mass and plural direct object noun phrases.

The influence of aspectual operators and derivational verbal affixes on the interpretation of nominal arguments has been largely neglected. It is a phenomenon that deserves attention, especially in the light of recent studies on the expression of quantification and (in)definiteness by means of verbal morphology. This topic is at the heart of the current research in syntax-semantics interface and quantification.

### 1.5.1 Previous Research on Verbal Morphology, (In)Definiteness and Quantification

The correlation of perfective aspect with definite direct objects, accusative case and holistic interpretation is well-documented in Slavic languages like Czech, Polish and Russian (cf. Wierzbicka 1967, Forsyth 1970, Comrie 1976, Rassudova 1977, Chvany 1983, among others). Nonetheless, there has been no attempt to provide a systematic account of such data. In particular, an account is needed that would predict not only those cases in which the perfective aspect *must* be correlated with definite objects, but also for those cases in which the perfective aspect *must not* or *need not* be correlated with definite direct objects.

A recent account that attempts to do just this, is given by Krifka (1986, 1989 and 1992) within the event semantics with lattice structures that he develops for the description of the influence of nominal arguments on the telic and atelic interpretation of verbal predicates. In that case, the nominal arguments "transfer" their reference properties onto the verbal predicate. "As the transfer of reference properties works in both directions, we should not be surprised to find the converse case as well, that is, a verbal predicate operator affecting the meaning of a nominal predicate" (Krifka 1992:49). This motivates, according to Krifka, the observation that perfective aspect marked on the verb seems to be responsible for the definite and bounded

interpretation of direct object noun phrases with inherently unbounded noun heads.

The influence of verbal morphology on the interpretation of nominal arguments has been recently studied in connection with a large research project that concerns the similarities and differences, within one language and across languages, in the structure and interpretation of quantification expressed within noun phrases and by various non-noun-phrase means. This research project was initiated by the work of Partee, Bach and Kratzer (1987) and some of the results can be found in Bach, Jelinek, Kratzer and Partee (1995).

Partee, Bach and Kratzer (1987) suggest that in syntax we may distinguish two distinct strategies for the expression of quantification: D-quantification and A-quantification. 'D' is mnemonic for Determiner and 'A' for the cluster of adverbs, auxiliaries, verb affixes, etc., all of which serve to express quantification by non-noun phrase means.

D-quantification and A-quantification are associated with different quantificational ontologies. Partee (1991b) suggests that D-quantifiers primarily quantify over individuals and A-quantifiers over cases, events, or situations. D-quantification and A-quantification are often interchangeable from a truth-functional point of view, as in English examples with *every* and *always*, for example (cf. Partee 1991b:10 and 12).

Within the class of A-quantification, Partee (1991a) draws attention to 'lexical quantification' induced by verb morphology and points out that it differs from the quantification induced by sentential adverbs, such as *always*, in that semantic effects of verb morphology are "directed to a specific argument or arguments of the verbs" (p. 10). Partee illustrates this point with the Czech prefix *po-*. Consider the following examples:

- (18-a) *Maloval<sup>I</sup> hesla (na stěnu).*  
 painted-3SG slogans-PL-ACC (on-PREP wall-SG-ACC)  
 'He painted (the/some) slogans (on the wall).'
- (18-b) *Pomaloval<sup>P</sup> stěnu (hesly).*  
 PREF-painted-3SG wall-SG-ACC (slogans-PL-INSTR)  
 'He covered the wall (with slogans).'

(b) entails that the whole wall was covered with writing. This meaning "is in a certain sense quantificational but is certainly to be captured at a lexical rather than a syntactic level" (Partee 1991a:19).

The notion of 'quantification' is here clearly used in the general sense to refer to the expression of quantity, extent or measure. The holistic effect induced by the prefix *po-* in the above examples can be also viewed as being related to the effect induced by the universal quantifier 'all'. The strategy that Partee, Bach and Kratzer (1987), and others who have followed their lead, is "to leave the boundaries of what counts as quantification vague, rather than risk imposing Anglocentric classifications that might make it harder to discover what count as natural classes within different languages. The methodological strategy my colleagues and I follow is to assume that we have a clear idea of what some prototypical cases of quantification are in English, and investigate how other languages express more or less the same things; ..." (Partee 1991a:20).

One of the many questions that this research poses is the following one: how can we predict at which argument(s) exactly will verbal morphology direct its semantic effects?

### 1.5.2 Verbal Morphology and Nominal Reference in Czech: Incremental Theme Hypothesis

I propose the following hypothesis:

In Slavic languages verbal morphology constrains the interpretation of the Incremental Theme argument. Perfective and imperfective aspectual operators as well as specific verbal affixes stand in a similar relation to the Incremental Theme argument as determiner quantifiers do to the nouns with which they are combined.

*Corollary 1:* The perfective operator functions as a universal quantifier over the denotation of the Incremental Theme argument. From this it follows that the perfective operator is correlated with a bounded Incremental Theme argument.

*Corollary 2:* The imperfective operator induces a partitive interpretation of the Incremental Theme argument (under a single event interpretation).

*Corollary 3:* Derivational verbal affixes often incorporate various quantificational notions, such as 'distributivity', '(small/sufficiently large) quantity', 'partitivity'. Derivational affixes function as quantifiers over the denotation of the Incremental Theme argument of the perfective and imperfective verbs they serve to derive.

Verbal affixes that serve to derive perfective and imperfective verbs function as operators over episodic predicates and their arguments. The Incremental Theme hypothesis predicts that they also constrain the interpretation of the Incremental Theme argument. I focus on the structure and interpretation of simple past tense clauses that denote single events and in which verbal morphology directs effects

similar to quantification, and related notions such as definiteness and boundedness, at the Incremental Theme argument.

This account has the advantage that all the ingredients on which it is based are independently motivated and needed elsewhere in the grammar. The notion of 'Incremental Theme' was introduced by Dowty (1988 and 1991), who draws on Krifka (1986, 1989, 1992). The Incremental Theme hypothesis presupposes an event semantics with lattice-structures (cf. Link 1983; Krifka 1986, 1989, 1992). It also relies on the independently motivated assumption that thematic roles are relations between individuals and events.

The relevant semantic effects on the Incremental Theme argument derive from the aspectual semantics of verbs and also from the idiosyncratic semantic properties of specific verbal affixes. The semantic effects triggered by aspectual operators concern the partitive-holistic distinction in the domain of objects and hence amount to effects similar to universal and partitive quantifiers. In proposing that (part of) aspectual semantics can be characterized in terms of the partitive-holistic distinction in the domain of situations I follow the suggestions in Vlach (1981), Bach (1981 and 1986b), and also in Krifka (1992), among others.

Following Krifka (1986, 1989, 1992) and Dowty (1988, 1991), I assume that verbs that take the Incremental Theme argument establish a homomorphic mapping between the denotation of the Incremental Theme and the event they denote. Then it follows that if a verb has a holistic meaning (perfective verb), then its Incremental Theme argument will have a holistic meaning. If a verb has a partitive meaning (imperfective verb), the Incremental Theme argument will have a partitive meaning.

The universal (or holistic) interpretation assigned to the Incremental Theme argument by the perfective operator provides a systematic motivation for the well-known correlation of perfective aspect with definite direct objects in Slavic languages. Similarly, as Krifka (1986, 1989, 1992) I argue that this correlation is

restricted to only a narrow class of direct objects, to *undetermined mass and plural direct objects* that are linked to the *Incremental Theme* argument. However, my account differs from Krifka in that the correlation itself is epiphenomal: it is mediated through the holistic, and bounded, interpretation assigned to the Incremental Theme argument by the perfective operator. I show that the perfective operator itself does not require that such objects be definite, rather it only requires that they have a holistic (universal) interpretation. The universally-quantified interpretation of the Incremental Theme argument in perfective sentences that denote single events is licensed if it is syntactically realized by a noun phrase that has an individuated, bounded referent. If the universal interpretation concerns an undeterminate noun phrase with an inherently unbounded noun, the only way in which the boundaries of the referent of such a noun phrase can be fixed, is to anchor it to a bounded entity in the discourse. In order to "individuate" an entity in this way, given that it is named by an inherently unbounded noun, we need to "identify" it contextually. This, however, implies that the relevant bounded referent will also be definite.

The semantic effects on the Incremental Theme argument are also attributable to the idiosyncratic lexical semantic properties of derivational verbal affixes and concern distributivity, quantity, measure, and other similar notions.

In the case of quantification triggered by verbal aspect and/or verbal affix the scope-bearing element is incorporated in a verb. Together with the Incremental Theme noun phrase they are used to signify that a free variable is introduced into the scope of quantification. The aspectual operator and/or verbal affix take scope over the local domain constituted by the event predicate, to which they are applied, and its arguments. This is to be expected given that the verb and its arguments are in the relation of predication and given that the predication is necessarily a local relationship. The domain of the aspectual operator and/or verbal affix is restricted to those individuals that are denoted by the Incremental Theme noun phrase.

The Incremental Theme hypothesis is supported by the following empirical evidence: constraints on the occurrence and interpretation of strong and weak quantifiers (Milsark 1974) with the Incremental Theme argument in perfective and imperfective sentences.

One of the findings of this research is that the force of quantification varies according to its source. The quantification that stems from the lexical properties of verbal affixes seems to have a weaker force than the quantification that is introduced by determiner quantifiers. For example, the distributive prefix *po-* does not combine distributivity with universality, while the determiner *každý* functions both a distributive and universal quantifier. The distributive determiner is a strong quantifier (cf. Milsark 1974), but the distributive prefix does not seem to be.

The Incremental Theme hypothesis has important consequences for the relation between quantification and lexicon. It amounts to the claim that certain quantificational effects on nominal arguments derive from the semantics of verbs and verbal affixes. In general, the rules governing the use of verbal affixes in their role as operators over event predicates must make reference to the lexical structure of verbal predicates. From this it follows that the rules that govern the use of verbal affixes as quantifiers over individuals will be formulated in the lexicon as well.

The study of verb morphology in connection with quantification raises a number of difficult issues in the organization of grammar. One of them regards the relation between the semantic and syntactic representations. Data, such as those that can be found in Czech, in which verbal morphology has quantificational import seem to pose problems for the hypothesis that the meaning of sentences can be derived in a systematic way by applying compositional semantic rules to independently motivated syntactic structures. Given the apparent non-compositionality of the data what is the nature of the mapping between syntax and semantics?



Although I examine in detail Czech data only, the general phenomena described here are not restricted to Czech, but they can be also observed in other Slavic languages, and even in such typologically distinct languages as Hindi, Japanese and Warlpiri, to give just a few examples. In general, the phenomena described here may be best observed in languages with rich verbal systems and incomplete determiner systems (e.g., lacking a set of articles like Czech, for example).

### 1.6 Aspect and Nominal Reference in German and Finnish

The German partitive *an*-construction is an illustration of a similarity between the formal expression of imperfective aspect and various locative adverbial phrases. The Finnish partitive case is used both as a partitive quantifier and as an imperfective aspect marker. Finnish also uses the accusative case as a universal quantifier and as a perfective aspect marker.

The parallel between partitive constructions in the nominal domain and the imperfective aspect in the verbal domain can be seen in connection with the independently motivated fact that languages tend to transfer partitive and locative (cf. Comrie 1976:98ff.) operations from the nominal domain to the expression of imperfective aspect. The question then arises how do we account for the systematic way in which languages transpose from space to time.

Following some suggestions in Krifka (1986), I argue that the transposition of the partitive and holistic (Finnish) as well as locative (German) operations from the spatial domain to the domain of time-occupying entities, or situations, is semantically determined. In German and Finnish, the syntactic argument that bears the partitive and in Finnish also the holistic marking is associated with the Incremental Theme role and determines the aspect of a clause. Just as in English, so in German and Finnish, the boundedness properties of the Incremental Theme argument determine the

telic and telic reading of a verb phrase or a clause.

The widening of our scope from the Incremental Theme to the incremental event type allows us to account for those Finnish sentences in which the partitive/accusative case that conveys the aspectual distinction is marked on the argument that denotes the moving entity, or the Holistic Theme (cf. Dowty 1991:569). To illustrate this point consider the following examples:

(19-a)

<i>Hän</i>	<i>ajoi</i>	<i>autoa.</i>
he-NOM	drove-3SG	car-SG-PART
'He was driving a/the car' or 'He drove a/the car.'		

(19-b)

<i>Hän</i>	<i>ajoi</i>	<i>auton</i>	<i>talliin.</i>
he-NOM	drove-3SG	car-SG-ACC	garage-ILL
'He drove the car into the garage.'			

(19-c)

<i>Hän</i>	<i>ajoi</i>	<i>autoa</i>	<i>talliin.</i>
he-NOM	drove-3SG	car-SG-PART	garage-ILL
'He was driving the car into the garage.'			

(a) shows that the possibility of expressing the aspectual distinction by means of case suffixes is preempted when the directional argument is absent. The direct object of the Finnish verb 'drive' only takes the partitive case. The verb 'drive' is a manner of motion of verb and it is not homomorphic.

What is interesting about such examples like (b) and (c) is the fact that the accusative/partitive case marking that gives rise to the aspectual distinction is marked on the noun 'car'. It is an argument that Dowty (1991:569) calls a 'Holistic Theme'. The participant associated with 'car' undergoes a change of state in stages. However, it is not the part structure of the car that is correlated with the part structure of the event. Rather, it is the path delimited by the Goal phrase 'to the garage' whose part structure is mapped onto the part structure of the event. Sentence (b) with the accusative case marking on 'car' implies that the event was completed and as a result the car was in the garage. The corresponding sentence with the partitive noun phrase

*autoa* in (c) most likely conveys 'he was in the process of driving the car into the garage'.

With verbs of manner of motion, directional prepositional phrases like 'into the garage' function as frame-creating adjuncts (cf. Fillmore 1989:101ff.).<sup>4</sup> The directional phrase added here to the verb 'drive' has a function that is not provided by the lexical semantic properties of this verb. The directional phrase creates a directed motion frame and the verb of manner of motion specifies the way in which the motion takes place. The progress of this motion event can be measured by comparing the various locations of the moving entity 'car' (Holistic Theme) at different consecutive time points with respect to the goal specified by the directional phrase. In short, manner of motion verbs, such as 'drive', together with directional prepositional phrases, such as 'into the garage', constitute a verbal expression that activates an incremental event type.

### 1.7 Informational Load and Informational "Flow"

The three cases discussed here have two fundamental characteristics in common. First, the interpretive rules make reference to the Incremental Theme argument (cf. Dowty 1988 and 1991; Krifka 1986, 1989, 1992). Second, the interpretive rules are asymmetric.

The asymmetry is due to fact that the verb and the Incremental Theme argument differ with respect to how much information they contribute to aspect and telicity of a complex verbal predicate. In German and Finnish, the Incremental Theme argument is specified with respect to the partitive-holistic distinction and bounded-unbounded distinction, while its governing verb is indeterminate on both counts. Since the

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<sup>4</sup> Cf. also 'superordinate adjuncts' in Jackendoff (1991:211).

Incremental Theme noun phrase encodes all the information that is relevant to aspect and telicity of a sentence, this information spreads from the Incremental Theme noun phrase over the entire sentence.

In Czech, the apparent 'flow' of information is reversed if the Incremental Theme is an undetermined mass or plural noun phrase. In such a case the verb encodes all the information about aspect, telicity and quantification. Hence, the information that concerns the universal, partitive, distributive, bounded (or unbounded) readings, and other information concerning quantity appears to 'flow' from the verb onto the Incremental Theme argument. The meaning restriction of the Incremental Theme argument by aspectual operators and derivational verbal affixes can be viewed as projecting a structure that is inherently present in the domain of verbal denotata onto the domain of nominal reference that has no or little inherent structure.

In English, the Incremental Theme argument is specified as bounded or unbounded, while its governing verb is indeterminate with respect to boundedness. Since the Incremental Theme argument carries more information about boundedness than its governing verb, this information appears to 'flow' from the Incremental Theme argument onto the complex verbal predicate that combines the Incremental Theme argument and its governing verb. This also holds in Czech imperfective sentences with a bounded Incremental Theme argument. In addition, the English progressive aspect imposes a partitive interpretation over the Incremental Theme argument.

In each case, the apparent 'flow' of information is due to the fact that certain linguistic forms specify more information than others or specify information that takes precedence over the information specified by other linguistic forms. The direction in which the information is 'transferred' is not a priori determined by the lexical semantics of verbs, as it may appear from Dowty's (1991) characterization of homomorphic predicates, but rather it is a function of the variation in the formal

encoding of the information that concerns aspect and telicity. That this should be expected follows from Krifka's (1986, 1989, 1992) formal characterization of the mapping relations between objects and events and that provide for 'the transfer of reference mode' (Krifka 1986; 1989) from the Incremental Theme argument onto the complex verbal predicate, and vice versa.

Krifka's (and also Dowty's) approach to the description of the influence of nominal arguments on the telic and atelic interpretation of verbal predicates is implicitly procedural. In Krifka's (1986, 1989) work this is reflected in such formulations as 'the transfer of reference mode' (Krifka 1986; 1989) from the Incremental Theme argument onto the complex verbal predicate, and vice versa. However, it seems that at least some apparently directional influences can be best treated in a declarative, unification-based approach to language description. As far as the unification mechanism is concerned, I mainly draw on Shieber (1986), Karttunen (1988), Pollard and Sag (1987 and 1993) and Fillmore and Kay (1993).

## Chapter 2

### Situation Types

#### 2.1 Introduction

The work of Dowty (1972, 1977 and 1979), Bennett and Partee (1972/78), Taylor (1977) Mourelatos (1978/81), and others, in the seventies showed that a relatively small set of situation types plays an important role in the organization of the grammar of natural languages. Since then this view has been steadily gaining in importance.<sup>1</sup> Situation types represent certain conventional ways in which languages tend to conceptualize the structure of various states of affairs in the real world.

The most influential typology of verbs, verb phrases and sentences based on the different kinds of situation they describe has its roots in Aristotle. Aristotelian typology was introduced into modern philosophy by Ryle (1949), Vendler (1957/67) and Kenny (1963).<sup>2</sup> Vendler and Kenny try to capture distinctions that are motivated by

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<sup>1</sup> Cf. Bach (1981, 1986), Parsons (1980, 1985, 1990), Hale and Keyser (1987), Tenny (1987, 1989, 1992, 1993a), Tenny and Henny (1993), Moens and Steedman (1988), Van Voorst (1988), Pustejovsky (1989, 1991), Grimshaw (1990), Jackendoff (1987), Dowty (1979, 1989, 1991), Krifka (1986, 1989, 1992), Levin and Rappaport (1992).

<sup>2</sup> *De Anima, Nicomachean Ethics and Metaphysics*. Aristotle is in general credited with discovering the distinctions discussed in this chapter. However, it is not clear to what extent Aristotle himself distinguished the various classes that the philosophers Ryle (1949), Vendler (1957; 1967) and Kenny (1963) propose (cf. Dowty 1979:53). A thorough analysis of the relevant work of Aristotle and further references can be found in Kenny (1963:173-183).

certain problems in the philosophy of mind and philosophy of action. Therefore, they restrict their analyses to action verbs. Even though Vendler's and Kenny's studies differ from the linguistic studies both in aim and scope, they describe distinctions that are highly relevant in the semantics of natural languages. The well-known four-fold distinction in states, activities, accomplishments and achievements was proposed by Vendler (1957/67). Recent approaches favor a tripartite distinction into states, processes and events, which is ontologically wider and which subsumes Vendler's accomplishments and achievements into one category 'events' (cf. Kenny 1963; Mourelatos 1978/1981; L. Carlson 1981; Bach 1981 and 1986; Parsons 1990). Many language phenomena strongly suggest that we need to separate states and processes from events. For this purpose, the distinction atelic vs. telic is used.

Situation types have been used in the description of the following grammatical phenomena. First, they are indispensable for the description of aspect in natural languages.

Second, the structure of situation types plays an important role in the syntax-semantics interface in the domain of argument structures (*Linking Theory, argument selection*). It enters into the description of universal and language-specific constraints on possible mappings between semantic and syntactic argument structure<sup>3</sup>. It is directly related to the theory of thematic roles in Foley and Van Valin (1984), Van Valin (1990)<sup>4</sup>, Pustejovsky (1988a and 1988b)<sup>5</sup>, and in Dowty (1988 and 1991). In

<sup>3</sup> Cf. Foley and Van Valin 1984; Van Valin 1987, 1990; Tenny 1987, 1992, 1993; Zaenen 1987, 1988, 1993; Dowty 1988 and 1991; Van Valin 1990; Wechsler 1991; Legendre 1991; among others.

<sup>4</sup> Foley and Van Valin (1984) and Van Valin (1990) are couched in Role and Reference Grammar (RRG). They adopt the verb classification of Chapter 2 in Dowty (1979). They define a linguistic level of lexical decomposition what they call logical structures. Thematic roles are defined according to the position a variable occupies in such a logical structure.

<sup>5</sup> Pustejovsky (1988a and 1988b) proposes a semantics based on events in which "it is the topology of the event itself which defines the aspectual classification of a verb or sentence. As a result of a finer-grained, subeventual structure, thematic relations are a derivative notion and play no primary role in determining the meaning of a verb (but may, in fact, play a role in language learnability).

Dowty's theory a subtype of telic event has important consequences for his theory of thematic roles.

Third, situation types determine the choice of verb auxiliaries in Dutch (Zaenen 1987, 1988, 1993).

Fourth, the influence of nominal arguments on the telic and atelic interpretation of complex verbal predicates can be adequately motivated if we assume that the complex verbal predicates in question are associated with a situation type with a certain narrowly defined property (cf. Krifka 1986, 1989, 1992; Dowty 1988, 1991): nominal arguments that influence the telic and atelic interpretation of complex verbal predicates denote participants whose properties are intrinsically tied to the temporal extent of the denoted situation. They are incrementally subjected to the denoted situation, part by part or degree by degree. I will also show that the same type of participant is associated with the nominal arguments whose semantic properties are constrained by an aspectual operator and/or a verbal affix in such languages as Czech.

I will first introduce Vendler's four-fold distinction in states, activities, accomplishments and achievements. In linguistics, Vendlerian classification was further developed within tense logic and event semantics. Approaches that draw on tense logic base the classification primarily on temporal criteria, on abstract properties of time points and intervals (cf. Bennett and Partee 1972/78; Dowty 1972, 1977, 1979; Bennett 1977, 1981; Taylor 1977; and others).

Approaches within event semantics take events or situations as primitive notions. Consequently, events are not analyzed in terms of time structures. Bach (1981), for example, proposes that at least some of the properties of event types can be understood in terms of parallels between verbal and nominal expressions that pertain to their 'part' structure, that is, to the ways in which an entity as a whole stands in relation to its parts. This method of analysis is inspired by the theories of *mereology*, or the logic of part-whole relations. An event-based approach has been advocated by



Bach (1981, 1986a, 1986b), Parsons (1985, 1990) and Krifka (1986, 1989, 1992), among others.

I will argue that the classification of situation types that is exclusively based on tense logic is inadequate. Instead, I will adopt an event-semantic approach to the classification of verbs, verb phrases and simple sentences in reconstructing certain properties of situation types in terms of the way in which a situation as a whole stands in relation to any of its parts. As is common in event-based approaches, part-whole relations in the domain of individuals will be taken as a point of departure and it will be shown how parallel part-whole relations in the domain of situations shed light on the properties of verbs, verb phrases and sentences. Such parallels give us insight about the linguistic structuring of space and time. They are well-attested in the linguistic, philosophic and psycholinguistic literature.

## 2.2 Vendler's Classification (1957/1967)

It was Vendler (1957; 1967)<sup>6</sup> who introduced the familiar four-fold distinction *states*, *activities*, *accomplishments* and *achievements*. Examples illustrating Vendler's categories are these:

**States:** *desire, want, love, believe, own, resemble, be in New York;*

**Activities:** *run, walk, write letters, push a cart, breathe;*

**Accomplishments:** *run a mile, walk to the car, write a letter, recite a poem, grow up, recover from illness;*

**Achievements:** *recognize, realize, spot, identify; lose, find, reach (the summit); win (the race); cross the border; start, stop, resume; be born, die.*

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<sup>6</sup> Vendler's article "Verbs and Times" was revised and published in 1967 as Chapter 4 in *Linguistics in Philosophy* (pp. 97-121). My references are to the 1967 version.

Vendler's goal is "to describe the most common time schemata implied by the use of English verbs" (Vendler 1967:98). Vendler's four-fold distinction is based on the following semantic properties: duration over time, change, set terminal point and homogeneity. As a point of departure, Vendler takes the progressive and argues that activities and accomplishments should be set apart from achievements and states, because activities and accomplishments occur in the progressive (his "continuous tense"), whereas states and achievements do not (Vendler 1967:99):

- (1-a) *John is running / pushing a cart.*
- (1-b) *John is running a mile / drawing a circle.*
- (1-c) *\*John is having a car. / \*Mary is being in New York.*
- (1-d) *\*John is realizing that he forgot to lock the door.*

Against this grammatical criterion it can be objected that it does not always give us clear results and hence the categorization is not well motivated. Dowty (1977 and 1979), Mourelatos (1978/1981) and Vlach (1981), among others, point out that many achievement verbs in Vendler's list can appear in the progressive: *He is winning the race, He is dying, He is reaching the top, He is falling asleep, He is leaving, He is arriving*, for example. Although it is true that many states in the progressive are mostly odd or anomalous, some states do occur in the progressive with special interpretations (cf. Carlson 1977, Bach 1981): cf. *I'm really loving the play, I'm understanding you but I'm not believing you* (cf. Bach 1981:77).

Moreover, there are different reasons for the acceptability of achievements and states in the progressive. As Vendler observes, states last "for a period of time" (Vendler 1967:103), but do not denote a process over time, they "cannot be qualified as actions at all" (Vendler 1967:106). States may arise as a result of change, they do not involve any changes. Hence, the acceptability of progressive sentences with state predicates seems to depend on whether the state predicate expresses a contingent property that can change over time (cf. Comrie 1976:38ff., Dowty 1979:176ff., Carlson 1981:43, Vlach 1981).

The misconception that the progressives of achievements are generally ungrammatical could be attributed to Vendler's claim that all achievements encode the inception or the termination of an act and "occur at a single moment" (Vendler 1967:103). Furthermore, it is explicable by Vendler's concentration on mental achievements, such as *recognize*, *spot*, *notice*. It is often assumed that such verbs denote mental acts that are truly instantaneous. They do not occur in the progressive: \**He is noticing/recognizing/spotting his friend's face in the crowd*. Achievements that are understood as occurring at a single moment, such as *flash*, *blink*, are odd with the progressive, unless we think of some unusual contexts, like a slow-motion movie, in which their beginning and end do not fall into a single moment, but instead are separated by an interval of time. Such punctual achievements are most likely to give rise to an iterative interpretation when they are used in the progressive. The possibility of an iterative interpretation depends on the resettability of the denoted punctual event (cf. *The light was flashing* vs. ?*He was finding his watch*, ?*She was noticing/spotting the squirrel*, or ?*The bomb was exploding*).

In light of such observations it follows that the compatibility with the progressive does not provide a suitable criterion for the classification of states and achievements into one class (and of activities and accomplishments into another).

Both activities and accomplishments differ from states and achievements in so far as they "are processes going on in time, that is, roughly (...) they consist of successive phases following one another in time" (Vendler 1967:99). It is an essential feature of accomplishments that they "proceed toward a terminus which is logically necessary to their being what they are" (Vendler 1967:101). "[W]hile running or pushing a cart has no set terminal point, running a mile and drawing a circle do have a 'climax', which has to be reached if the action is to be what it is claimed to be" (Vendler 1967:100).

The presence (absence) of a "set terminal point" has the following consequence: activities are homogeneous, while accomplishments are not. Activities "go on in time in a homogeneous way; any part of the process is of the same nature as the whole" (Vendler 1967:101). "If it is true that someone has been running for half an hour, then it must be true that he has been running for every period within that half hour" (Vendler 1957;1967:101). By contrast, accomplishments are not homogeneous: "... in case I wrote a letter in an hour, I did not write it, say, in the first quarter of that hour" (Vendler 1967:101).<sup>7</sup>

Apart from Vendler, other philosophers and linguists applied various tests to distinguish between the classes of the Aristotelian situation typology. Kenny (1963) uses tense-implications and nine linguistic criteria in order to classify verbs into three types: *static verbs*, *activity verbs* and *performance verbs* (subsuming Vendler's accomplishments and achievements).

The most complete list of tests can be found in Dowty (1979: Chapter 2 and 3), who gives eleven syntactic and semantic criteria extracted from the work of Ryle (1949), Vendler (1957; 1967), Kenny (1963), Lakoff (1965) and Ross (1972). In what follows I will give a brief summary of these tests:

### I. Non-stative Tests

a. Only non-statives occur in the progressive:

- (2-a) *John is smiling.*
- (2-b) *John is drawing a circle.*
- (2-c) *\*John is knowing the answer.*
- (2-d) *\*She was finding her house for some time.*

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<sup>7</sup> In Vendler's words, "the man who stops running did run", but "if someone stops running a mile he did not run a mile" (Vendler 1967:100).

b. Only non-statives occur as complements of *force* and *persuade*:

- (3-a) *John forced Barry to smile.*
- (3-b) *John forced Barry to draw a circle.*
- (3-c) *\*John persuaded Barry to know the answer.*

c. Only non-statives occur as imperatives:

- (4-a) *Smile!*
- (4-b) *Draw a circle!*
- (4-c) *\*Know the answer!*

d. Only non-stative co-occur with agentive adverbs like *deliberately* and *carefully*:

- (5-a) *John smiles deliberately.*
- (5-b) *John carefully draws a circle.*
- (5-c) *\*John deliberately knows the answer.<sup>8</sup>*

e. Only non-stative occur in pseudo-cleft constructions:

- (6-a) *What John did was smile.*
- (6-b) *What John did was draw a circle.*
- (6-c) *\*What John did was know the answer.*

There are many predicates with inanimate subjects that do not pass the b.-d. tests. The reason is that these tests isolate a narrower property than non-stativity, namely agentivity. Agentivity entails non-stativity, but not vice versa. Many such non-stative and non-agentive verbs can occur in the *do*-construction (Ross 1972):

- (7-a) *What the rock did was roll down the path.*
- (7-b) *What the machine did was make noise.*

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<sup>8</sup> The occurrence as imperative, as a complement of *force* or *persuade* and with adverbs like *deliberately* clearly characterize agentive verbs.

**II. Non-statives have a habitual interpretation in the simple present**

- (8-a) *John smiles.*
- (8-b) *John draws a circle.*
- (8-c) *John knows the answer.*

**III. 'ϕ for an hour, spend an hour ϕing'.**

This criterion distinguishes achievements and accomplishments from activities and states. Only the latter two can occur with durative adverbial preposition phrases with *for* and as complements of *spend α-amount of time*:

- (9-a) *Max ran for an hour.*
- (9-b) *John was sick for two years.*
- (9-c) *?John built a cabin for three years.*
- (9-d) *\*John died for a year.*

Dowty (1979:88) observes that there are verbs that appear to be achievements except for the fact that they can be combined with durative temporal *for*-phrases, or other durative adverbials, even if there is no indefinite plural or mass term in a sentence:

- (10) *The soup cooled for ten minutes.*
- (11) *The ship sank for an hour (before going under completely).*
- (12) *John aged forty years during that experience.*

Such verbs have also been called *degree words* (Sapir 1949; Bolinger 1972) or *vague predicates* (Lewis 1970; Kamp 1975). Dowty (1979:88) labels them *degree-achievements*.

**IV. 'ϕ in an hour, take an hour to ϕ'.**

This criterion is intended to distinguish activities and states from achievements and accomplishments. Only the latter two can occur with adverbial preposition phrases with *in* and as complements of *take α-amount of time to ϕ*:

- (13-a) *(\*)John swam in an hour.*

- (13-b)     *\*John was sick in two years.*  
 (13-c)     *John built a cabin in three years.*  
 (13-d)     *John noticed the painting in a few minutes.*
- (14-a)     *(\*It took John to swim in an hour.*  
 (14-b)     *(\*It took John two years to be sick.*  
 (14-c)     *It took John three years to built a cabin.*  
 (14-d)     *It took John a few minutes to notice the painting.*

**V. 'φ for an hour' entails 'φ at all times in the hour'.**

Just like the previous two criteria, this criterion is also mainly intended to distinguish between states and activities, on the one hand, and accomplishments, on the other hand (cf. Dowty 1979:60). If John ran for an hour, then, at any time during that hour it was true that John ran. If John wrote a letter for an hour, then it is not true that he wrote a letter at any time during that hour. This test is related to Vendler's homogeneity property.

**VI. 'x is φ-ing' entails 'x has φ-ed'**

This test goes back to Kenny (1963), who introduced it to differentiate activity verbs from accomplishment/achievement verbs (his "performances"). For activity verbs, the entailment from the progressive form "x is φ-ing" to the simple form "x has φ-ed" is valid, while for accomplishment/achievement verbs it is not.

(15-a)     *John is walking*

is said to entail

(15-b)     *John has walked.*

On the other hand,

(16-a)     *John is writing a letter John is falling asleep John is dying*

do not entail

(16-b)

*John has written a letter*  
*John has fallen asleep*  
*John has died.*

Strictly speaking, these are not semantically valid entailments (cf. Taylor 1977:205, Bach 1986:71, and the discussion below.) Nevertheless, the intuition behind this test is obvious and valid. The reason why this entailment does not hold for accomplishments and achievements is that they they entail a definite change of state, namely the coming into existence of a completed letter, the state in which John is asleep and dead. Such a definite change of state is called the *result, upshot, end-state, culmination, goal, or terminal point*. For example, if the speaker asserts that John was, is or will be writing a letter, then he does not commit himself to the coming into existence of a letter. In *John is writing a letter*, the existence of a completed letter is a possible outcome of the described situation. However, if the speaker uses a perfect tense sentence like *John has written a letter*, he commits himself to the completion of the event.<sup>9</sup> The epistemic position of the speaker of an accomplishment/achievement sentence in the progressive is at the core of what Dowty (1972 and 1979) labels as the 'imperfective paradox'. (The nature of this paradox will be discussed in the chapter on aspect.)

On the other hand, *John is walking* does not describe a situation with a definite end-state. Therefore, if John is walking now, then he has already completed at least some walking. The entailment from a progressive to a corresponding sentence in the perfect tense is valid.

## VII. Complement of *stop*:

<sup>9</sup> According to Dowty (1979:61), if accomplishment expressions in the progressive have a habitual reading, then they entail that the 'definite change of state' was reached. For example, *John was walking to the park* entails that John walked to the park on a habitual reading.



Unlike accomplishment, activities and states, achievements cannot occur with *stop* (except in a habitual interpretation):

- (17-a) ?*John stopped being sick when he took the medication.*
- (17-b) *John stopped running.*
- (17-c) *John stopped building the house.*
- (17-d) (\*)*John stopped noticing the painting.*

### VIII. Complement of *finish*:

Accomplishments are distinguished in that they are acceptable with *finish* (without requiring any special interpretation):

- (18-a) \**John finished being sick when he took the medication.*
- (18-b) (\*)*John finished walking.*<sup>10</sup>
- (18-c) *John finished building the house.*
- (18-d) \**John finished noticing the painting.*

### IX. Ambiguity with *almost*:

As Morgan (1969) pointed out, *almost* is ambiguous with accomplishments, but not with activities. For example,

- (19-a) *John almost walked*

entails that John did not walk. By contrast, accomplishment sentences like

- (20) *John almost wrote a letter*

are ambiguous: (i) John did begin writing a letter, but he did not finish writing it; (ii) John perhaps had the intention of writing a letter, but changed his mind and did not even start writing it.

### X. 'x $\phi$ -ed in an hour' entails 'x was $\phi$ -ing during that hour'

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<sup>10</sup> Further below it will be shown that activities can be also used as complements of *finish*, provided they are used in an accomplishment sense.

This criterion is related to the fourth test. For many achievement expressions the adverbial preposition phrase with *in* is understood as 'after  $\alpha$ -amount of time':

(21) *John noticed the painting in a few minutes*

means *John noticed the painting after a few minutes*. And similarly, *We shall start in two minutes* means *We shall start after two minutes*. On the other hand,

(22) *John built a cabin in three years*

and *John built a cabin after three years* do not have the same meaning. If *John built a cabin in three years* is true, then it is true that John was building a cabin during those three years.<sup>11</sup> And similarly, according to Vendler (1967:104) and Mourelatos (1981:194), *I shall run a mile in five minutes* and *I shall run a mile after five minutes* do not have the same meaning. In other words, with achievements, the time indicated is calculated from a contextually given reference point, while with accomplishments it is calculated from the beginning of the situation itself.

What neither Vendler, Mourelatos nor Dowty noticed is the fact that with accomplishment the temporal *in*-phrase can also be interpreted as *after  $\alpha$ -amount of time*. Consider the following sentence:

(23) *He signed a contract to write the script for one 'Star Trek' episode in one month.*

(23-a) *It took him one month to write it.*

(23-b) *He started writing it one month after signing the contract.*

Here, the time span indicated by *one month* can be calculated from the signing of the contract or from the start of writing.

#### **XI. Co-occurrence with *studiously, attentively, carefully*:**

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<sup>11</sup> Notice that again we have to allow for a certain 'gappiness' within the interval in question.

This test overlaps with one of the non-stative tests, as Dowty (1979:59) observes. Ryle uses adverbs, such as *assiduously*, *attentively*, *studiously*, *vigilantly*, *conscientiously*, that presuppose a volitional, agentive activity, to distinguish between two classes of achievements: those achievements that entail some "subservient task activity" from those that are "purely lucky achievements" and "prefaced by no task performances". As far as the latter are concerned, Ryle gives the following example: "For a runner to win, not only must he run but also his rivals must be at the tape later than he; for a doctor to effect a cure, his patient must both be treated and be well again..." (Ryle 1949:150). Ryle points out that adverbs like *studiously*, *attentively*, *carefully* are anomalous with "purely lucky achievements":

(24)        ??*John carefully found a penny.*

Further developments of Vendlerian classification can be divided into two main approaches (with a number of intermediate positions): approaches within tense logic and within event-based semantics. Approaches that draw on tense logic base the classification primarily on temporal criteria. This approach regards the concept of time as the only primitive concept. A purely temporal approach to the characterization of the verbal expressions has been proposed by Bennett and Partee (1972/78), Dowty (1972, 1977, 1979), Bennett (1977, 1981), Taylor (1977), among many others.

Approaches within event semantics take events or situations as primitive notions. Consequently, events are not analyzed in terms of time structures. Bach (1981), for example, proposes that at least some of the properties of event types can be understood in terms of parallels between verbal and nominal expressions that pertain to their 'part' structure, that is, to the ways in which an entity as a whole stands in relation to its parts. This method of analysis is inspired by the theories of *mereology*, or the logic of part-whole relations. An event-based approach has been advocated by Bach (1981, 1986), Parsons (1985, 1990), among others.

In what follows I will discuss these two main approaches to the typology of situations and argue for the approach in which situations are understood as primitive entities.

### 2.3 Classifications Based on Temporal Criteria

The framework of classical tense logic<sup>12</sup> and its model-theoretic semantics dominated much of the research on the classification of verbal expressions, aspect and tense during the 1970's and early 1980's. At the time, many philosophers and linguists tried to motivate the properties of various kinds of situation type on the basis of purely temporal properties, that is, on the basis of abstract properties of moments and/or intervals of time. Discussions revolved around the following issues: evaluation at points (traditional tense logic, see Montague 1968, 1974<sup>13</sup>, Scott 1970, for example) or at intervals (Bennett and Partee 1972/1978, Bennett 1977 and 1981, Taylor 1977, Dowty 1977 and 1979, and Hinrichs 1985, for example), multiple indexing, two-valued (Dowty 1977 and 1979) or many-valued logic (Hoepelman 1976, 1978, 1981), extensional semantics (Taylor 1977) or intensional Montague semantics (Dowty 1977 and 1979), sentence semantics or discourse semantics (König 1980, Smith 1980, 1986 and 1990).

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<sup>12</sup> Tense logic is concerned with the study of valid inferences of tensed sentences, the structure of time, and the analysis of temporal relations. Discussions of tensed sentences date back to Aristotle. The origins of modern tense logic can be traced back to the publication of A. N. Prior's *Time and Modality* in 1957. In 1967, Prior summarized the work in tense logic in the first decade in *Past, Present and Future*. Prior seems to be the first one to make the decisive step in the development of formal tense logic by considering the tenses not as operators on predicates or subjects, but on whole sentences. Tense logic can be considered as a branch of modal logic and historically the focus of attention was on modal notions when inferences with tensed sentences were studied (cf. Clifford 1975:18ff.)

<sup>13</sup> Montague (1974), Paper 5, "On the Nature of Certain Philosophical Entities".

Classical tense logic, on which these studies were based, was developed in order to solve certain philosophical problems. It was not intended as a means of describing the semantics of verbal expressions in natural languages. This fact is at the root of the limitations and shortcomings of many description of verbal expressions within tense logic. There are many philosophical problems related to the notion of time that are, to a large extent, irrelevant to the explication of the notion of tense as it is encoded by linguistic expressions and to the semantic properties that motivate the classification of verbal expressions. For example, the tense logical approach is concerned with questions like the following: Is the set of times infinite or finite? Is there a first (last) moment of time? Is time discrete, dense, continuous? For what portion of an interval is a proposition expressed by a given sentence valid? Or, does a given sentence denote a situation that allows for gaps and for how many? It is not clear what difference, if any, the answers to these questions make for the formulation of linguistic theories.<sup>14</sup>

It has been pointed out (cf. Vlach 1981; Bach 1981, 1986, among others) that we meet with formidable obstacles if we try to reconstruct the semantic properties of verb predicates that were employed by Vendler (1957/1967) and Kenny (1963), for example, only with the apparatus provided by tense logic, that is, in terms of abstract properties of intervals and moments of time. Theory-internal assumptions of tense logic give rise to unexpected problems, such as those that have to do with the specification of the smallest and minimal parts of denoted situations and the 'gappiness' of the interval during which situations are asserted to hold. In order to account

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<sup>14</sup> For example, with respect to the problem of whether time is discrete or dense, Dowty (1979:76) observes that there are no good linguistic reasons to assume either position. However, later in his book, Dowty (1979:139) assumes, along with Bennett and Partee (1972/1978), that time is dense. This is motivated by his definition of the abstract predicate BECOME that encodes a definite change-of-state entailment that characterizes the class of accomplishment and achievement predicates. See also Kamp (1980), on the logic of change and the density of time.

for such problems we are forced to postulate additional constraints and ad hoc theoretical constructs that do not play a systematic role in the theory of language. As a case in point I will discuss the reconstruction of the homogeneity property introduced by Vendler (1957/1967). Vendler (1957/1967) uses the homogeneity property to motivate his informal distinction between activity and accomplishment expressions. Activities "go on in time in a homogeneous way; any part of the process is of the same nature as the whole" (Vendler 1967:101). "If it is true that someone has been running for half an hour, then it must be true that he has been running for every period within that half hour" (Vendler 1957/1967:101). The problems related to Vendler's homogeneity property are also reflected in the application of Kenny's (1963) entailment from 'x is V-ing' to 'x has V-ed' to verb predicates.

### 2.3.1 Bennett and Partee (1972/1978), Taylor (1977)

In Bennett and Partee (1972/1978) Vendler's homogeneity property closely corresponds to the *subinterval property*:

"Subinterval verb phrases have the property that if they are the main verb phrase of a sentence which is true at some interval of time I, then the sentence is true at every subinterval of I including every moment of time in I. Examples of subinterval verb phrases are: *walk, breathe, walk in the park, push a cart*" (Bennett and Partee 1972:17).

The *subinterval property* is intended to distinguish states and activities from accomplishments and achievements. The *subinterval property* is too strong for two reasons. First, it only applies to certain states, but it does not apply to activity verbs, as individual moments do not suffice for the statement of their truth conditions (cf. Taylor 1977:207, Dowty 1979:168, Bach 1981:71). Second, the *subinterval property* does not allow for any gaps. However, activities like *walk, breathe, walk in the park, push a cart* readily allow for gaps (this point was made by Dowty 1977:50, among others). Take the following example: if Mary ran for an hour one may truthfully assert *Mary*

*ran* during that hour even though Mary was not engaged in running at every subinterval and instant of that hour. We must allow for a certain number of subintervals during which Mary does not run.

Taylor (1977) avoids the first criticism directed at Bennett and Partee's subinterval property by postulating that activities are valid at intervals larger than a moment. In general, single moments of time do not suffice for the statement of the truth conditions for non-state verbs. The situations expressed by state predications, such as *Rod is hirsute*, obtain at or throughout an interval of time  $P$  and they are true of any moment  $m$  within  $P$  (cf. Taylor 1977:206). From this it follows that state predications denote properties that can be true of moments of time. Taylor's temporal postulates that characterize Vendler's four classes are as follows:

- (25-a) If  $\alpha$  is a *stative* predicate, then  $\alpha(x)$  is true at an interval  $I$  just in case  $\alpha(x)$  is true at all moments within  $I$ .
- (25-b) If  $\alpha$  is an *activity* verb (...) or an *accomplishment/achievement* verb (...), then  $\alpha(x)$  is only true at an interval larger than a moment.
- (25-c) If  $\alpha$  is an *accomplishment/achievement* verb, then if  $\alpha(x)$  is true at  $I$ , then  $\alpha(x)$  is false at all subintervals of  $I$ .
- (25-d) If  $\alpha$  is an *activity* verb, then if  $\alpha(x)$  is true at  $I$ , then  $\alpha(x)$  is true for all subintervals of  $I$  which are larger than a moment.  
Taylor (1977) quoted in Dowty (1979:166)

Taylor's temporal postulates are supposed to motivate the different behavior of Vendler's classes with respect to the progressive aspect.<sup>15</sup> However, if Taylor's temporal postulate for activity verbs is given an unconstrained interpretation, it cannot account for the 'gappiness', the second problem associated with Bennett and Partee's subinterval property.

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<sup>15</sup> Taylor's (1977) postulates are here given in Dowty's (1979:166) formulation. Taylor uses the terms 'energeia' verbs for activity verbal expressions, 'kinesis' verbs for accomplishment and achievements verbal expressions. The implication of these postulates for the progressive will be discussed in the chapter on aspect.

Apart from "atemporal" states, such as those expressed by *be a believer in God*, which do not allow for any gaps, activities and accomplishments readily allow for gaps. Achievements are usually thought of as being without gaps. Hence, the characterization of activity, accomplishments and temporary states (or *stage-level* states, cf. Carlson 1977) must allow for a certain number of gaps within the time interval during which they are asserted to hold. For example, during an intermission in a theatre, if someone points at an empty seat next to me and asks *Is someone sitting here?*, I can answer with *This seat is occupied, my friend is sitting here*. It is obvious to me and to my addressee that his/her question and my answer are about whether anyone is sitting there for the evening, since no one is sitting there at the moment of speaking. In other words, the stative sentence can be true for the interval but not true at each and every moment within that interval (cf. Vlach 1981:280).<sup>16</sup> In general the permitted number and size of such gaps and the required number of subintervals at which the situation must hold will depend on pragmatic factors. For example, an hour full of running may be without gaps, like a bathtub full of water, *a year* full of running is naturally assumed to have gaps (iterative interpretation), like a street full of policemen (cf. Vlach 1981:282, fn. 17). An explicit account of 'gappiness' presupposes that we can determine once and for all the permitted number and size of non-trivial gaps that are characteristic for each situation type.

The 'gappiness' property gained a surprising prominence in the temporal accounts of situation types and was considered by some logicians important enough to serve as a basis for a classification of situation types (cf. Rescher and Urquhart 1971:160, for example). 'Gappiness' is problematic as a semantic criterion, because it presupposes a clear-cut distinction between trivial and non-trivial gaps. Even if we

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<sup>16</sup> This example also shows that the progressive sentences lack the subinterval property, that is they do not obtain at every subinterval and instant of the interval throughout which they are asserted to hold.



could draw a line between trivial and non-trivial gaps, we might still wonder what non-trivial gaps would tell us about the semantics of situation types, what role they would play in semantics and in the grammar theory of natural languages in general.

Related to the problem of 'gappiness' is the application of the durative *for*-phrase as a criterion for setting apart states and activities from accomplishments and achievements. Just like the *subinterval property* it turns out to be too strong if understood in its unconstrained interpretation within tense logic. Such an interpretation is given by Dowty (1979:60): ' $\phi$  for an hour' entails ' $\phi$  at all times in the hour'. Here the problem stems from the fact that Dowty (1979:79) represents durative adverbials, such as *for six weeks*, as universal quantifiers over time intervals; i.e., in terms of a quantified time expression and a two-place AT operator:  $(\forall t:t \in \textit{six weeks}) \textit{AT}(t, p)$ . This formula is understood as "for all times  $t$  such that  $t$  is a member of the period *six weeks*, it was true at  $t$  that  $p$ " (cf. Dowty 1979:79). Clearly, in its unconstrained form this entailment is too strong, just like Bennett and Partee's (1972/1978) *subinterval property*. Dowty observes that if "we are to use the universal quantifier to represent durational adverbs like *for six weeks* in a natural logic at all, then the moments it quantifies over must be something like 'relevant psychological moments' which are both vaguely specified and also contextually determined" (Dowty 1979:81).

It seems to be incorrect to say that durative adverbials themselves have the property of quantifying over all (universal quantification) or just some relevant, vaguely specified and contextually determined, moments and/or subintervals of time. Rather, we need to interpret this variability as the feature of the situations denoted by the predications that durative adverbials modify and the context in which the durative adverbial is used. Durative adverbials have two inherent properties: they indicate a certain temporal measure and they have the combinatorial potential to modify unbounded sentences. How the denoted period, temporal measure, is divided in terms of its (proper) periods is not a matter of the semantics of durative adverbials, but

rather is to be determined by the semantics of the predications in the scope of durative adverbials and by various pragmatic considerations. An adequate account of durative adverbials cannot rely on universal quantification and it must be flexible enough to capture the variability of contexts in which durative adverbials can be used.

Taylor (1977) draws attention to another problem with his temporal postulate for activities. He observes that the postulate does not apply to all the activity verbs, but rather only to *homogeneous activity* verbs, such as *blush*. For homogeneous activity verbs it holds that

"even a microsecond within a period of falling is plausibly reckoned as itself genuinely a period of falling, even though it can be told as such by means of normal empirical criteria only indirectly, via the knowledge that it does indeed come within some wider period long enough for those criteria to be applied" (Taylor 1977:212).

Taylor distinguishes homogeneous activity verbs from heterogeneous ones like *chuckle* which denotes a situation that has proper parts that are too small to count as chuckling. Therefore, it is divisible only up to certain minimal proper parts. Other examples of heterogeneous activity verbs are *talk*, *giggle* and verbs of motion like *run*, *swim*, *walk*, *crawl*, *dance*, *waltz*, for example. As Dowty (1979:168) observes, such verbs of motion involve patterns of change of position, or particular sequences of more simple changes of position, that are "required to characterize a certain complex activity, though no particular member of the sequence need occur first" (Dowty 1979:171). So for example, since the waltz involves sequences of three steps, any interval at which *x* takes less than three steps is not an interval at which *x waltzes* is true. *Mary is waltzing* can be true at a time *t* even though *Mary has waltzed* is false, because *t* might fall within the very first "minimal" subinterval of the interval within which *Mary waltzes* is true, and at any time within that "minimal" subinterval it will be true that *Mary is waltzing*, but false that *Mary has waltzed*. In other words, within this first "minimal" subinterval, there would be no past interval for which *Mary*

*waltzes* would be true (cf. Taylor 1977:207, Dowty 1979:168).

The above observations lead Taylor to the following conclusion: "it must be denied that there is a genuine entailment from 'x is V-ing' to 'x has V-ed' for heterogeneous E-verbs [activities]" (Taylor 1977:224). In other words, Kenny's (1963) entailment from 'x is V-ing' to 'x has V-ed' cannot be applied to all the activity verbs, but rather only to homogeneous ones.

How do we resolve the problem that has to do with the identification of the minimal subinterval or minimal part of heterogeneous activities? Taylor (1977) assures us that "there is no cause for undue concern, provided the natural assumption be made that the minimal periods of chuckling within a piece of normal-rate chuckling are the least times of chuckling so discernable by normal empirical criteria. For them it will at least remain true that no speaker will be in a position *warrantably to assert* that *x* is chuckling until, some minimal period of chuckling having passed and been recognized, it is true that *x* has chuckled; ..." (Taylor 1977:224). "(...) within any period of chuckling there will be *minimal periods* [italics mine] of chuckling, and it is natural to identify the minimal periods of a chuckling carried out at the normal rate with those which everyday empirical criteria can identify as such" (Taylor 1977:212).

As another case in point that shows that purely temporal characterization of the relevant properties of situation types is not sufficient, let us take Kenny's (1963) entailment from 'x is V-ing' to 'x has not V-ed' which is supposed to characterize accomplishment/achievement verbs. Strictly, speaking it is not a semantically valid entailment, as is shown by the following example.

(26) *If Brutus is stabbing Caesar, Brutus has not yet stabbed Caesar.*

Brutus could have stabbed Caesar on some other occasion, therefore, strictly speaking, this is not a valid entailment. To make this a valid entailment, we need to explicitly exclude all the stabbing occasions that occurred prior to the current one. Taylor

(1977:209, Postulate 4) is aware of this problem and tries to restrict its application by formulating an additional postulate that characterizes the notion of an individuated time period within which an event denoted by a given telic verbal expression holds. This additional postulate should guarantee that "'x is stabbing y' will entail 'x has not yet stabbed y during *this* period of his stabbing" (Taylor 1977:209).

A related problem arises with accomplishments that contain NPs denoting objects subjected to the described event:

(27) *If John is building a house, John has not built a house.*

Consider the case of John's building a series of houses. When he is engaged in building the second house, it would be false to say that he has not yet built a different house from the one he is now building. To amend this problem, Dowty (1979:57) suggests that "we must give a 'wide scope' reading to any quantifier occurring within the  $\phi$  to apply the test appropriately" (Dowty 1979:57). This is to ensure the identification of the appropriate object (a/the house) subjected to the denoted event (building of that house). Such problems with the application of Kenny's entailments provide in Bach's (1986) view "a strong argument against all attempts to reconstruct events and the like on the basis of times" (Bach 1986:71).

The above observations make it sufficiently clear that tense logical approaches can model the semantic properties of verbal categories only at great cost. Theory-internal assumptions of tense logic force us to consider problems, such as the minimal parts and 'gappiness' of the denoted situations, that do not seem to deepen our understanding of the semantic properties of verbal expressions. Moreover, the resolution of such problems complicates the proposed temporal accounts. For example, Taylor's temporal postulates are coherent if additional semantic constraints are formulated and/or pragmatic conditions on the application of the relevant temporal postulates and tests are evoked that draw on the language users' knowledge about the denoted situations and on such notions as 'everyday' or 'normal empirical criteria'

(cf. Taylor 1977). Modifications of this kind weaken the force of his temporal postulates. In short, it is impossible to provide an adequate characterization of the relevant semantic properties of verbal categories only with the apparatus provided by tense logic, that is in terms of abstract properties of intervals and moments of time.

It is, therefore, not surprising that new approaches gradually emerged within tense logic and truth-conditional semantics that combined temporal and non-temporal properties in their characterization of verbal categories. As an example the highly influential work of Dowty (1972 and 1979) will be discussed in the next section.

### 2.3.2 Dowty (1972, 1979)

Dowty emphasizes that an adequate description of verbal expressions, including their aspect and tense forms, requires semantic, pragmatic and discourse semantic motivations. Dowty (1979) explicitly rejects such approaches as Taylor's (1977), which try to reduce the differences between different verb classes to purely temporal properties, to abstract properties of moments or intervals of time. The reason is that they neglect lexical semantics of verbs and hence provide no adequate motivation for the different behavior of the verbal classes they propose. "[A] description such as Taylor's leaves it an apparent accident that the class of verbs that have definite change-of-state entailments and the class of verbs that seem to obey (56) [postulate (c) above] is exactly the same" (Dowty 1979:167).

Dowty attempts to motivate the typology of situation types that is rooted in the work of Aristotle, Kenny, Ryle and Vendler in terms of the change-of-state entailments that are (or are not) present in the different types. He develops a fine-grained lexical semantic analysis of situation types that combines the insights and lexical decomposition analysis of generative semantics (cf. Lakoff 1965, McCawley 1968, Postal 1970, and Ross 1972) with the formal theory of truth-conditional and model-

theoretic semantics.

Dowty observes that "the syntactic tests for distinguishing the four categories [Vendler's states, activities, accomplishments and achievements] do not give us totally consistent results for all examples below. In fact, consideration of some of them will force us to make some revisions in the Vendler-Kenny classification" (Dowty 1979:65-66). Dowty's *revised classification* in states, activities, accomplishments (complex changes) and achievements (singulary changes)<sup>17</sup> is based on the set of five partially cross-classifying semantic distinctions, four temporal and one non-temporal (agency):

(i) *momentary* vs. *interval* (ii) *change* vs. *no change* (iii) *definite change* vs. *indefinite change* (iv) *singulary change* vs. *complex change* (v) *agentive* vs. *non-agentive*.

(28) Dowty (1979: pp.163ff., 184)

verb predicates	→	momentary (a)		interval
interval	→	no change (b)		change
change	→	indefinite change (c)		definite change
definite change	→	singulary change (d)		complex change (e)

(a): *be asleep, be in the garden* (stage-level states); *love, know* (object-level states); habitual uses of verbs in all classes;

(b): *sit, stand, lie* (interval states); *be polite, be a hero*.

(c): *make noise, roll, rain; walk, laugh, dance* (activities)

(d): *notice, realize, ignite; kill, point out (something to someone)*;

(e) *flow from x to y, dissolve; build (a house), walk from x to y, walk a mile*;

As is obvious from the above diagram, the most fundamental criterion that Dowty uses to distinguish between the different types of predicates is based on the temporal

<sup>17</sup> Cf. Dowty (1979), Chapter 3. 8: *Another Look at the Vendler Classification in an Interval-Based Semantics*, pp. 163ff.

criterion of **change**. The fifth semantic distinction, the notion of 'agentivity', is orthogonal to the other four, so that each of these four classes is further split into agentive and non-agentive predicates. However, the importance of agentivity is less important for the classification of verb predicates than its prominence in Dowty's system seems to suggest.

A change of state can be characterized as a succession of at least two different states of affairs.<sup>18</sup> Therefore, predicates that entail a change can only be true at intervals of time and their truth conditions "require access to information about the physical state of the world at at least two moments in time" (Dowty 1979:168). State predicates do not entail any change: "States are like snapshots of the world at a given instant" (Chierchia and McConnell-Ginet 1990; 1992:353).

As in Taylor (1977), the notion of *change* motivates the assumption that only states can be true at moments of time, while all the non-stative classes, activities, accomplishments and achievements can only be true at intervals of time.<sup>19</sup>

On the basis of the co-occurrence with the progressive aspect, Dowty draws a line between **momentary** states (*be asleep, be in the garden, love, know* and habitual uses of verbs in all classes) and all the other classes of predicates. Dowty's distinction in *momentary* and *interval* predicates cuts across Carlson's (1977) distinction in *object-level* and *stage-level* predicates. Dowty's *momentary* predicates fall into two groups: Carlson's (1977) *stage-level predicates* like *be asleep, be in the garden*, on the one hand, and *object-level* predicates like *know, love*, on the other hand.

<sup>18</sup> See Kamp (1980:135-179), for a detailed discussion of the problems involved in the definition of the notion of 'change'.

<sup>19</sup> Dowty illustrates this point with the paradigm example of non-stative verbs, namely those that denote a change in the physical properties: "consider a segment of a motion picture film showing a ball rolling down an inclined plane. A single frame of this film does not in itself offer us the evidence to say that the ball is really in motion, assuming that the film does not show any blurs, but any two frames (adjacent or not) showing the ball in slightly different locations do provide evidence of movement" (Dowty 1979:168). Dowty credits Wittgenstein (1958), *Philosophical Investigations*, with making a similar point.

Activities as well as accomplishments and achievements are characterized by a change of state over time. The class of accomplishment and achievement predicates is distinguished from the activity class by having a "definite" change of state entailment. Dowty illustrates this point with motion predicates. An activity sentence like

(29-a) *The ball moved*

entails an **indefinite change** of state, any change of location of the ball will do to make this sentence an appropriate utterance. Such an activity sentence "is true of any interval in which the ball changes its location to any degree at all, and thus may be simultaneously true of an interval and various subintervals of that interval" (cf. Dowty 1979:168). The truth conditions that Dowty (1979:169) gives for *moved* (*x*) can be paraphrased as follows: 'x moved' is true at an interval *I* just in case *x* was located at one place at the beginning of *I* and at another place at the end of *I*.<sup>20</sup> "[I]t is the narrow scope existential quantification over places in this definition that is responsible for the indefiniteness" (Dowty 1979:169).

By contrast, accomplishment sentences like

(29-b) *The ball moved six feet. / The ball moved to the bottom of the slope.*

entail a **definite change** of state: the ball moves a specific distance (*six feet*), to a specific location (*to the bottom of the slope*). Such accomplishment sentences "are true when a change of location of a particular specified location has taken place, and thus are true of a single interval, but not of any subintervals or superinterval of that

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<sup>20</sup> For problems connected to the characterization of motion verbs, see Dowty (1979:170). He gives M. J. Cresswell's example of a perfect sphere rotating in space but not coming to occupy any new previously unoccupied space. In such a case it would be necessary to make reference to positions occupied by parts of an object. Dowty also points out that the case of an object that moves in a circular path presents a problem, as the object may occupy exactly the same position at the beginning and end of an interval of movement. Motional activities characteristic of animate beings, like *running*, *swimming*, *walking*, *crawling*, *dancing*, etc., involve patterns of change of position, or particular sequences of more simple changes of position, such changes are not just related to the location of the whole body, but related to the positions of its parts (cf. Dowty 1979:170-1).



interval" (Dowty 1979:168).

Both accomplishment and achievement expressions entail a definite change of state. Accomplishments correspond exactly to Dowty's 'complex change' and achievements to his 'singulary change' predicates. The distinction between 'singulary change' and 'complex change' predicates is mainly motivated by the presence or absence of a subsidiary causal event that brings about the change.<sup>21</sup> This criterion seems to underlie Vendler's distinction between achievements and accomplishments. In Dowty's (1979:183) classification, *accomplishment verbal expressions* "denote 'definite interval' predicates which entail this subsidiary activity or event, and *achievement verb (phrase)* to refer to those that do not, irrespective of agency or multi-part change of state". Examples of such accomplishment verbal expressions are *build a house, shoot someone dead, the collision mashed the fender flat*. Achievement verbal expressions on the other hand, are *reach the age of 21, awaken, reach the finish line, arrive in Boston*.<sup>22</sup> It should be emphasized that Dowty's use of the terms 'achievement' and 'accomplishment' does not correspond to Vendler's use of these terms, as Dowty's 'subsidiary causal event' criterion overrides any considerations having to do with agency. Vendler's examples of achievements are mostly non-agentive events that cannot be deliberately brought about (*die, lose, notice*), while his accomplishments are typically agentive. Dowty's integration of achievements and accomplishments is clearly superior to Vendler's distinction between achievements and accomplishments that is based, among other things, on the criterion of agency. However, the criterion of 'agency' muddies the issues in both Vendler's and Dowty's classification and should be avoided altogether.

<sup>21</sup> Cf. Dowty (1979:183): "This presence or absence of a causal event seemed to be the most salient distinction between the accomplishment and achievement class for Vendler (and is for me), ...".

<sup>22</sup> Other examples of achievement verbs are *realize, forget, find, discover, arrive at, reach, depart from, leave* and "aspectual" complement verbs like *stop, start, begin, continue*, etc.

How does Dowty (1979) account for the change-of-state entailments that differentiate among verbal categories? Dowty proposes the following 'aspect calculus' hypothesis: the relevant properties of the various kinds of predicates can be explained by means of basic stative predicates, the combinatorial apparatus of intensional logic and three sentential operators DO, BECOME and CAUSE.<sup>23</sup> Each verb can be represented as a propositional function containing (at least) one predicate which is assigned one or more arguments. Each stative verb can be taken as a stative predicate. Non-stative verbs are constructed from stative predicates the three operators DO, BECOME and CAUSE.

In Dowty's lexical decomposition analysis, activity predicates have a semantic structure that contains states and the DO relation. Dowty provides an analysis of the progressive and for the temporal properties of the DO relation from which it follows that DO allows the progressive but states do not.

Achievement and accomplishment predicates have a logical structure consisting of a one-place atomic predicate BECOME and an embedded clause. The sentence embedded directly under BECOME may contain a state, an activity, accomplishment or achievement predicate (cf. Kenny 1963:178). The truth conditions for BECOME can be roughly characterized as follows:

"BECOME ( $\phi$ )" is true at an interval  $I$  iff  $\phi$  is true at an interval  $K$  that immediately follows  $I$  and is false at an interval  $J$  that immediately precedes  $I$ .

<sup>23</sup> Cf. Dowty (1979:71): "the different aspectual properties of the various kinds of verbs can be explained by postulating a single homogeneous class of predicates--stative predicates--plus three or four sentential operators and connectives."

The idea that state as well as non-state predicates can be analyzed in terms of the same kind of stative properties may seem counterintuitive. However, the translations in intensional logic are not intended to constitute a linguistic level of representation. Moreover, it is not crucial that a given sentence corresponds to a unique translation in intensional logic. As Dowty observes: "... it is not necessarily the form of a particular complex translation or meaning postulate that is literally significant, but the more subtle claim that word meanings of certain kinds are always constructable out of a certain fixed set of primitive semantic operations (here represented by the interpretations of operators such as CAUSE and BECOME) and stative properties" (Dowty 1979:199).

The intuition behind this definition is related to Kenny's (1963) view: "performances [accomplishments/achievements] are specified by their ends" (Kenny 1963:178). The proposition variable  $\phi$  corresponds to the result or end state of achievements and accomplishments:

"Performances are brought to an end by states. Any performance is describable in the form: 'bringing it about that  $p$ '. Washing the dishes is bringing it about that the dishes are clean; learning French is bringing it about that I know French, walking to Rome is bringing it about that I am in Rome. In all these cases, what is brought about is, by our criteria, a state: 'is clean', 'knows', 'is in Rome' are all static verbs" (Kenny 1963:177).

Or, the proposition  $\phi$  may also be an activity, as the beginnings and endings of activities can also be achievements. And it may even be another achievement or accomplishment. However, in order to prevent an infinite regress, it is crucial that

"every performance must be ultimately the bringing about of a state or of an activity" (Kenny 1963:178).

Accomplishment predicates are defined in terms of the operator CAUSE. The class of accomplishments seems to correspond to the class of causative verbs in generative semantics. The notion of causation, as it is encoded by CAUSE, is explained in terms of the semantics for conditionals developed by Lewis (1973) and Stalnaker (1968) (it involves the counterfactual "if not  $\phi$ , then not  $\psi$ " and resemblance relation between possible worlds). All accomplishments have the logical structure [ $\phi$  CAUSE  $\psi$ ], where  $\phi$  and  $\psi$  are propositions. CAUSE is a two-place sentence connective.<sup>24</sup>  $\phi$  is often a BECOME sentence or contains an activity predicate,  $\psi$  is a BECOME sentence (cf. Dowty 1979:91). To illustrate how Dowty's lexical decomposition works, consider the relation between the following state, achievement and accomplishment predications:

<sup>24</sup> Dowty adopts a "bisentential analysis" of CAUSE that was earlier suggested by Vendler (1967), Geis (1970), Fillmore (1971), McCawley (1971), among others. The bisentential analysis differs from McCawley's original proposal that treated CAUSE as a relation between individuals and propositions.

- (30-a) *The door was open.*  
 (30-b) *The door opened.*  
 (30-c) *John opened the door.*

We can translate *is open* with a one-place stative predicate  $open'_a$  ("a" stands for adjective). The intransitive verb *open* in b. can be given the following translation:

$$(30-b') \quad open'_i = \lambda x \text{ BECOME } (open'_a (x))$$

The transitive verb *open* in c. can be translated as follows:

$$(30-c') \quad open'_t = \lambda x \lambda y [\text{CAUSE } (x, \text{BECOME } (open'_a (y)))]$$

The  $\lambda$ -expression in (c') denotes a relation that holds between  $x$  and  $y$  iff some property that  $x$  has (or some action that  $x$  engages in) causes  $y$  to become open. This can be put in more simple terms as:  $[[\textit{John does something}] \text{ CAUSE } [\text{BECOME } [\textit{the door is open}]]]$ . One of the reasons why Dowty proposes the decompositional account is to motivate in a straightforward way the entailment relations that hold among lexical items. To see this, consider again the main predicates in *The door was open*, *The door opened* and *John opened the door* and their respective translations in intensional logic.

There are many problems related to this analysis. I will briefly mention two. First, the formula ' $open'_t = \lambda x \lambda y [\text{CAUSE } (x, \text{BECOME } (open'_a (x)))]$ ' specifies a necessary condition for the truth of the sentence *John opened the door*. This sentence entails the logical formula as well as the sentence *John caused the door to become open*. However, the truth of this formula is not a sufficient condition for the truth of the sentence *John opened the door*, because it does not incorporate the notion of direct causation.

Second, Dowty (1976:250ff.) tries to show that the lexical decomposition of accomplishment and achievement predicates can be supported by independent evidence. Certain adverbs can be construed as having either the whole BECOME sentence or only the stative clause embedded under BECOME in their scope. This can be illustrated with the following ambiguous sentence: *The sheriff of Nottingham jailed*

*Robin Hood for four years.* Under the first or the 'external reading', the whole sentence is in the scope of the durative adverbial *for four years*: (for four years) (CAUSE (the sheriff of N) (BECOME (in jail RH))). Notice that this can be interpreted as (i) 'The sheriff of Nottingham repeatedly jailed Robin Hood during the period of four years' (iterative reading) or (ii) 'The sheriff of Nottingham spent four years bringing it about that Robin Hood was in jail'. Under the second possible interpretation, or under the 'internal reading', the durative adverbial *for four years* modifies only the result state, e.g., the embedded stative sentence *Robin hood is in jail*. This reading can be paraphrased as 'The sheriff of Nottingham brought it about that for four years Robin Hood was in jail' and represented in the following way: (CAUSE (the sheriff of N) (BECOME (for four years (in jail RH)))).

As Dowty himself observes, ambiguities illustrated by the lexical decomposition of such verbs as *to jail* do not arise with all the accomplishment verbs, but rather only with verbs that denote a resettable event. Chierchia and McConnell-Ginet (1990; 1992:359) show that data from adverbial modification do not directly support (or provide evidence against) Dowty's decompositional analysis. They point out that sentences with verbs like *clean* "intuitive judgments definitively reject internal modifier interpretations" (Chierchia and McConnell-Ginet 1990;1992:359). Consider the following two sentences:

- (31-a) *John cleaned the jacket again.*
- (31-b) *John caused the jacket to be clean again.*

Suppose that John bought the jacket which was new and in a clean state, and no one ever cleaned the jacket before John bought it. If then got dirty and John cleaned it, then it would be appropriate to say (b), but not (a). However, on Dowty's analysis both (a) and (b) should be true in this situation.

## 2.4 Classifications within Event-Based Approaches

In the past ten years or so, an approach to the classification of verbal expressions has emerged that is based on event semantics (Bach 1981, 1986a and 1986b, Saurer 1984, Parsons 1985 and 1990, Hinrichs 1985, Krifka 1986 and 1989, Pustejovsky 1988a and 1988b, and others). Various approaches within event-semantics are based on the assumption that there is a limited and small number of events, basic semantic concepts, that constitute part of lexical semantics of verbal expressions.

It is now widely recognized that event-based semantics allows us to formulate many significant linguistics generalizations that otherwise would be difficult to formulate or missed altogether.<sup>25</sup> For example, the framework of event-semantics can provide a straightforward solution to the problems related to the application of Kenny's (1963) entailments within temporal approaches. As Bach (1986:71) observes, event semantics allows us to invoke the notion of an 'individuated event'. With this notion we can capture in a straightforward way the intuition behind Kenny's entailment which characterizes accomplishments (Kenny's "performances"): If John is building a house, then *that* building of a house by John is not over, consequently, John has not yet built *the* house he is in the process of building.

The idea of viewing events as basic entities of a model goes back to Frege (1918), Whitehead (1920), Reichenbach (1947) and above all to Davidson (1967). Davidson (1967) is the first one to use the notion of explicit event quantification in the logical representation of a sentence. He proposes to represent sentences denoting events with an additional argument position for an event argument.<sup>26</sup> Ordinary *n*-

<sup>25</sup> See Parsons (1990), among others, for an extensive account of such generalizations.

<sup>26</sup> A succinct summary of Davidson's motivation for this approach and its relevance for philosophical problems can be found in Neale (1990:246): "Davidson has argued that without an ontology of events--construed as unrepeatable particulars--much of our philosophical and daily discourse is unintelligible. Philosophical discussion of causation, for example, makes sense only if we assume that causes and effects are events and that causation is a relation that holds between events. Philosophical theses such as metaphysical determinism and the identity theory of mind are, according to Davidson, best understood as theses about

place action predicates of tensed sentences are represented by  $(n+1)$ -place predicates in the first-order formal language. For example, *Mary sings* is represented as:

$$(32) \quad (\exists e)(\text{sing}'(\text{Mary}', e))$$

Verbs like 'sing' contain an additional argument place for an event (construed as a particular) and sentences like *Mary sings* are then treated as existential quantifications over events.<sup>27</sup>

Davidson's approach was adopted in linguistics by Bartsch (1972, 1975), Parsons (1980, 1985 and 1990) and Cresswell (1973) who used it to describe the semantics of adverbials. Davidson's approach was also adopted in Higginbotham (1983) and Vlach (1983), in the situation semantics of Barwise and Perry (1983), and in Carlson (1984).

### Parsons (1980, 1985 and 1990)

Parsons (1980, 1985 and 1990) extends Davidson's analysis (Davidson 1967 and 1980) to a full theory of event types. Parsons (1990:13-19) gives four arguments in support of the event-based semantics.

#### I. Entailment relations between sentences with adverbial modifiers

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events: Determinism is the thesis that every event is causally determined by antecedent events, and the identity theory is the thesis that every mental event is identical with some physical event. Moreover, Davidson argues that reference to events is built into natural language and that once we see this we can capture the logical structure of certain sentence types, in particular, *action sentences*".

<sup>27</sup> Davidson (1967; 1980:118) expresses this as follows: "For example, we would normally suppose that 'Shem kicked Shaun' consisted in two names and a two-place predicate. I suggest, though, that we think of 'kicked' as a *three*-place predicate, and that the sentence to be given in this form: (17)  $(\exists x)$  (Kicked (Shem, Shaun, x))".

Consider the following sentences:

- (33-a) *Mary sang.*
- (33-b) *Mary sang out of tune.*
- (33-c) *Mary sang in the shower.*
- (33-d) *Mary sang out of tune in the shower.*

Clearly (a) is entailed by each of (b)-(d). And (b) and (c) are both entailed by (d). Davidson suggests that we capture these logical relationships by quantifying over events. If the adverb 'out of tune' is treated as an "adjective of events" the logical form of (b) can be rendered as

- (33-b')  $(\exists e)(\text{sang}'(\text{Mary}', e) \ \& \ \text{out-of-tune}'(e)).$

The entailment can be represented in terms of first-order logic.<sup>28</sup>

## II. Complements of perceptual verbs

Sentences like *Mary saw Brutus stab Caesar* are analyzed as follows: The subject *Mary* perceives a certain event, an event described by the embedded clause *Brutus stab Caesar*. This can be paraphrased in Davidsonian way as 'There is a seeing whose subject is *Mary* and whose object is a stabbing of *Caesar* by *Brutus*.'

## III. Implicit and explicit reference to events

Implicit and explicit reference to events concerns the formal relationships between verbs and the nominal gerunds derived from them, and between adjectives and the *-ly* adverbs derived from them, as in in the following sentences:

- (34-a) *After the singing of the Marseillaise they saluted the flag.*
- (34-b) *After the Marseillaise was sung they saluted the flag.*

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<sup>28</sup> As Parsons (1990:5) observes, Davidson's theory fails to provide a *general* account. It works well for adverbials like 'in the bedroom', 'happily', but it fails for 'in a dream', 'necessarily'.



- (35-a) *They sang the Marseillaise quietly.*  
 (35-b) *The quiet singing of the Marseillaise (soothed their ears).*

According to Parsons, it is not a coincidence that such relationships exist. Within the event-based semantics we can provide a straightforward account for them by assuming that verbs and nominal gerunds, on the one hand, adjectives and *-ly* adverbs, on the other hand, contribute exactly the same predicate to the logical form.

#### IV. Explicit quantification over events

- (36-a) *In every burning, oxygen is consumed.*  
 (36-b) *Agatha burned the wood.*  
 (36-c) *Oxygen was consumed.*

Sentence (c) follows from (a) and (b). It is clear that the explicit quantification over burnings in (a) is related to (b) and (c). Hence, implicit quantification over events can be assumed if we find inferences that link it with explicit quantification over events.

#### Bach (1981, 1986)

Following Vendler (1957/1967), Kenny (1963), Mourelatos (1978/1981) and L. Carlson (1981), Bach (1981 and 1986) proposes the following trichotomy of 'eventualities': states, processes and events.<sup>29</sup>

(37)	Bach (1986)			
EVENTUALITIES	→	STATE		non-state
state	→	dynamic		static
non-state	→	PROCESS		EVENT
event	→	protracted		momentaneous

<sup>29</sup> The terminology 'states', 'processes' and 'events' is also used in Comrie (1976:13, 48-51, and passim).

momentaneous → happenings | culminations

As Carlson (1977) and Dowty (1979), Bach (1981 and 1986), distinguishes between two kinds of state predicates according to their ability to occur with the progressive: only dynamic state, but not static state predicates, can occur with the progressive.

This is illustrated with the following examples:

- (38-a)     ?Mary is being in New York.  
               ?I am knowing the answer.  
               ?John is believing that the earth is flat.  
 (38-b)     I am living in California.

All the other classes of predicates are acceptable with the progressive:

- (39-a)     John was running.  
 (39-b)     Mary was building a cabin.  
 (39-c)     Mary was finding a unicorn.

Examples of dynamic state predicates are *sit*, *stand*, *lie+LOC*. Examples of static state predicates are *be drunk*, *be in New York*, *own x*, *love x*, *resemble x*. Bach's distinction between dynamic and static states draws on Carlson's distinction (1977) between object-level and stage-level predicates. Carlson's distinction can be roughly described as a distinction between predicates that hold more or less permanently or that can be predicated atemporally of their arguments and predicates that are episodic, namely those predicates that Carlson analyzes as applying to a spatiotemporal slice of an individual.

The relevance of the distinction 'dynamic state-static state' becomes apparent in the face of Bach's characterization of the progressive aspect. Following Carlson (1977), Bach suggests that "a progressive verb phrase denotes the property of being an individual such that there is a manifestation (or realization) of that individual of which the basic predicate holds. In mereological terms we can identify the manifestation of an individual with some temporally limited proper part of the individual" (Bach 1981:78).

Non-states are subdivided into **processes** (*walk, push a cart*) and **events**. Events are **protracted** (*build x, walk to Boston*) or **momentaneous**. Momentaneous events are either **happenings** (*recognize, notice, flash once*) and **culminations** (*die, reach the top*).

There are four main features that characterize Bach's (1981 and 1986) classification. First, Bach proposes an agentivity-neutral classification. In this respect Bach's classification is to be preferred to such classifications as Dowty's, Vendler's or Kenny's which involve the notion of 'agentivity'. As Mourelatos (1978;1981) points out Vendler's and Kenny's classifications are too narrow from the linguistic point of view, because they are restricted to verbs that denote actions and events related to human agency. Linguists are concerned with all kinds of verbs, regardless of whether they denote actions or natural events, such as snowing. Therefore, a typology of situation types that does justice to the variety of verb predicates in natural languages must cover a wider ontological context than Vendler's and Kenny's typology do.

Second, Bach's categorization emphasizes the basic distinction between states and non-states. This distinction plays an important role in the organization of the grammar of natural languages. It is pervasive in traditional descriptive accounts of verb classes. However, it is deemphasized in the four-fold classification of Vendler and in Dowty's classification, in both his original and revised proposal.

Third, Bach posits one situation type 'events' (with further subdivisions) that subsumes a two-way distinction made in the accounts of Vendler (accomplishments vs. achievements) and Dowty (singulary change vs. complex change), for example. The same proposal is made by Mourelatos (1978/1981). Contrary to Vendler (1957; 1967), he argues that the behavior in the progressive is not a sufficient reason for separating accomplishments from achievements. The decisive semantic property that is shared by all the event predicates has to do with the fact that they "involve a

product, upshot, or outcome" (Mourelatos 1978:417; 1981:193). This sets them clearly apart from state and activity expressions that do not have this entailment. This is also recognized by Kenny (1963) who views Vendler's accomplishments and achievements as belonging to one category "performances" (Kenny 1963:175). However, his category "performances" is too narrow, it is restricted to events involving human agency.

Fourth, Bach's proposal is couched within event-semantics. He assumes that states, processes and events are primitive notions, rather than being analyzed in terms of time structures. On his account, time is a derivative notion (cf. Bach 1981:69-70, 75). He proposes that at least some of the properties of the situation types can be understood in terms of parallels between verbal and nominal expressions that pertain to their 'part' structure, that is, to the ways in which an entity as a whole stands in relation to its parts. This method of analysis is inspired by the theories of *mereology*, or the logic of part-whole relations.<sup>30</sup> For instance, for events like a finding of a unicorn and building of a cabin, it holds that

"no proper part of one event can be an event of the same kind. Call this property ANTISUBDIVISIBILITY. This property is clearly not shared by processes. Note that it is not correct to say that a process can always be subdivided into parts that are also processes of the same kind. The point is that sometimes processes can be so subdivided but events never can. Further if you have two distinct events of the same kind, their sum is never an event of the same kind; but if you have two or more processes of the same kind add up to one process of the same kind, you will or may have a process of the same kind: call the latter ADDITIVITY. Thus we can say that events are antisubdivisible and nonadditive; processes lack these properties" (Bach 1981:70).

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<sup>30</sup> The mereological predicate logic and calculus of individuals goes back to the Polish logician Stanislaw Leśniewski (1916 and a series of articles between 1927-1931). It was further developed in Leonard and Goodman (1940), Goodman and Quine (1947) and Grätzer (1971).

## 2.5 Parallels between the Linguistic Structuring of Space and Time: Parts and Wholes

According to the traditional linguistic view, nouns name or describe individuals or objects<sup>31</sup>, while verbs typically describe various states of affairs, or situations. We use count and mass noun phrases to individuate and identify *space*-occupying entities. The principles of individuation and identification that are operative in the domain of individuals can be extended to the domain of *time*-occupying entities, situations, denoted by various verbal expressions. The most prominent role has recently played by the mereological 'part' relation used for modeling ontological domains like time, space, or pluralities (Taylor 1977, Mourelatos 1978/1981, Bach 1981 and 1986, Hinrichs 1985, Krifka 1986 and 1992, Zucchi 1993). Nominal and verbal expressions fall into two main classes depending on the way in which an individual or a situation as a whole stands in relation to any of its parts. This is shown in the following table:

UNBOUNDED	BOUNDED	
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UNDETERMINED PLURAL AND MASS NP <i>apples</i>  <i>wine</i>	SINGULAR COUNT NP <i>an/the/one apple</i> <i>five apples</i> <i>a glass of wine</i>	
-----		
ATELIC <i>Mary drank wine</i> <i>Mary was in New York</i>  activity state  process	TELIC <i>Mary drank a glass of wine</i> <i>Mary arrived</i>  accomplishment achievement  event	(GAREY 1957)  Vendler 1957/67; Taylor 1977  Mourelatos 1978/1981,

<sup>31</sup> By 'objects' I mean ordinary objects like my pencil or people like your friend. However, the term 'objects' also includes abstract objects such as *love*. This use of the term 'object' can be found in Carlson (1977 and 1979), among others.

state		Bach 1981 and 1986b, Parsons 1985 and 1990
indefinite change	definite change	Dowty 1979
no change		

For ease of exposition the above table provides a summary of the terminology introduced so far. As is customary in the current literature, I will refer to the main distinction in the domain of verbal expressions as 'telic' and 'atelic'.<sup>32</sup> Despite their 'goal' and 'purpose' connotations, these terms are now commonly used for all kinds of verbal expressions (that have animate and inanimate, human and non-human subjects).

A number of close parallels between the linguistic structuring of space and time have been described in the linguistic and philosophic literature.<sup>33</sup> They share the assumption that spatial notions are more basic than temporal notions. This assumption is reflected in natural language expressions as well as in theories about natural language. Principles of spatial organization are of fundamental importance to human cognition (cf. Miller and Johnson-Laird 1976:375ff.). A number of natural language expressions indicate that we understand time in terms of space (see, for example, time metaphors in Lakoff and Johnson 1980, Traugott 1988, Sweetser 1990). Localism (cf. Anderson 1971, 1973, for example) is based on the assumption that spatial expressions are more basic, grammatically and semantically, than non-spatial

<sup>32</sup> The term 'telic', coined by Garey (1957), is not the most suitable term. The reason is that it is derived from the Greek word *télos* that means 'goal', 'purpose'. Garey's (1957) examples of telic verbs are those denoting goal-oriented actions with human agents. He characterizes telic verbs as follows: "... a category of verbs expressing an action tending towards a goal envisaged as realized in a perfective tense, but as contingent in an imperfective tense" (Garey 1957:106). Atelic verbs, on the other hand, do not involve any such goal or boundary in their semantic structure. They can be characterized as verbs denoting actions that "are realized as soon as they begin" (Garey 1957:106).

<sup>33</sup> See, for example, Leisi (1953), Allen (1966:197-200), Leech (1969:241, 243-44), Taylor (1977:210-211), Mourelatos (1978:425-426, 429-30), Bach (1981:67, 70, 1986: 5, 8, 24), Carlson (1981), Talmy (1978, 1985, 1986, 1988), Hinrichs (1985), Krifka (1989), Langacker (1987), Jackendoff (1987, 1990:27), Zucchi 1993, among others.

expressions. Within Localism, a variety of apparently non-spatial constructions is analyzed in terms of spatial notions. Recent research in *Cognitive Grammar* (cf. Talmy 1978, 1985, 1986, 1988; Herskovitz 1986; Lakoff 1987; Langacker 1987, 1990; and many others), and in *Conceptual Semantics* (cf. Jackendoff 1983, 1990 and 1991) advances proposals about the centrality of spatiotemporal notions in a general structural model for the semantic structure of lexical items.

Given the goals of the present study, there are two main reasons for focusing on the parallels between the linguistic structuring of space and time. The first reason is heuristic. The description of parallels between the properties of nominal and verbal expressions sheds light on those properties of verbal expressions that are notoriously elusive, namely on situation types and aspect.

The second reason concerns two related phenomena: first, the systematic contribution of nominal expressions to the telic and atelic interpretation of complex verbal predicates, and second, the systematic contribution of verbal morphemes to the meaning of nominal arguments. The verbal morphemes in question convey aspect, along with possibly further specifications of the denoted situation. They also have a derivational function and effects on the argument structure of verbs. Both phenomena can be adequately described if they are understood as a manifestation of the interplay of basic categories that cut across the syntactic distinction between nominal and verbal expressions as well as across the ontological distinction between situations and individuals. We need an explicit account of the systematic relationships between parts of objects and parts of situations.

### 2.5.1 Semantic Parallels

A count expression denotes a discrete, well-demarcated, or *bounded* entity, whereas a mass expression is *unbounded* in the sense that it does not make it explicit how its

denotation is to be individuated or divided into objects. This property of mass expressions is responsible for what Quine (1960:91) calls the property of **cumulative reference**:

"So-called *mass* terms like 'water', 'footwear', and 'red' have the semantical property of referring cumulatively: any sum of parts which are water is water" (Quine 1960:91).

In general, *any sum of parts which are P is also P* (whereby **P** stands for any mass term).

Mass noun phrases also have the property of **distributive** (divisive or divided) **reference**: *any part of something which is P is also P*. Hence, parts of the interpretation of the noun phrase expression *water* are describable by the same expression *water*.<sup>34</sup>

By contrast count expressions are neither cumulative nor distributive. First, count noun phrases are not cumulative: for example, the sum of two entities each of which is denoted by the noun phrase *a house* (or the sum of the parts constituting one house and the parts making up another house), yields a complex entity that cannot be described by the same noun phrase *a house*, but rather it is describable by a plural noun phrase like *two houses* or *houses*. Second, count noun phrases are not distributive: for example, the referent of the noun phrase *a house* does not have parts that are objects denoted by the *same* noun phrase. Greenberg (1972) relates this property of count noun phrases to the internal structure of the entities they denote: "If I cut a

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<sup>34</sup> As is suggested by Quine's (1961:91) quote, the cumulativeness property can be applied both to mass noun phrases as well as to adjectives. For example, mass predicates like *hot* are distributive: If this coffee is hot, then any sip of it will be hot, and if this ink is blue, then any drop of it will be blue, as well. On the other hand, count predicates are not necessarily distributive: if this blanket is warm, it need not be the case that every proper subpart of it is warm. Mass predicates are not only distributive, but also cumulative: If an entity is the union of parts, each of which the predicate is true of, then the predicate is true of that entity. For example, if every sip of the coffee is hot, then the whole portion of coffee is hot. Count predicates are not cumulative. A given stack of books may be heavy even though every book in it is light.



piece of meat in two, I have two pieces of meat, but if I cut a dog in two, I still have only one dog, a dead one. The property that distinguishes dogs and automobiles in these cases is evidently internal organization into an integrated and organic whole, ... We might call this feature +/-structured" (Greenberg 1972:22-23).

The same analysis in terms of part-whole relations can be also applied to verbal expressions. The analogy is easy to see: When we analyze individuals, we consider their spatial parts, when we analyze situations, we consider their temporal parts. The mereological description presupposes that we can assign verbal expressions to one of the basic situation types, whereby situations can be part of larger situations or contain other situations as their parts.

Just as mass noun phrases, like *water and gold*, identify substances without regard to any boundaries, so atelic verbal expressions, processes (*blush*) and states (*know*) denote unbounded situations. This observation can be supported by showing that atelic verbal expressions also share with mass noun phrases the properties of cumulativity and distributivity. For processes like *John drank beer*, it holds that both the main situation described by *John drank beer* and each of the situations that make it up are describable by the same atelic sentence *John drank beer* (Dowty 1991:568).<sup>35</sup> This property was already observed by Vendler (1957:67):

"... running and its kind go on in time in a homogeneous way; any part of the process is of the same nature as the whole" (Vendler 1967:101).

Similarly, states like *John was tipsy* have parts that are states denoted by the same sentence. We may then conclude that processes and states are distributive or "like-parted".

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<sup>35</sup> Cf. also Dowty (1979): "for given a particular activity verb, it seems that the same *kind* of property must be acquired for each interval of which that verb is true of an individual" (Dowty 1979:168-9).

Atelic expressions are cumulative: Take again *John drank beer* (process). Two or more situations denoted by such an atelic expression add up to one situation of the same kind. It is a situation that is describable by the same atelic expression *John drank beer*. And the same holds for states: two states, each of which is denoted by *John was tipsy*, add up to a state *John was tipsy*. To summarize, atelic expressions pass the cumulativity and distributivity test.

Count noun phrases, such as *a house*, denote clearly individuated, bounded, entities. In this respect they are comparable to telic verbal expressions, such as *build a house* and *discover a treasure*. Telic verbal expressions denote situations that involve a definite change of state, hence they are understood as having definite limits, as being bounded. Just as count noun phrases lack the distributivity and cumulativity properties, so telic verbal expressions do. In general *no* spatial area within a house is itself an area occupied by a house. Similarly, bounded situations denoted by telic sentences like *John built a house* are not distributive. That is, no proper part of a situation denoted by *John built a house* can be a situation of the same kind (cf. also Bach 1981:70, Dowty 1991:568, among others). The reason is that telic sentences like *John built a house* denote situations that have various proper parts and no proper part can be denoted by the same telic sentence (i.e., *John built a house*). This intuition about distributivity lies behind Vendler's characterization of accomplishments:

"... in case I wrote a letter in an hour, I did not write it, say, in the first quarter of that hour" (Vendler 1967:101).

Telic verbal expressions denote situations that are not cumulative: The sum of two situations of the same kind, which are denoted by a given telic expression, is never a situation of the same kind. For example, the sum of two telic situations, each of which is denoted by *John wrote the letter*, is not a telic situation describable by the same sentence *John wrote the letter*, but rather by a different telic sentence *John wrote (the) two letters* Or *John wrote (the) letters*. To summarize, atelic expressions

pass the cumulativity and distributivity test, while telic expressions fail them.

There are also parallels that concern pluralities of individuals and situations. Quine (1960:91) observed that a characteristic feature of mass noun phrases, their cumulative reference, is shared by bare plural noun phrases:

- "a. If *a* is water and *b* is water, then the sum of *a* and *b* is water.
- b. If the animals in this camp are horses, and the animals in that camp are horses, then the animals in both camps are horses" Link (1983:303).

Bare plural noun phrases denote entities that are divisible. A bunch of horses can be separated into two bunches of horses, but this division process can continue only until we reach groups of horses with a certain minimal cardinality of individuals.

In the case of nominal expressions, the plural morpheme *-s* maps a singular noun denoting a single individual (*horse*) into an expression denoting a number of such individuals (*horses*). The binary distinction between one and more-than-one individuated entity has obvious parallels in the domain of verbal expressions. A verbal expression denoting a single situation, such as *The beacon flashed* or *He sighed (once)*, is mapped into an expression denoting a number of situations of the same kind: in *The beacon flashed five times in a row* the repetition occurs a limited number of times. In *He kept sighing, He sighed and sighed* or *He was sighing* the repetition occurs an unspecified number of times. The plural morpheme *-s*, the construction with a phasal verb like *keep* or *continue*, the progressive together with a punctual verb, an iterative adverb like *five times* and the coordinated construction with the conjunction *and*, all have the same semantic value: they indicate multiplicity of a number of individuated entities. The cross-categorial distinction "uniplexity" vs. "multiplexity" is introduced by Talmy (1986, 1988:17-77) for the singular and plural in nouns (*a horse vs. horses*) and for semelfactive and iterative verbs (*He sighed vs. He kept sighing*).<sup>36</sup>

<sup>36</sup> Talmy characterizes the operation of 'multiplexing' in the following way: "By this operation, an original solo referent is, in effect, copied onto various points of space or time" (Talmy 1986:12). In a similar way as Talmy, Jackendoff (1987; 1990:29; 1991:3) describes the parallel between plural count nouns and iteration in the following way: iteration is "an operator which maps a conceptual constituent that encodes a single Event into a conceptual

Apart from iterativity, multiplicity of situations concerns habitual and distributive situations. In *The students left the room one after another* we have a distributivity. Allen (1966:198, 222) and Leech (1969:135-36, 137, 240-42, 243) observe that (present and past) habitual expressions like *He makes toys, Jane writes books, They came every afternoon, They played bridge every afternoon* are analogous to plural count nouns. The above observations can be summarized in the following table:

(40)	<b>UNIPLEXITY</b>	<b>MULTIPLEXITY</b>
	<b>singular</b> a horse	<b>plural</b> horses five horses
	<b>single event</b> The beacon flashed He sighed (once)	<b>iterativity</b> The beacon flashed five times in a row He sighed and sighed He kept sighing He was sighing
	The student left the room	<b>distributivity</b> The students left the room one after another
	He is smoking He sighed (once)	<b>habituality</b> He smokes He sighs a lot

### 2.5.2 Syntactic Parallels

**Quantification and number.** Syntactically, count nouns can occur in a determination construction with the indefinite article *a(n)*, cardinal count numerals (*three*) and with quantifiers like *each, every, either, both, many, several, (a) few* and *some*

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constituent that encodes a repeated sequence of individual Events of the same type. Brief consideration suggests that in fact this operator has exactly the same semantic value as the plural marker, which maps a conceptual constituent that encodes an individual Thing into a conceptual constituent that encodes a collection of Things of the same type. That is, this operator is not formulated specifically in terms of Events, but rather should be applicable in X-bar fashion to any conceptual entity that admits of individuation" (Jackendoff 1991:29).

(stressed). Mass nouns, on the other hand, can occur in a determination construction with *much*, *all*, *most*, *a lot of*, *an amount of*, *(a) little* and the unstressed indefinite article *some* (*any* in non-assertive contexts), for example. Mass and plural nouns also admit of expressions of comparison like *more* and *less* and of measurement with such measure expressions as *a bathtub*, *a cup*, *a heap*, *a herd*.

The grammatical distinction 'count/mass' is motivated by the semantic properties of cumulativity and distributivity. The operation of counting only applies to the domain of individuated objects. Substances like water cannot be counted, but they can be measured. They cannot be counted, because we simply do not know what to count. The reason is, as Carlson (1981:50) points out, that the parts already counted are further divisible into a number of smaller parts. Since it is difficult to individuate the relevant parts to be counted, the exact number of such parts is necessarily vague, even if there were a finite upper bound to the number of the parts of a substance that we count.

"For a given number of minimal objects that satisfy a noncountable noun, there is an exponentially related number of other overlapping objects that also satisfy the same noun, in virtue of additivity. (...) The paradox of counting the noncountable can be put in the form of a dilemma. If all objects that satisfy a noncountable noun can be counted at all, their number is worthless. Two conditions are needed for a practicable numerical estimate: (a) the objects counted should be more or less equal in relevant respects; and (b) they should exhaust the totality without overlap. In other respects, the choice of unit is immaterial. But this, in turn, is nothing other than a rough description of MEASURING a substance!" (Carlson 1981:50).

Count noun phrases and telic verbal expressions are countable, whereas mass noun phrases and atelic verbal expressions are not. This can be shown by the fact that only telic verbal expressions, but not atelic ones, can be easily modified with various quantifiers, numerals and expressions of quantity and measure. Consider the following examples:

- (41-a) *Much mud was in evidence.*
- (41-b) *(\*) Much dog was in evidence.*

- (42-a) *John slept a lot last night.*  
 (42-b) *(\* John found a unicorn a lot last night.*  
 (43-a) *Many dogs were in the yard.*  
 (43-b) *(\* Many muds were on the floor.*  
 (44-a) *John fell asleep three times during the night.*  
 (44-b) *(\* John slept three times last night. (Bach 1986:5)*

The above examples show that iterative adverbials (*three times*) and quantifiers (*a lot*) function as quantifiers over count nouns and telic situations (cf. also Bach 1981:74). Telic predications denote "those situations that can be directly or intrinsically counted" (Mourelatos 1981:209). Such data provide support for the underlying semantic parallels between nominal and verbal expressions. They clearly show that not only noun meanings but also verb meanings include the feature of 'countability' (cf. also Leech 1969:134).

Following Mourelatos (1978/1981) we may say that a telic sentence like

- (45) *He crossed himself*

entails the iterative adverbial (*at least*) *once*. This motivates the fact that it can be modified with another iterative adverbial like *three times*, for example. Mourelatos (1978/1981) suggests that all and only telic predications "include, or can admit, or imply cardinal count adverbials that refer to the situation itself, as distinct from associated occasions" (Mourelatos 1978:429; 1981:209). Leech (1969:125) illustrates the 'situation-occasion' distinction with the following ambiguous example. *He knocked on the door three times* has two interpretations: (i) there was one knock on the door on three different occasions (in the case of multiple-occasions interpretation, there is an implied 'once' assigned to the situation); (ii) there were three knocks on the door on one single occasion. Both the situation and occasion are quantified, hence we can assign one cardinal count adverbial to the occasion and another cardinal count adverbial to the situation. This can be best shown when the quantification is explicit: *He knocked on the door three times on two occasions*.

By contrast, iterative adverbials are not admissible with atelic verbal expressions, with the exception of those cases in which an atelic expression is construed as a telic one.

As a corollary, Mourelatos (1978; 1981) shows that the same co-occurrence restrictions are valid when telic and atelic expressions are paraphrased with nominalization constructions. The nominals (a gerund or a deverbative noun with suffixes like *-ion*, *-ment*, *-al*, *-ure*) preserve the countability feature of the telic predications from which they are derived.

- (46-a) *Vesuvius erupted three times.*  
 (46-b) *There were three eruptions of Vesuvius.*

"Either the occurrences are explicitly counted, or if they are not, the occurrences are nevertheless implicitly under the governance of terms that presuppose that the occurrences are countable ('a' or 'at least one')." (Mourelatos 1978:425; 1981:204)<sup>37</sup>

- (47-a) *Vesuvius erupted.*  
 (47-b) *There was (at least) one eruption of Vesuvius.*

Independently of Mourelatos (1978; 1981), Talmy (1986:11) also notices that the countability feature is preserved across the nominal and verbal domains. To telic expressions correspond nominal expressions that are count ('reification as an object') and to atelic expressions correspond mass nominal expressions ('reification as mass'). This is illustrated by the following examples:

- (48-a) *John called me. - John gave me a call.*  
 (48-b) *I was called by John. - I got a call from John.*  
 (49) *Max ran yesterday. - There was (some) running by Max yesterday.*<sup>38</sup>

<sup>37</sup> Mourelatos (1981:204, fn. 31) points out that his paraphrases bear resemblance to Davidson's (1967:81-95; 1969:216-234) logical representation of a action sentences that involve explicit event quantification.

<sup>38</sup> Examples are taken from Mourelatos (1981:204).

- (50-a) *John helped me. - John gave me some help.*  
 (50-b) *I was helped by John. - I got some help from John.*<sup>39</sup>

Quantification by means of iterative adverbials and by means of cardinal numerals does not always yield truth-conditionally equivalent sentences. The meaning difference between the following sentences illustrate this point:

- (51-a) *She promised three times.*  
 (51-b) *She made three promises.*

(a) means that there were three occasions on each of which 'she' made the same promise. The felicitous utterance of (a) requires that the speaker and the hearer share the knowledge of what 'she' promised. (This is an instance of a lexically sanctioned *definite null instantiation*, cf. Fillmore and Kay 1992.) (b), on the other hand, is most naturally interpreted as implying that there were three different promises.

Talmy (1986:11) also notices that the inverse relation of 'actionalizing' also preserves the countability feature across the verbal and nominal domains, as is shown in:

- (52) *I removed the pit from the cherry. - I pitted the cherry.*

Mourelatos (1981:210) also notices that "the duality of *many lambs* versus *much lamb* has its counterpart in the option (...) *There were many killings, there were many deaths*; or, with greater Pathos, *There was much killing, there was much dying*."<sup>40</sup>

**Measure.** Building on the parallels between verbal and nominal expressions, durative adverbials can be thought of as 'some sort of MEASURE of time' (Carlson 1981:46), "they stand to verbal expressions as amount expressions stand to nominal

<sup>39</sup> Examples are taken from Talmy (1986:11).

<sup>40</sup> This parallel is, strictly speaking, slightly flawed. The reason is that in the case of *lamb*, and other such nouns, different senses of the same noun may have different countability preferences: *lamb* can either mean a young sheep, and in this sense it is a count noun, or flesh of a young sheep used as food, and in this sense it is a mass noun. However, notice that the gerund *killing* does not have two senses, one corresponding to its count use and one corresponding to its mass use. Its countability is crucially determined by the syntactic construction in which it is used. In this respect, *killing* should not be compared to nouns like *lamb*, but rather to nouns like *cake, paper, stone* and *noise*.



expressions" (Bach 1981:74). In other words, both unbounded quantities of stuff and atelic situations (states and activities) can be individuated or measured. Stuffs are individuated in portions or containers, while atelic situations in periods of time. This spatial-temporal analogy can be represented as follows:

(53)

unbounded	bounded
<i>N</i>	<i>MEASURE (N)</i>
water	a bathtub / puddle / drop of water
sugar	a cube of sugar
timber	a stand of timber
elephants	a herd of elephants
trees	a cluster of trees
<i>S</i>	<i>FOR+NP<sub>duration</sub> (S)</i>
John was in New York.	For three days, John was in New York.
Max slept.	Max slept for an hour.
Ralph taught English.	Ralph taught English for a year.

Just as a bathtub can be full of water, so an hour can be thought of as being filled with Max's running. Just as we can 'package' or collect and thus individuate substances and individuals into containers like bathtubs or bounded groups like herds or clusters, so we can 'package' or individuate unbounded situations into portions and stretches of time (cf. Mourelatos 1978:430 and Bach 1986:11).

**Portion-excerpting or unit-excerpting.** By the operation of 'unit-excerpting' "a single instance of the specified equivalent units is taken and set in the foreground of attention" Talmy (1986:12). This operation applies to an entity with 'discrete' or 'particulate' internal organization that is "conceptualized as having breaks, or interruptions, through its composition" (Talmy 1986:15).<sup>41</sup> Talmy opposes 'discrete' quantities like those denoted by *furniture* and *breathe* to 'continuous' quantities denoted by mass nouns like *water* and process verbs like *sleep*.

<sup>41</sup> Jackendoff (1991:8) uses a feature system that contains the semantic feature "internal structure" for the same notion. He uses this feature to distinguish between individuals, such as *a pig*, and groups, such as *a committee*, only the latter are assigned the 'internal structure'

For example, we can 'excerpt' an individual, a discrete entity, from the group of entities referred to by such mass and collective nouns as *rice, timber, furniture, committee* by using a 'classifier-like' expression, as in *a grain of rice, a piece of wood, a piece of furniture* and *a member of the/a committee*. However, which 'classifier'-like expression exactly will be used, is often not predictable.

There is a parallel situation in the domain of verbal expressions. Dowty (1979:173) observes that non-homogeneous activity expressions "are always defined in terms of more primitive accomplishments/achievements" (Dowty 1979:173). For example, what the atelic (activity) verb *walk* denotes may be seen as involving two or more instances of an event denoted by the telic expression *take a step*. The same relation holds between the atelic verb *breathe* and the telic expressions *take a breath* or *breathe in/out*. However, such lexicalization patterns are not fully productive in English. For many atelic (activity) verbal expressions, such as *chuckle, giggle*, for example, there is no corresponding telic verbal expressions describing the minimal event in terms of which the atelic expressions could be defined.

(54)

<b>unbounded</b>	<b>bounded</b>
furniture	a piece of furniture
to breathe	to take a breath
	to breathe in/out

The following table provides an overview of the cross-categorical notions introduced in this section:

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feature.

(55)

**DISCRETE**

**multiplex**  
horses

He sighed and sighed  
He kept sighing  
He was sighing

timber  
furniture  
He breathed

**CONTINUOUS**

water

He slept

**UNBOUNDED**  
cumulative reference  
distributive reference

five horses  
a herd of horses  
a family

a sea  
a glass of water

**BOUNDED**

The beacon flashed five times    The tank emptied

**uniplex**  
a horse  
a piece of furniture

He sighed (once)  
He took a deep breath  
He breathed in/out

### 2.5.3 The 'Part-of' Relation and its Limits in Natural Language Semantics

It is often pointed out that the proportion 'count : mass :: telic : atelic' is complicated by two problems (at least): the problem of the smallest parts and the problem of minimal parts.<sup>42</sup> The problem of the smallest parts was first noticed by Quine (1960) who observes that the distributivity property in its unconstrained form is too strong, because it allows for the division of any stuff or substance to arbitrary small parts.

<sup>42</sup> A detailed description of mass and count noun phrases and of many problems related to the semantics of noun phrases within theories based on mereology can be found in Ojeda (1993).

However, for most substances it is false to claim that every part of a given substance is also that same substance. So for unspecific parts of water, all the inferences to arbitrary small proper parts of water may not be valid, because even water is not infinitely divisible. A collection of several molecules of water does not count as water, and each molecule of water is divisible into two hydrogen atoms and one oxygen atom that on their own do not count as water. So there are parts of water that are too small to count as water.

The second problem has to do with the identification of the relevant minimal parts of such *heterogeneous substances* as fruit-cake that consist of a number of different ingredients or parts. Such substances have parts, though not the smallest ones, that are too small to count as the stuff denoted by a given mass noun. "Division of a lump of fruit-cake will produce a lump of fruit-cake only until a sample of some minimal size is reached; a mere sultana does not in itself constitute a lump of fruit-cake, ..." (Taylor 1977:211).<sup>43</sup> In short, for a mass noun *P* denoting such heterogeneous substances, there should then be a specific minimal size that parts of its referent have in order to count as *P*.

Taylor (1977) argues that the distinction 'homogeneous-heterogeneous' has its counterpart in the domain of verbal expressions. Contrary to Vendler's (1957;1967:101) claim that all the activity expressions "go on in time in a homogeneous way" Taylor (1977) suggests that we need to distinguish between *homogeneous activity verbs*, like *fall, move, blush*, from heterogeneous activity verbs, like *chuckle, giggle, talk, walk*. Heterogeneous processes, like *chuckling*, according to Taylor (1977), are divisible only up to certain minimal subparts. For example, there are

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<sup>43</sup> However, a sultana may constitute a part of a fruitcake. Depending on its history, a given sultana may or may not be part of a fruitcake, just as, depending on its history, a glass pane, may or may not be a part of a spaceship. So a question like 'Did she eat the whole slice of fruitcake?' can be felicitously answered with 'No, there was a bit left on her place, a sultana.'

small subintervals of the time of which *x chuckles* is true that may not be times of chuckling themselves, because they are too small to count as chuckling.

However, these problems do not invalidate the insights that we gained from the part-whole analysis of situations and individuals. Few substances, if any, are homogeneous through and through. Nonetheless, from the point of view of the semantic theories of natural language it seems perfectly reasonable to assume that substances like gold and water are homogeneous, even though they are not infinitely divisible. In order to understand natural language expressions like *gold* and *water*, we do need to know what their smallest parts are and as far as natural language is concerned, any part of something which is gold is also gold. Questions regarding the smallest parts are relevant and coherent within the physical theories. However, even if such theories could identify the smallest parts of matter, such 'expert knowledge' would hardly have any relevance to the semantic theories of natural language (cf. Nagel 1987, Chapter 5).

As far as the minimal parts hypothesis and the heterogeneity property is concerned, it is reasonable to reject its relevance to the semantics of mass nouns (cf. Bunt 1979:255 and 1985:45) and also to the semantics of atelic verb expressions. There are no crucial grammatical facts that would hinge on it. It has also been observed that such questions as 'What is a minimal part of *warm water*?' or 'What is a minimal part of *dirty water*?' do not even make any sense. There is no such thing as an atom or a molecule of warm water; a single atom or molecule of water cannot be in itself warm, because warmth is an emergent property that is caused by molecular movement (cf. ter Meulen 1984).

In sum, natural language semantics involves a coarser part structure than physical theories do, a part structure that involves a notion of relevant or contextually determined proper part. Therefore, it is justified to assume that as far as the semantic theories of natural language are concerned, the notion of divisibility is not to be taken

in the strict sense as entailing that every part of a given substance is also that same substance.

Related to the issues discussed in the preceding paragraphs is the problem of individuation and reidentification of objects and events. To individuate means to mark off one referent of a count expression from another. Bach (1986:15) observes that we have no ready answers to such questions as 'How many things are there in the room?' and 'How many events took place in the last hour?' A situation of building a cabin, for example, consists of a variety of situations, drawing up the plans, hammering and pounding in nails, sawing wood, and the like. There is often vagueness about the exact number of such situations that is due to the difficulties in their individuation. Even if we were able to individuate the situations that constitute a building situation and determine their number, how would it contribute to our understanding of the global properties of the building situation? We need not answer the questions above, for "[i]t is not part of linguistics to decide whether all matter is atomic or all happenings are reducible to little granules of process" (Bach 1981:15). Our linguistic inquiry into ontological facts concerns only those ontological presuppositions that can be found in our understanding of the world as it is reflected in linguistic categories. In short, "our guide in ontological matters has to be language itself" (Link 1983:303ff.).

## **2.6 Problems for Classifications into Situation Types**

### **2.6.1 The Scope of the Classification**

In this chapter it has been proposed that verbs be classified into different situation types on the basis of their inherent lexical semantic properties. This approach is subject to two main objections. First, different speakers may have different expectations about the way situations obtain or evolve in time. The classification has more to do

with our common sense beliefs and expectations about various states of affairs, with our "real world knowledge", than with linguistic categories. As a result, the classification is "fuzzy", because the criteria on which it is based are subject to "differing expectations about the way changes will happen over time" (cf. Dowty 1979:185). This concerns such notions as 'single change of state', 'complex change of state', 'homogeneity', for example. Dowty (1979:185) concludes that it is "not a categorization of verbs, it is not a categorization of sentences, but rather of the propositions conveyed by utterances, given particular background assumptions by speaker and/or hearer about the nature of the situations under discussion".

Second, the association of a situation type with a given verb is not stable, a number of verbs seem to 'shift' from their basic situation type to another depending on the context in which they are used. The second objection has to do with the fact that the membership of a sentence in one of the situation type classes cannot always be viewed as a projection of the lexical properties of its lexical head.

The assignment of a specific situation type to a verbal predicator is not invalidated by such objections. The first objection can be discarded on the following grounds. It is widely accepted that it is at the lexical level at which the knowledge of the world and knowledge of a language tie up (cf. Putnam 1978, Dowty 1979; Partee 1980). This position in semantics has been most fruitfully explored by researchers whose work builds on the frame semantic approach of Fillmore. Within frame semantics, words are taken as representing categorizations of experience, and consequently, their meanings are relativized to conceptual scenes or frames (cf. Fillmore 1977a:59). Frame semantics, along with the framework of Construction Grammar<sup>44</sup> with which it is closely connected, applies this tenet not only to words, but it also emphasizes the continuities between language and experience for form-meaning

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<sup>44</sup> Cf. Fillmore 1986a, Fillmore 1986b, Fillmore 1988, Fillmore, Kay, and O'Connor 1988, Kay 1988, Lakoff 1986, Lambrecht 1986, Fillmore and Kay 1992).

pairings at the structural level and that are larger than individual words. Frame semantics poses such general questions as, 'What categories of experience are encoded by the members of this speech community through the linguistic choices that they make when they talk?' (Fillmore 1982b:111).

Related to the first objection is the common confusion as to what entities the typology of verbal expressions is to be applied: is it to be applied to particular situations or to their linguistic representations? The assumption that classifications, such as those proposed by Ryle, Vendler and Kenny, concern our common sense beliefs, our "real world knowledge", rather than linguistic categories, might lead us to proposing that such classifications directly concern particular situation occurrences. However, such a proposal is problematic in many respects and must be rejected. For example, it allows for the misconception that there is a certain *unique* way in which the world is structured which our language categories conveniently pick out. On this view, the world has *exactly* the structural properties that that we attribute to it when we use our linguistic representation. This view also allows for the misconception that the fact that we distinguish between different kinds of verbal expressions on the basis of the different kinds of situations they denote is dictated by the way the world is structured.

Following Searle's (1993) "external realism" stance, it is assumed that there is more than one way the world is independently of our linguistic (or any other) representations of it. The world has all the structure that we attribute to it when we use our particular conceptual scheme (e.g., natural language, for example). Of course, the world has more structure than we are able to pick out with our linguistic categories. This structure exists quite independently of the fact whether we attribute certain structural properties to the world. There may be other conceptual schemes, apart from natural language, we could use that would allow us to pick out a different sort of structure in the world.



The linguistic scheme itself provides us with a wealth of categories, or particular shared "knowledge structures", which enable us to convey information about the world. A particular situation we experience may be categorized in many different ways. For example, if we see John giving Mary a book and Mary giving John a five dollar bill, many different kinds of situation may be going on: the five dollar bill that is changing hands can be a price for the book, a bribe, a tip, and even a ransom in some contrived situations. As Fillmore (1976b:28 and elsewhere) points out, each of these words is understood as naming a quantity of money that changes ownership in one kind of situation, but it simultaneously locates that situation within a larger history about which a number of details are known. The word 'price' links together a money transfer scene with a commercial transaction scene. Understanding this word requires also knowing the commercial transaction scene. Furthermore, a commercial transaction scene may be described from the point of view of John's selling of a book to Mary or as Mary's buying a book from John. Consequently, the Agent semantic role can be assigned to either the seller (John) or the buyer (Mary).

Similarly, listening to Mary's singing, we may answer the question *What is she doing?* by using either (a) or (b):

(56-a) *Mary is singing.*

(56-b) *Mary is singing the anthem of Togo.*

These two sentences differ from each other in so far as (b) is most likely understood in such a way that if Mary has started singing the anthem from its beginning and if she continues singing, she may eventually finish singing the whole anthem. The temporal linear dimension inherent in the object of performance (anthem) as it is realized in time delimits the denoted event. Hence, (b) describes a telic situation. Such situations can be thought of as completed, expressed in perfective aspect, or incomplete, expressed in the progressive aspect, as in (b). By contrast, it does not make sense to talk about completion in the case of situation types expressed by such sentences as (a) that abstract away from a particular performance object.

Notice that the same point that we made with respect to situation types and verbal expressions can be made with respect to individuals and NPs: we may point to a piece of gold and felicitously assert *This is gold* using a mass NP, or *This is a nugget*, using a count NP (cf. Dahl 1981:83).

To conclude, what we classify are linguistic expressions. The fact that we distinguish between different kinds of situation is an artifact of our linguistic scheme that allows us to convey information about certain aspects of the structure of the world. The distinctions that underlie the proposed typology of situation types are linguistically significant and valid due to their systematic reflexes in the grammar of natural languages. That is, we discover the relevant classes by observing their syntactic effects.

### 2.6.2 'Shifts' between Classes of Verbal Expressions

Although Vendler's (1957; 1967) intention seems to be to classify primarily individual verbs into *states*, *processes*, *accomplishments* and *achievements*, further developments of his classification have shown that the distinctions on which his categories are based concern verbs, verb phrases and clauses. Second, in many cases the relevant distinctions do not arise solely from the inherent semantic properties of verbs. Often a given verb, independently of the sentence in which it occurs, and the whole clause are each assigned to a different situation type. For example, atelic predicates are understood as telic if they occur as complements of phasal verbs like *finish* or *stop*. On their own, *look at* and *look for* are atelic predicates, but they can be used as telic predicates in the following contexts (cf. Dowty 1979:61):

- (57-a) *I haven't finished looking at your term paper yet, but I'll try to finish it tonight so we can discuss it tomorrow.*

If a library has an established search procedure for books involving a definite number of prescribed steps, then we can say

(57-b) *The librarian finished looking for 'Moby Dick', but he did not find it.*

The membership of verb phrases and clauses in one of the situation types cannot be always viewed as a projection of the inherent lexical semantic properties of their head verbs. The relevant distinctions that motivate predicate classification into situation types are encoded not only in the lexical semantics of individual verbs, but they are also subject to the sentence-internal linguistic context, discourse-level linguistic context and the context of the utterance (cf. Comrie 1976:45-6, Dowty 1979:185, for example). From this it follows that such distinctions cannot be made in the lexicon of a language once and for all.

At the same time, it must be emphasized that many such 'shifts' of situation type are systematic and predictable from the basic meaning of a verb and the context in which it occurs. Parallel systematic shifts from count to mass, and vice versa, can be found in the domain of nominal expressions. Building on the parallels between the linguistic structuring of space and time discussed in section 2.5 above, let us first have a brief look at the 'shifts' in the domain of nominal expressions.

**Universal Grinder.** Almost all the nouns that are classified as count nouns, can be given a mass sense (David Lewis's *Universal Grinder*, cf. Pelletier 1975; 1979<sup>45</sup>). Often, it is the material which constitutes the bounded entity. This is illustrated by

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<sup>45</sup> This paper was first published as "Non-singular Reference: Some Preliminaries." In: *Philosophia*, 5, (1975). It was reprinted in Pelletier F. J. (Ed.) 1979:1-24. Taking up a suggestion by David Lewis, Pelletier (1975; 1979) proposes a "Universal Grinder" into which any object denoted by a count noun can be fed. Universal Grinder machinery "allows it to chop up any object not matter how large, no matter how small, no matter how soft, no matter how hard" (Pelletier 1979:6) into a homogeneous mass, which is then appropriately denoted by the same noun used as a mass noun. For nouns which do not have physical objects in their extension, and which are "ungrindable, because there is nothing to grind", it is only necessary that a normal sentence use the word in a mass sense (cf. Pelletier 1979:6).

the following sentences:

- (57-a) *Much missionary was eaten at the festival.*<sup>46</sup>  
 (57-b) *I like stuffed missionary, said the cannibal.*  
 (57-c) *Give me some more pillow.*<sup>47</sup>

In English, a mass interpretation can be superimposed over (what is inherently) a count noun in constructions with the indefinite article *some*, the amount expression *much* and in constructions in which a singular count noun occurs without a determiner as the only element of a maximal noun phrase.<sup>48</sup>

However, in some cases the expected 'shift' does not occur. Certain nouns always entail that their referents are countable and this property cannot be overridden by a construction that requires the mass sense. Such nouns cannot be treated as mass nouns: *\*Would you care for some more pea?* (cf. Fillmore 1989:49). Such examples are admittedly few, nonetheless, they suggest that we cannot simply claim that "every noun must have (perhaps hidden) both a count and a mass sense" (Pelletier 1979:5ff.). The use of the noun *cat* as a mass noun is possible only in a restricted set of sentential constructions: *There was cat all over the driveway.* Example due to Ronald Langacker, cf. Fillmore (1989:48). *\*I saw cat all over the driveway.* "It is true that there may be constraints on the location of such noun phrases within sentence structure, and restrictions on the inclusion of other noun phrase constituents" (Allan 1980:547)

**Universal Packager.** Almost every noun which would normally be classified as a mass noun can be given a count sense: a kind or a conventional portion (*Universal Packager*, cf. Pelletier 1975; 1979):

- (58-a) *There are several German beers available.* [= kinds of beer]

<sup>46</sup> Bach (1981:10).

<sup>47</sup> Example due to Uriel Weinreich, cf. Fillmore 1989:48.

<sup>48</sup> Even proper names can behave like mass nouns: *More Mexico for less, Never has so much Mexico been offered for so little.*

(58-b) *After two beers he's incoherent* [= portion]

A mass noun is used as a count noun in a determination construction with the numeral (here *several* and *two*) and with the plural suffix. When we use a sentence containing a bare plural noun like *beers*, it is elliptical for something like *kinds of beer* or *bottles of beer*.<sup>49</sup>

The Universal Grinder and the Universal Packager have their counterparts in the domain of verbal expressions. Almost any atelic verb, verb phrase or clause can have a telic sense, provided it occurs in an appropriate context. Dowty, for example, observes, "I have not been able to find a single activity verb which cannot have an accomplishment sense in at least some special context" (Dowty 1979:61). And vice versa, telic verbs, verb phrases or clauses can be given an atelic sense. Some of the most frequently discussed sentence internal situation type 'shifters' are given in the following list:

- (1) the nature of the verb's arguments;
- (2) various modifying adjuncts (temporal and directional adverbial phrases, secondary predicates);
- (3) aspect (progressive);
- (4) complement of phasal verbs;
- (5) mood (imperative).<sup>50</sup>

<sup>49</sup> The use of a mass noun as a count noun seems to be restricted to foodstuffs (cf. Fillmore and Kay, 1992:3.29, ms). For example, given an appropriate setting (such as a customer in a restaurant to his waitress), it is clear that such questions as 'How many beers are in your kitchen?' can have an answer 'Three oatmeals.' Here, the mass noun accepts both pluralization and a numeral. The sense of *oatmeal* is changed and what we understand are some such phrases as 'kinds of' or 'bottles of', etc. That is, the sentence can either refer to a number of portions or to a number of different kinds of beer.

<sup>50</sup> This list partially overlaps with the list given in Mourelatos (1979:199): "(a) the verb's inherent meaning; (b) the nature of the verb's arguments, that is, of the subject and of the object(s), if any; (c) adverbials, if any; (d) aspect; (e) tense as phase (e.g., perfect); (f) tense as time reference to past, present, or future".

State predications acquire a telic sense in imperative constructions: *Please understand (get the point) that I am only trying to help you!* (Mourelatos 1981:196); *Know the answer to every question - just read my book, The Guide to All Knowledge, on sale everywhere* (Binnick 1991:174).

In what follows I will address the first three.

**Nominal arguments and the telic-atelic distinction.** Verb's arguments, the subject and object(s), determine the telic or atelic interpretation of the complex verbal predicate.<sup>51</sup> The first systematic analyses of this phenomenon can be found in Verkuyl (1972:54-61 and in many of his papers between 1972 and 1987) and Dowty (1972 and 1979). Dowty (1979) observes that "[i]f a sentence with an achievement verb contains a mass noun phrase or a bare plural noun phrase (or if a sentence with an accomplishment verb contains such a noun phrase as object), then it behaves like a sentence with an activity verb" (Dowty 1979:63). This is illustrated by the following examples (from Dowty 1979:62-3 and Bach 1981:74):

- (59-a) *John ate the bag of popcorn in an hour.*
- (59-b) *\*John ate popcorn in an hour.*
- (60-a) *John ate apples.*
- (60-b) *John ate the apples.*
- (61-a) *\*John discovered the buried treasure in his yard for six weeks*
- (61-b) *John discovered crabgrass in his yard / fleas on his dog for six weeks.*
- (61-c) *(\* John discovered two fleas on his dog for six weeks.*
- (62-a) *?Mary found a unicorn for 3 hours.*
- (62-b) *Mary found unicorns for 3 hours.*

The subject noun phrase has the same effect on the situation type of the complex verbal predicate:

- (63-a) *Beer was drunk all day.*
- (63-b) *??A glass of beer was drunk all day.<sup>52</sup>*

<sup>51</sup> Cf. for example, Garey 1957, Gruber 1965, Allen 1966:192-204, Leech 1969:125-126 and 134-137; Leech calls this phenomenon "semantic concord", Gabbay and Moravcsik 1973:523; Bolinger 1975:247, cf. Table 6-2, and 152-153; Mourelatos 1978; Platzack 1979; Hoepelman and Rohrer 1980; Carlson 1981; Hinrichs 1985; Krifka 1986; Jackendoff 1987; Tenny 1987; among many others.

<sup>52</sup> Examples taken from Sanfilippo (1990:87). Whereby "??" indicates incompatibility under a single event interpretation.

In the above examples, undetermined mass noun phrases (*popcorn, crabgrass, beer*) and undetermined plural noun phrases (*apples, fleas*) are correlated with an atelic interpretation of sentences. The singular count noun phrase (*the buried treasure*), measure construction (*a glass of beer, the bag of popcorn*) and the definite plural noun phrase (*the apples*) are correlated with a telic interpretation.

In the above examples, the situation type of a given complex verbal predicate or a clause can be calculated by compositional rules. Their meaning is derived in a systematic way by applying compositional semantic rules to independently motivated syntactic structures.

**Locative adverbial phrases.** While a sentence like (a) is an atelic sentence, the addition of locative adverbial phrases, source, goal or extent, yields a telic sentence:

- (64-a)     *John walked.*  
 (64-b)     *John walked out of the room / to the park / across the desert.*  
 (64-b')    *John walked a mile.*  
 (64-b'')   *John flew over a sea (in an hour / ?for an hour).*

If the Path covers a definite quantity of space, the whole predicate has a telic reading. For example, *out of the room, to the park, a mile, across the desert, over a sea* express a bounded Path. By contrast, *toward the house, down the road, over water, for miles and miles* express an unbounded Path. The PPs indicating unbounded Paths give rise to the atelic interpretation of the whole sentence, as is shown in:

- (64-c)     *John walked toward the house / down the road / for miles and miles.*  
 (64-c')    *John flew over water for an hour / ?in an hour.*

The above examples show that the telic or atelic interpretation of verb phrases depends on the nature of the optional prepositional phrase that modifies them: a prepositional phrase expressing a bounded Path gives rise to a telic interpretation and a prepositional phrase expressing an unbounded Path to an atelic one. Hence, the situation type of a given verbal predicate or a clause can be calculated from the meaning of its parts by compositional rules.

However, this is not the case in the following examples of situation 'shift':

- (65-a) *Willy wiggled/danced/spun/bounced/jumped.*  
 (65-b) *Willy wiggled/danced/spun/bounced/jumped into Harriet's arms.*<sup>53</sup>

Each of the simple intransitive verbs in (a) denotes a particular manner of motion. They are associated with the atelic (*wiggle, dance, spin*) or telic (*bounce, jump*) situation type (under a single situation interpretation). The Goal phrase *into Harriet's arms* introduces a bounded Path into (b). Hence, they are telic. Notice that the verbs on their do not imply that their Agent participant traversed a Path. The (b) sentences can be paraphrased as follows:

- (65-b') *Willy went/got into Harriet's arms by wiggling/dancing/spinning/bouncing/jumping.*

Since the above sentences contain a simple (non-progressive) head verb, they entail that the Agent traversed the whole extent of the Path.

The basic insight that needs to be captured is that the bounded spatial extent of the Path is here directly correlated with the bounded temporal extent of the whole event denoted by (b) sentences. This 'shift' in the situation type and boundedness is reflected in the different behavior with durative *for*-PPs and time-span *in*-PPs:

- (66-a) *Willy danced ? in a minute / for a minute.*<sup>54</sup>  
 (66-b) *Willy danced into Harriet's arms in a minute / ? for a minute.*

**Resultative adjuncts.** Adjectives functioning as secondary predicates that express a resultant state of the referent expressed by a direct object induce 'atelic → telic shift', as is shown in:

- (67-a) *John hammered the metal.*  
 (67-b) *John hammered the metal flat / smooth / shiny.* Dowty (1979:219)

<sup>53</sup> Examples are taken from Jackendoff (1990:223).

<sup>54</sup> The question mark indicates that we disregard the interpretation which in (a) *in a minute* is interpreted as 'after a minute.'



Resultative and goal phrases make the same contribution to the structure of situations: they delimit them. This seems to motivate the observation that resultative and goal phrases do not co-occur. Consider the following sentence:

- (68-a)     \**John walked his feet sore to Richmond.*  
 (68-b)     \**She kicked the bucket flat out of her way.*  
 (68-c)     \**Harry laughed himself silly into Harriet's arms.*

This sentence is not well-formed because the spatial terminus denoted by *to Richmond* and the end-point on the scale associated with the property denoted by the resultative adjunct compete for the delimitation of the situation. Following Bach (1981:74) we may explain this by evoking an analogy with the count-mass distinction. Resultative and goal phrases stand to verbal expressions as measure expressions do to nominal expressions. We do not usually use measure expressions, such as *3 pounds of*, with singular count nouns, such as *a horse*, that denote clearly demarcated individuals: \**3 pounds of a horse*. Similarly, we do not use a delimiting expression, such as *to Richmond*, to delimit a situation that is bounded, such as *John walked his feet sore*. Generally, if we assume that the entities denoted by NPs are schematized as one-, two- or three-dimensional entities, as spatial points, regions or volumes, then a region is bound by only one line and a volume by only one surface. Similarly, there is only one delimitation that characterizes a telic situation, only one well-defined goal or limit.

**Temporal adjuncts.** Telic predicates take temporal prepositional phrases with the time-span *in*, while atelic predicates can be modified with durative *for*-phrases. In those cases in which a given predicate can be interpreted as telic or atelic, the temporal prepositional phrase decides on the interpretation. This is illustrated by the following examples:

- (69-a) *The insect crawled through the tube for hours/in two hours' time.*  
 (69-b) *He read a book for/in an hour.*  
 (69-c) *She combed her hair for/in five minutes.*  
 (69-d) *Lynn made cookies/soup/dinner for/in forty minutes.*<sup>55</sup>

With verbs like *read*, *comb* and with fixed phrases like *make cookies/soup/dinner* it is not the nature of nominal arguments that determines the situation type of the whole verbal expression, but rather the temporal adverbial PP. Such verbs and verb phrases cannot be easily categorized as belonging to one of the situation types. Such verbs are best treated as underspecified with respect to the situation type. Take *Minnie combed her hair*, for example. It can be given an atelic construal in the following context: *Absent-mindedly gazing at herself in the mirror Minnie combed her hair for a while*. It may be interpreted as a telic sentence, if Minnie follows a certain hair-combing procedure that involves a number of successive steps: *Minnie combed her hair in ten minutes*. It is not all that clear how we could empirically justify which of the two possible construals is more basic. Therefore, such verbs as *comb* are best left underspecified with respect to the situation type.

In the nominal domain, the underspecification solution is motivated for such nouns with a double-life as *cake*, *stone*, *cork*. They are equally well established in both bounded (count) and unbounded (mass) constructions. The decision to leave the situation type for such verbs as *comb* indeterminate would not affect the claim that the lexical head and the minimal saturated clause share the same situation type value. In this case, the lexical head and the minimal saturated sentence share the same indeterminate situation type value.

In many cases the meaning of a complex verbal predicate and its situation type is not a simple function of its component parts. Take, for example, a telic predicate in the scope of a durative *for*-phrase. Generally, a durative *for*-phrase takes scope over

<sup>55</sup> Example (a) is taken from Declerck (1979:768ff.), (b) and (c) are due to Fillmore (1971) (quoted in Dowty 1979:61) and (d) is taken from Fillmore and Kay (1992).

an atelic predicate. A telic predicate can be accommodated within its scope provided it is interpreted as atelic (process) or if it has an iterative interpretation. The atelic construal of a telic predicate is shown in the following example:

(70) *Mary played the same waltz for an hour.*

It can be understood as follows: there was some playing of the waltz by Mary and it lasted for an hour.

The most likely interpretation of the following sentences (cf. Dowty 1979:173, and Vlach 1981:281-2) with telic predicates is iterative:

(71-a) *Max won for a year.*

(71-b) *John rode the bus to work for three years.*

Here the 'shift' concerns a mapping from a single telic situation into a number of telic situations of the same kind. In (b) it is the series of bus rides to work which continued for a three year period. What is interesting about this case is the fact that *John rode the bus to work* on its own is a telic sentence that does not entail any iteration. The iterative interpretation is not entailed by the durative prepositional phrase *for three years*. In short, there is no lexical item in *John rode the bus to work for three years* that *by itself* contributes the meaning of iteration to the meaning of the whole sentence. The meaning of such a sentence is not a simple function of its component parts, for a distinct semantic property, iterativity, emerges when a telic sentence like *John rode the bus to work* and the durative adverbial phrase *for three years* are combined. Such data seem to pose problems to purely compositional accounts. What principles of interpretation license the iterative interpretation? How do we describe them?

Time-span *in*-phrases may induce a 'shift' in meaning from an atelic situation to a telic one, if an appropriate context is provided. Consider the following examples:

(72-a) *Pat built houses for six months.*

(72-b) *(\*)Pat built houses in six months.*

As Fillmore and Kay (1993) observe, b. is acceptable under a special construal: *When he was younger and had more energy, Pat built houses in six months. Now each house takes him a year.* The time period *in six months* here indicates the duration of building of one individual house. *Pat built houses in six months* is semantically well-formed if it has a habitual interpretation, meaning that there was an unspecified, and sufficiently large, number building events, each of which was associated with a different house, and the construction of each house took six months. Such examples show that it is not simply the nature of nominal arguments that determines the situation type of the complex verbal predicate, but rather, in this case, a combination of the time-span *in*-phrase together with the unbounded, bare plural, DO noun phrase.

A similar case is illustrated by the following examples:

(73-a) *John swam today.*

(73-b) *Today John swam in an hour.* [i.e., John swam a certain distance.]

In (a) *John swam* is atelic. *John swam* has a telic reading in the construction with the temporal *in*-PP, as in (b). In this context, the verb *swam* on its own is understood to mean 'swim a certain set distance'. Although such a construal is rather marginal, it is sanctioned, provided that the set distance is clearly recoverable from the context.<sup>56</sup>

<sup>56</sup> Dowty (1979:61), for example, suggests that the sentence *Today John swam in an hour* is felicitous in the following situation: "if I know (and the addressee knows) that John is in the habit of swimming a specific distance every day (...), then I can assert that today John swam in an hour, or that he finished swimming early, or that on Tuesday he stopped, but did not finish swimming" (Dowty 1979:61). Another example of this kind can be found in Comrie (1976:45-6): "a singing class where each of the pupils is required to sing a certain passage; then the verb *sing* on its own, in this context, may be taken to mean 'sing the set passage'; so that from *John is singing* it will not follow that *John has sung*" Comrie (1976:46). In this context, the following conjoined sentences have a telic reading: *John has already sung, now Harry will sing.* Hence, not only the sentence-internal linguistic context, but also the discourse-level linguistic context and the context of the utterance can enforce a telic interpretation of a sentence that would otherwise have a process interpretation.

However, it is not always possible to find a suitable accommodation strategy that would resolve the clash between the combination of 'V + an unbounded NP' and a bounded time-span *in*-phrase, as is shown by the following ungrammatical sentence:

(74) \**John ate popcorn in an hour.*

Iterative and frequency adverbials behave like quantifiers over telic predicates (cf. Bach 1981:74). Atelic predicates are acceptable in the scope of such quantifiers, if they can be assigned a telic interpretation. This construal is highly dependent on the context of use. For example, the following combination of an atelic sentence in the scope of the cardinal count adverbial (*three times*) is well-formed if the atelic sentence *He pushed the cart* can be taken to mean *He pushed the cart out of his way three times, He pushed the cart over the hill three times, or He started pushing the cart three times*, for example (cf. Mourelatos 1981:207).

(75-a) *He pushed the cart three times.*

And similarly, the following sentence

(75-b) *Sometimes Bill ran*

is acceptable if it entails that there were several occasions on which Bill started to run, ran, and stopped.

State predicates can also occur with iterative and frequency adverbials, provided they refer to some 'bounded portion' of the denoted state:

(76-a) *John hated liars three times in his life.*

(76-b) *John was in New York twice.*

Certain state verbs like *know* and *understand* can be given a telic sense in the context of temporal adverbial phrases like *suddenly, once, at that moment*:

(77-a) *And then suddenly I knew!* ("insight sense")

(77-b) *Once Lisa understood (grasped) what Henry's intentions were, she lost all interest in him.*<sup>57</sup>

<sup>57</sup> Examples taken from Mourelatos (1981:196).

(77-c) *At that moment I knew the answer.*<sup>58</sup>

The above examples focus on the beginning on the stative situation denoted by the basic meaning of the verbs *know* and *understand*. They have an ingressive meaning.

It seems that the atelic-to-telic 'shift' requires more work on the part of the interpreter than the 'shift' in the opposite direction. Interestingly, this asymmetry has its parallel in the domain of nominal expressions, as well. Bach (1986:11) notices that if we derive a non-count meaning from a count meaning, the meaning change is regular and predictable. In *There is apple in the salad*, the mass term *apple* refers to the stuff apples consist of (cf. also *(smell of) onion*, *(taste of) apple*, *much lamb*). On the other hand, if we derive a count meaning from a non-count meaning, the meaning change seems to be less systematic. For example, *a beer* may be a serving of beer or a kind of beer. Similarly, in the verbal domain, when "we put a process expression into a count context, we must come up with some kind of corresponding event, but just what it is is relatively free, perhaps the beginning of the process in question, or some bounded portion of it" (Bach 1986:11).

**Progressive.** The English progressive is found in its primary function, namely that of indicating an 'on-going process' or a contingent situation (cf. Comrie 1976:38), only with episodic predicates. Following Carlson (1977) and Bach (1981:78), I assume that the progressive operator can have a state predicate in its scope, if the predicate has an episodic sense (Bach's "temporary" or "dynamic states"); that is, if it describes or can be construed as describing a temporary changeable property of the manifestations of individuals over some limited length of time. With state predicates that do not allow for such an episodic interpretation (cf. Bach's "static states") the progressive is anomalous or it is used with marked interpretations. (This is not surprising given that aspectual categories tend to be neutralized or develop special

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<sup>58</sup> Example taken from Mittwoch (1990:81).

functions with such stative verbs.) The following examples illustrate this point:

- (78-a) *I am hoping, intending.*<sup>59</sup>
- (78-b) *John is knowing all the answers to test questions more and more often.*<sup>60</sup>
- (78-c) *Sue is believing in God ever more strongly.*<sup>61</sup>
- (78-d) *I'm understanding you but I'm not believing you.*<sup>62</sup>
- (78-e) *I am understanding more about quantum mechanics as each day goes by.*

In the last example, "the reference is not to an unchanging state of comprehension, the degree of comprehension being the same from one time-point to another, but rather of a change in the degree of understanding: on any given day, I understood more about quantum mechanics than on any previous day. Thus the verb *understand* here refers not to a state, but to a developing process, whose individual phases are essentially different from one another" (Comrie 1976:36-7).

Most stative verbs can be used with special interpretations within the scope of the progressive operator (cf. Bach 1981:77). The only exceptions are certain syntagmas with the verb *be*: *\*Mary is being drunk*, *\*Mary is being asleep*, and *be* when it combines with a locative prepositional phrase, as in *\*Mary is being in New York*.

The 'shifts' described in this section share the following characteristics: the verb, independently of the clause in which it occurs, and the clause are each assigned to a different situation type. To put it differently, the membership of a clause in one of the situation type classes cannot be viewed as a projection of the lexical properties of its lexical head. Does the existence of 'shifts' force us to abandon the assumption that individual verbs are classified into different situation types on the basis of their inherent lexical semantic properties? Or should we view such 'shifts' as merely exceptional uses of certain verbs in special contexts?

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<sup>59</sup> Kenny (1963:175).

<sup>60</sup> Binnick (1991:173).

<sup>61</sup> Binnick (1991:173).

<sup>62</sup> Bach (1981:77).

The shifts between count and mass nouns do not force to the assumption that the lexical distinction between mass and count nouns should be abandoned. Rather, the nouns are viewed as having the potential to be used either as count or mass nouns. They manifest different degrees of individuation and can be ordered on an individuation scale (cf. Ross 1973).

If we abandoned the classification of verbs into the situation types, we would miss the fact that such 'shifts' are to a large extent systematic and predictable on the basis of the inherent lexical meaning of a verb, on the one hand, and the meaning of contextual factors that induce the 'shift', on the other hand. A systematic account of such 'shifts' presupposes that we can determine what the basic inherent lexical meaning and the situation type of a verb is, what meaning is associated with the construction in which it occurs, and how the inherent lexical meaning of a verb is integrated with the constructional meaning. I assume that situation types are associated with lexical predicators, mainly with verbs and adjectives. They represent a part of the lexical meaning of such predicators. Situation types are also associated with clauses, or better with propositions conveyed by utterances against a particular background of assumptions by the speaker and hearer about the denoted situations.

The assumption that individual verbs are classified into different situation types on the basis of their inherent lexical semantic properties is supported by the fact that in many cases the expected 'shift' does not occur. Certain verbal predicates are always associated with a given situation type and they cannot be integrated with the meaning of a construction that requires a verbal predicate of a different situation type. To illustrate this point consider the following progressive sentence

(79)        \**Max is being in the garden.*

Syntagmas like *be+LOC*, *be asleep* never occur in the progressive.

To give another example, take predicators like *find* that denote punctual events, as in



(80-a) *I found a penny on the street.*

They are not compatible with durative adverbials, such as *for a while*:

(80-b) *?I found a penny for a while*

Punctual predicators can be combined with durative adverbials if the whole sentence in which they occur has an iterative interpretation (in which case we may prefer to say something like *I found pennies for a while*).

In English the meaning 'shift' from the atelic to telic interpretation, and vice versa, is not morphologically marked on the verb forms involved. It is enforced by some properties of the linguistic or extra-linguistic context. What type of rule licenses such 'shifts'? Is it a lexical or some extralexical rule? How do we account for those cases in which the situation type of a given complex verbal predicate or a sentence can be calculated from the meaning of its parts by compositional rules? How do we account for those cases in which the situation type of a complex verbal predicate or a sentence is not a simple function of its component parts?

## 2.7 Conclusion

The study of situation types has its origins in the philosophy of action. In this Chapter, I discussed their application in linguistics, along with some problems that their use poses. In particular, linguists noticed various cases in which there is a discrepancy between the situation type of a verb phrase or a clause and the situation type that its head verb has independently of that verb phrase or clause. The description of such situation 'shifts' poses a number of interesting problems for the theory of lexicon and the nature of the mapping between syntax and semantics, given the apparent non-compositionality of the relevant data. In Chapter 3 I will discuss two accounts of the description of apparent 'shifts' that are due to the semantic properties of certain nominal arguments.

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## Chapter 3

### Telicity and Noun Phrase Semantics

#### 3.1 Introduction

Within the area of situation types, a number of debates focused on two related issues: (i) the influence of nominal arguments on the telic or atelic interpretation of complex verbal predicates; and (ii) the semantics of durative *for*-PPs and time-span *in*-PPs, and their role as diagnostics for atelic and telic verbal expressions, respectively.

For example, with such verbs as *eat*, *print* and *drink*, we find the following pattern of distribution:

- (1-a) *Mary ate a sandwich in an hour / ?for an hour.*
- (1-b) *Mary ate blueberries ?in an hour / for an hour.*

These examples show that the telicity of a complex verbal predicate depends on the direct object noun phrase: a bounded noun phrase (*a sandwich*) yields a telic predicate, while an unbounded noun phrase (*blueberries*) an atelic predicate. This difference is reflected in the different behavior with durative *for*-PPs and time-span *in*-PPs.

In the same way the subject noun phrase contributes to the telic and atelic interpretation of a sentence:

- (2-a) *The paper was printed on the VAX in ten minutes / ?for ten minutes.*  
(2-b) *Beer was drunk all day / ?in one day.*

By contrast, complex verbal predicates headed by such verbs as *watch, carry, push, browse* are atelic, regardless whether their direct object arguments are bounded or unbounded:

- (3) *Mary liked the documentary on Kafka / five documentaries / (these) documentaries ?in an hour / for an hour.*

Nominal arguments that influence the telic and atelic interpretation of complex verbal predicates denote participants whose properties are intrinsically tied to the temporal extent of the denoted situation. For example, the eating of a sandwich necessarily ends when all the sandwich is consumed. By contrast, the state of liking of a documentary is not temporally delimited by any property of the documentary. How can this observation be explicitly represented? How do we explain the systematic contribution of nominal arguments to the telic and atelic interpretation of verbal predicates and sentences?

The phenomenon was noticed as early as in the 19th century with the inception of the research on 'Aktionsart' (German term meaning 'type of action'). It is mentioned by Garey (1957) who coined the terms 'telic' and 'atelic'. Its introduction into contemporary linguistics is largely due to Verkuyl (1972) and Dowty (1972). It is at the heart of current research in syntax and semantics, in particular, it plays an important role in the syntax-semantics interface in the domain of argument structures (cf. Van Valin 1987, 1990; Dowty 1988, 1991; Tenny 1987, 1992, 1993; Zaenen 1987, 1988, 1993; for example).

In this chapter I will discuss two recent proposals for describing the influence of nominal arguments on complex verbal predicates. One strategy is to relate the phenomenon to a particular *syntactic* position in the d-structure. This is the essence of Tenny's (1987, 1992, 1993) *Aspectual Interface Hypothesis*. It is based on the claim that the argument that determines the telicity of complex verbal predicates is

the *internal direct object argument* in the d-structure.

The second strategy is to motivate the influence of nominal arguments on complex verbal predicates by the thematic structure of verbs. This *lexical* strategy was proposed by Krifka (1986, 1989, 1992) and Dowty (1988, 1991). In Krifka's account, the relevant rules concern a particular thematic role, *Gradual Patient*. Dowty builds on Krifka's proposal and suggests that the rules involve one of the contributing properties of the Patient Proto-Role, *Incremental Theme*.

I will then extend Krifka's and Dowty's approach to account also for those cases in which a telic (or an atelic) interpretation of clauses can be assigned in a systematic way, although it is not calculated by compositional rules on the basis of the lexical properties of the lexical head verbs and the boundedness properties of one of its sub-categorized nominal arguments. This approach relies on the notion of the 'incremental event type'.

### 3.2 Syntactic Factors in Telicity: Tenny (1987, 1989, 1992)

Tenny claims that there is a uniform mapping between the argument in the conceptual structure that has the aspectual role of delimiting or 'measuring out' the event, as she puts it, and the internal direct object argument in the d-structure. In the following examples, this is illustrated by *an apple*, *the butter*, *the desert* and *the road to the town*:

- (3-a) *I ate an apple.*
- (3-b) *The butter melted.*
- (3-c) *He crossed the desert.*
- (3-d) *He walked the road to the town.*

For example, in (c) it is the length of the path across the desert that delimits the event of crossing the desert. We can correlate individual stretches of the path with the amount of time it took to cover them. When we reach the end of the path, the event

denoted by (c) *He crossed the desert* necessarily ends. Hence, (the path across) the desert delimits the denoted event. Clearly, what Tenny calls 'aspectual delimitedness' is better known as 'telicity' (or 'boundedness') (cf. Garey 1957, Comrie 1976, Hopper and Thompson 1980, Zaenen 1988, Rappaport and Levin 1988, Dowty 1991, among many others). The use of the term 'aspect' in this connection may be misleading, because 'aspect' is also used for the distinction between the progressive and non-progressive construction in English, or between the perfective and imperfective verbal aspect in Slavic languages, for example.

By contrast, none of the arguments in the following examples delimits the denoted situations:

- (4) stative verbs
- (4-a) *John likes Bill.*
- (4-b) *The candle glows.*
- (4-c) *Mary knows calculus.*
  
- (5) non-stative non-delimiting verbs
- (5-a) *Dan pounded the wall.*
- (5-b) *Lisa studied French.*
- (5-c) *Susan shook the tree.*
- (5-d) *Bill pushed the cart.*

Verbal predicates that express delimited events are associated with an aspectual structure in the Lexical Conceptual Structure (LCS). As in Levin and Rappaport (1988), Hale and Keyser (1988) and Jackendoff (1990), among others, so in Tenny's framework the LCS represents the syntactically relevant parts of the verb's lexical meaning. The significant innovation in Tenny's framework is the introduction of the aspectual structure into the LCS. It is a level of lexical representation that serves as an interface between a LCS and a syntactic argument structure. This is captured in the Aspectual Interface Hypothesis (AIH):

**Aspectual Interface Hypothesis (AIH)**

The mapping between thematic structure and syntactic argument structure is governed by aspectual properties. A universal aspectual structure associated with internal (direct), external and oblique arguments in syntactic structure constrains the kinds of event participants that can occupy these positions. Only the aspectual part of thematic structure is visible to the syntax (Tenny 1989:3).

The Aspectual Interface Hypothesis is divided into three constraints that are stated over three syntactic argument positions in the d-structure:

- (i) Measuring-out Constraint on Direct Internal Arguments
- (ii) Terminus Constraint on Indirect Internal Arguments
- (iii) The Non-Measuring Constraint on External Arguments (cf. Tenny 1992:13)

The *Measuring-out Constraint on Direct Internal Arguments* functions as the main linking principle between the LCS and syntactic structure. It says that with "verbs in which the internal argument undergoes any change or motion, all and only direct internal arguments, or D-structural objects of the verb, measure out events" (Tenny 1989:35).

The *Terminus Constraint on Indirect Internal Arguments* says that an indirect internal argument can participate in aspectual structure by providing a terminus for the event described by the verb. In order to preserve the claim that all and only direct internal arguments of verbs denoting any change or motion measure out the event, Tenny distinguishes between the internal arguments that *measure out* events and those that *delimit* events by providing a terminus for the event. With verbs such as *to push*, for example, the *direct* internal argument measures out the event and the *indirect* internal argument delimits it. Consider the following examples:

- |       |                                     |               |
|-------|-------------------------------------|---------------|
| (6-a) | <i>to push the cart</i>             | non-delimited |
| (6-b) | <i>to push the cart to New York</i> | delimited     |

According to the AIH, the internal direct object arguments in these examples measure out the event. They differ in so far as only in (b), the indirect internal argument, the Goal-PP *to New York*, delimits the event through reference to the location of the

referent of the internal direct object argument, *the cart* (cf. Tenny 1989:10). it is caused by Agent. The goal-PP *to New York* "participates in defining the temporal endpoint of the event by naming the spatial terminus that correlates with the event's temporal terminus" (Tenny 1992:4).

The *Terminus Constraint on Indirect Internal Arguments* and the *Measuring-out Constraint on Direct Internal Arguments* together amount to the claim that only internal arguments, only constituents inside the verb phrase in the d-structure, can delimit events. The verb and its internal object arguments constitute a *core event* of the event structure, a central and basic unit of the verb's meaning.

An external argument cannot participate in 'measuring-out' or delimiting the event described by a verb. This is captured by the *Non-Measuring Constraint on External Arguments*. Even though external arguments are included in event structure representations as the arguments of CAUSE predicates (or are associated with 'initial subevents'), they are outside the aspectual structure and map to syntactic positions outside of the verb phrase. This *asymmetry of the external argument and internal argument(s)* is of crucial importance to Tenny's Aspectual Interface Hypothesis.<sup>1</sup>

Given that aspectual properties of verbal predicates are represented in the form of *aspectual roles* that are directly tied to the internal argument positions in the d-structure, the three linking constraints can be also understood as constraints over aspectual roles. There are three aspectual roles: MEASURE, TERMINUS and PATH which accompanies TERMINUS. "An aspectual role is the role an argument plays in the internal temporal structure of the event described by the verb" (Tenny 1992:2).

<sup>1</sup> The asymmetry of the external argument and internal argument(s) can be also found in Verkuyl's (1988, 1989) compositional account of the telicity phenomenon. Verkuyl argues that the relation of the external argument (subject) to the situation type of the sentence is not as close as that of the internal argument (object), because the subject relates to the verb phrase as a whole rather than directly to the V. This difference creates "aspectual asymmetry". Therefore, Verkuyl distinguishes between "S-aspect" and "verb phrase-aspect".



The linking of these roles to syntactic positions is constrained as follows: a MEASURE must be an internal direct argument, a TERMINUS must be an internal indirect argument, a PATH is either implicit or an internal argument. Verbs with Aspectual Structure are represented lexically with an aspectual role grid, as is shown in:

(7) Lexical representation of verbs with Aspectual Structure

eat: Aspectual Structure:	[(MEASURE)]	<i>eat an apple</i>
melt: Aspectual Structure:	[MEASURE]	<i>melt the butter</i>
walk <sub>1</sub> : Aspectual Structure:	[(MEASURE)]	<i>cross the desert</i>
walk <sub>2</sub> : Aspectual Structure:	[(PATH, TERMINUS)]	<i>walk the road to the town</i>

Tenny (1992:6)

Verbs that have no Aspectual Structure are represented as follows:

(8) Lexical representation of verbs without Aspectual Structure

*The bottle floated.*

float: Aspectual Structure: [ ] Tenny (1992:20)

Tenny uses the notion of 'measuring out (the event)' in an informal sense, "as a convenient metaphor for uniform and consistent change, such as change along a scale" (Tenny 1989:7). Tenny (1989) and Tenny and Heny (1993:9-12) distinguish three basic verb classes according to the measuring-out relation they involve:

- (i) incremental-theme verbs: *eat, drink, load (a wagon), destroy the city*;
- (ii) change-of-state verbs: *melt, freeze, cure (a patient), darken (a photograph), ripen*;
- (iii) verbs of consuming distance (Path-object verbs) and verbs of imparting distance: *climb, push (a cart)*.

The 'measuring-out' property unifies one-place and two-place predicates of change or motion. In each of these three classes "there is a measurable quantity or property which is not temporal, and which is associated with the direct or indirect object, which the verb converts into a temporal measure of the event" (Tenny and Heny 1993:9).<sup>2</sup> The 'scale' for incremental-theme verbs is related to a volume-like quantity of the object. The spatial *extent*, or *volume*, of the referent of the direct internal argument, as it gradually comes into existence or disappears, measures out and delimits the event. The 'scale' for change-of-state verbs is related to a *property* applied to the participant denoted by the internal direct object argument: for example, it is related to the darkness of the photograph and the ripeness of the fruit, or the consistency of the piece of butter. The 'scale' for motion verbs is the linear scale of *distance*.

Tenny's AIH is motivated by the hypothesis of the *autonomy of syntax*, one of the basic tenets of the Government and Binding Theory. The AIH attempts to reconcile two seemingly conflicting goals: to specify correspondences between lexical conceptual structure and syntactic structure without compromising the autonomy of syntax. The strategy that Tenny pursues is to distinguish several layers of lexical representation (LCS) and allow only one of them to be "visible" to syntactic and morphological processes. The privileged layer of the LCS that syntax can "see" is the aspectual structure. Non-aspectual elements of the LCS, in particular thematic roles like Agent and Patient, have no significance for mapping and no status in syntactic theory.

The implementation of the AIH relies on the proposal that the aspectual and non-aspectual information in the LCS should be represented *modularly*, on two distinct role tiers (cf. Tenny 1992:14). "[A]spectual roles are associated only with

<sup>2</sup> "The verb's direct internal argument may be thought of as being converted into a function of time at some level of semantic representation. This is an aspectual property, because aspect refers to the internal temporal organization of an event" (Tenny 1989:7).

verb's internal arguments, while thematic roles may be associated with verb's external or internal arguments" (Tenny 1992:2). Given that the rules that mediate the mapping between the LCS and syntactic d-structure are sensitive only to the aspectual roles, thematic roles are eliminated from the mapping apparatus. In this way Tenny takes one step further the widespread assumption within the recent Government and Binding theory that thematic roles are not referred to by syntax, except at the interface, that is, in linking (cf. Zubizarreta 1986; Belletti and Rizzi 1986; Levin and Rappaport 1986; Rappaport and Levin 1985;<sup>3</sup> Grimshaw 1987; Rappaport, Laughren and Levin 1987).

The modularity of Aspectual Structure and Conceptual Structure is correlated with the distinction between universal and language-particular constraints on argument structure. Aspectual roles are tied to syntax in a direct way, because they contain only that semantic information that is relevant to universal linking principles. "The Universal Linking Principles based on event structure and Aspectual Structure give us a range of possible forms for argument structures cross-linguistically. Other language-particular, non-universal linking patterns may be stated over non-aspectual thematic information in (Lexical) Conceptual Structures" (Tenny 1992:23).

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<sup>3</sup> "The principles and rules which effect the mapping between predicate-argument structure and syntactic structure do not make reference to theta-role labels, nor do syntactic or productive morphological processes. They may distinguish among arguments of a predicate only in terms of the manner of theta-role assignment. (Rappaport and Levin 1985:3). In a similar vein, Belletti and Rizzi (1988) state: "the qualitative distinction between, say, Agent and Patient is presumably relevant at some conceptual level of categorization of events, but is not exploited by the grammar (...) substantive distinctions between theta-roles are irrelevant within formal grammar but play a crucial role at the interface between formal grammar and other cognitive systems. In fact, they contribute to determining the initial syntactic representations (D-structures) through a system of mapping principles projecting theta-structures onto syntactic structures. On this view the apparent sensitivity of certain grammatical processes to theta-hierarchies [Jackendoff] may be empirically correct but is epiphenomenal: everything is mediated through structure, and grammatical processes only refer to structural information which indirectly reflects theta information through the operation of mapping principles. Theta-hierarchies and the like intervene only once, in the formation of D-structures. From there on, reference to such entities is excluded in formal grammar" (Belletti and Rizzi 1988:294-5).

The AIH has attracted considerable attention (Pinker 1989, Grimshaw 1990, Jackendoff 1990, Pustejovsky 1991, Levin and Rappaport Hovav 1990, Gropen et al. 1991, Dowty 1991, and others). Its appeal is understandable given that telicity plays an important role in the syntax-semantics interface in the domain of argument structures, as has been shown by Van Valin (1987, 1990), Van Voorst (1986, 1988), Dowty (1988, 1991) and Zaenen (1987, 1988, 1993), for example. Moreover, the AIH seems to provide a semantic motivation for the Unaccusative Hypothesis proposed by Perlmutter (1978) in Relational Grammar and adapted in GB Theory by Burzio (1981, 1983, 1986). According to Tenny (1989:18ff.), the AIH explains the distribution of verb meanings across unergative and unaccusative verb classes. "Those verb meanings which become unaccusative verbs describe exactly those event types in which the event participant may be construed as measuring out the event [*melt, freeze, evaporate, open, collapse*]. Verb meanings in which the event participant may not be construed as measuring out the event must become unergative verbs [*run, dance, whisper, study*]" (Tenny 1989:20-21).

Nevertheless, I will argue that the AIH is flawed in two main respects (cf. Filip 1990). First, the claim that the internal direct object argument is invariably associated with the participant in the aspectual structure that measures out the event does not seem to be empirically valid. A closer look reveals that it has the status of a stipulation. Second, the mapping between the LCS and the syntactic structure cannot be constrained by a *single* property, regardless whether it is related to telicity, or to some other single property.

The first objection concerns the following general assumption on which the AIH is based: arguments in lexical conceptual structure are reflected directly and uniformly in syntactic relations. However, it has been observed (cf. Jackendoff 1990:150ff., for example) that there are many mismatches between conceptual arguments and syntactic arguments. To illustrate this point, consider the following

example

(9-a) *Martha pushed the cart to the corner.*

According to the AIH, the internal indirect argument *into the corner* delimits the event through the reference to the location of the moving entity denoted by *the cart*. *The cart* is the internal direct object argument that "measures out" the event. Now consider the following example:

(9-b) *Martha danced into the corner.*

By the same line of reasoning as given for such examples as (a), we should be able to say that in (b) the internal indirect argument *into the corner* also delimits the event through the reference to the location of the moving entity. However, in (b), what is at stake is the location of the referent of the *external subject argument*, *Martha*. In other words, the subject *Martha* in (b) and the internal direct object *the cart* in (a) have the same aspectual property of "measuring-out" the event. This conclusion clearly contradicts the AIH and it is only blocked by the stipulation that it is all and only internal direct object arguments, and not external arguments, that can measure out events. The same point may also be illustrated by the following examples:

(10-a) *Martha pushed John into the pool.*

(10-b) *John dove into the pool.*

Tenny mentions that in such examples as *Martha danced halfway* "the property which is measuring out the event (location), although it is changing in the external argument (*Martha*), can only be expressed in its pure form through an internal argument, as in *Martha danced half the distance (home)* (Tenny 1989:19, fn. 8). However, this move cannot be applied to transitive verbs of motion, as in

(11) *John entered the icy water (very slowly).*

Since *enter* has an internal direct object argument, we cannot claim that there is some understood internal direct object argument that measures out the event. As Dowty (1991:570) suggests, with transitive verbs of motion like *reach*, *leave*, *depart* and

*abandon*, it is the subject argument that delimits the situation denoted by the whole sentence. One might further try to argue that *the water* is an underlying oblique argument that is advanced to the direct object position, while *John* is an underlying internal direct object argument that is advanced to the subject position. This is in principle possible given that the theory allows for the transformational movement between d-structure and s-structure. However, if we allowed for such a transformational movement in order to guarantee that arguments in lexical conceptual structure are reflected directly and uniformly in syntactic relations in the d-structure, the claim that an internal direct object position in the d-structure has a special "measuring-out" property would lose any empirical force. The question then would arise whether this claim "still had any empirical content or had been elevated from empirical hypothesis to methodological assumption, i.e. that one was in actuality prepared to postulate any syntactic abstractness necessary to maintain a uniform semantic association with a certain syntactic position" (Dowty 1991: 571, fn. 15).

The implicit assumption behind the AIH is that syntax is the decisive criterion: arguments have certain aspectual properties, because they have certain syntactic properties. The resulting analyses are only indirectly justified by semantic criteria that involve notions like 'measuring out of the event' and 'verbs of change or motion'. Since the AIH tries to keep syntax and lexical semantics separate (in the interest of the autonomy of syntax), it crucially hinges only on one semantic notion: the notion of 'measuring out (the event)'. However, this notion is not explicitly defined and Tenny uses it in an informal sense, "as a convenient metaphor for uniform and consistent change, such as change along a scale" (Tenny 1989:7). How can the Aspectual Interface Hypothesis provide a rigorous connection between lexical semantics and syntax, if it depends on the 'measuring out' notion that is not clearly characterized?

The stipulative character of the AIH, along with the lack of an explicit characterization of the crucial semantic notion 'measuring out of the event', becomes

evident in Tenny's account of psychological verbs, for example. According to Tenny, only the Experiencer of *frighten* verbs, but not of *fear* verbs, "measures out" the denoted mental event. Due to this aspectual difference the *frighten* class assigns the Experiencer to the internal direct object argument, while the *fear* class to the external argument.

- |        |   |          |
|--------|---|----------|
| (12)   | <b>John</b> <i>fears solitude.</i>  | stative  |
| (13-a) | <i>Solitude</i> <i>frightens</i> <b>John.</b>   | stative  |
| (13-b) | <i>Harry</i> <i>frightened</i> <b>John</b> <i>yesterday</i><br><i>when he slammed the door.</i> | eventive |

This analysis is invalidated by one major flaw. The change of mental state of the Experiencer participant entailed by the *frighten* class in its eventive/inchoative reading (cf. Croft 1986, Jackendoff 1990:140, and others) cannot be 'measured' on a scale, except in a trivial sense.

It might be argued that the 'measuring out' relation could be extended to the trivial case in which the Experiencer at once undergoes an instantaneous change from one mental state to another. However, in such a case we would not use any interesting aspects of the 'measuring out' relation, or any interesting aspects of the part structure of the relevant scale on which the change in Experiencer's state of mind is measured.

A more serious objection concerns the application of the 'measuring out' relation to psychological verbs of the *frighten* class that may be understood as involving a gradual transition from one mental state to another. Examples are verbs like *calm*, *disillusion*, *sadden*, *soothe* and *disarm*:

- (14) *The music gradually saddened / calmed / depressed John.*

It is certainly possible to monitor the process of John's becoming more and more sad. However, it is not clear what it would *mean to say* that John is halfway sad. There is no point at which we can say that John is partly sad and on his way to being completely sad. Hence, the following sentences are odd or ungrammatical.

- (15-a) ?*The music halfway saddened John.*  
 (15-b) *The music gradually saddened John, \*a little of him at a time.*

In order to give a sensible interpretation to the above sentences, for example, one would need to know what constitutes the final stage of somebody's being sad beyond which that person cannot be sadder.<sup>4</sup> However, psychological verbs do not entail such an absolute end-point on a scale that would measure the changes in the Experiencer's state of mind. If the Experiencer argument 'measured out' a psychological event, then the predicate expressing it would have to be clearly telic, because by definition the 'measuring out' relation characterizes telic events and their participants only (cf. Tenny 1992:4). Contrary to the AIH, gradual psychological predicates do not behave like telic predicates, in Vendler-Dowty classification. (A similar problem seems to be posed by "degree achievements", cf. Dowty 1979).

To conclude, no semantic motivation in terms of the aspectual difference can be found for the difference in the d-structure of *fear* and *frighten* classes of verbs. Psychological verbs of the *frighten* class are by no means exceptional in this respect. There are other predicates that entail a change in the argument associated with the internal direct object position, however the change cannot be measured on a scale, in a non-trivial way. Take, for example, predicates like *stir (the soup)*, *sweat*, *breathe*, *shiver (from fear)*, and many others. Contrary to the AIH, a participant that undergoes a change of state does not necessarily change part by part or degree by degree in one of its properties. In short, the 'measuring out' relation or 'aspectual delimitedness' characterizes a much smaller class of predicates than the AIH is intended to cover. Hence, it cannot be viewed as a single semantic parameter that is responsible for the mapping between the semantic and syntactic representations, unless we are willing to accept that the uniform and direct association of 'aspectual delimitedness', or telicity,

<sup>4</sup> Notice that we cannot correlate the 'measuring out' of the event directly with the part structure of a temporal scale. The reason is that if it took John ten minutes to become sad, it is not necessarily the case that after five minutes he was halfway sad.



with the direct object position in the d-structure amounts to a mere stipulation (cf. Filip 1990, Dowty 1991). If the claim that the telicity phenomenon is reducible to syntactic properties in the d-structure amounts to a stipulation, then the claim that is based on it, namely that syntax does not need to "see" thematic roles, is deprived of an empirical foundation. Consequently, other arguments must be found to justify the elimination of thematic roles from the universal principles that govern the syntax-semantics interface.

The second main objection concerns the observation that the mapping between the thematic structure and syntactic structure cannot be constrained by a *single* property, as Tenny (1989) claims, regardless of whether that property is related to telicity, or some other single property. As has been pointed out in the previous paragraphs, in many cases telicity (or the 'measuring-out' property) is irrelevant to the mapping between the lexical semantic structure and syntactic argument structure. Such examples as *John entered the icy water (very slowly)* show that telicity on its own is not sufficient for the mapping. In the above example, *John* functions both as an Agent and the entity whose spatial extent delimits the denoted event. The mapping between lexical semantic and syntactic structure, seen both from the cross-linguistic and language-particular perspective, is determined by a number of interacting principles: syntactic, semantic and pragmatic. In particular, there are many studies in which it has been convincingly argued that the mapping rules must refer to thematic roles (cf. Fillmore 1968, 1977 and elsewhere; Dowty 1988 and 1991, Bresnan and Kanerva 1989, Alsina and Mchombo 1990, among many others).

As far as the influence of nominal arguments on the telic and atelic interpretation of complex verbal predicates is concerned, Tenny's account seems to be inconsistent in the following respect. According to Tenny, "aspectual structure is a structure associated with bounded events" (Tenny, 1992:4); hence "activities or states (in Vendlerian terms) do not have Aspectual Structure" (Tenny, 1992:4). This postulation

has an undesirable consequence that *John drank a glass of beer* is telic and associated with Aspectual Structure, while *John drank beer* is atelic (activity) and hence it cannot be associated with Aspectual Structure. This amounts to the claim that the verb *drink* has different meaning in *John drank a glass of beer* and *John drank beer*. This, however, defies the intuition that the verb *drink* has the same lexical semantic properties regardless of whether it occurs in a telic or an atelic sentence (see also Krifka 1986, 1992; Dowty 1988, 1991, for example). Moreover, it is not clear how we would express the observation that the differences in meaning between the above sentences are due to the different contributions made by the count noun phrase *a glass of beer* and the mass noun phrase *beer*. Their contribution is governed by the same general rule: (un)bounded noun phrase yields an (un)bounded complex verbal predicate. From this it follows that the verb *drink* is associated with two different linking mechanisms, one universal and one language-particular, according to whether it occurs in a telic or an atelic construction.

The same problems arise with the contribution of undetermined plural noun phrases, in the internal direct object position and, in particular, in the external subject position, as is shown in:

(16-a)	<i>John ate blueberries.</i>	non-delimited
(16-b)	<i>John ate the blueberries.</i>	delimited
(17-a)	<i>Guests arrived.</i>	non-delimited
(17-b)	<i>A/the guest arrived.</i>	delimited

Tenny (1989:12, fn. 5) observes that undetermined plural noun phrases must be considered a separate phenomenon for the purpose of the Aspectual Interface Hypothesis. Similarly, as in the case of undetermined mass noun phrases, Tenny's account raises the following questions for verbal predicates with undetermined plural noun phrases: What linking rules account for the linking between LCS and syntactic arguments in sentences with undetermined plural noun phrases in the external subject position in the d-structure? What rules license, on Tenny's account, the interpretation of

sentences with undetermined plural noun phrases?

### **3.3 Semantic Factors in Telicity: Krifka (1986, 1992) and Dowty (1988, 1991)**

#### **3.3.1 Lattice Analysis of Objects and Events**

Dowty (1988, 1991) proposes that the influence of nominal arguments on the telicity of verbal predicates is motivated by the meaning of telic predicates:

- (18) "THE MEANING OF A TELIC PREDICATE IS A HOMOMORPHISM FROM ITS (STRUCTURED) THEME ARGUMENT DENOTATIONS INTO A (STRUCTURED) DOMAIN OF EVENTS, modulo its other arguments. (...) A homomorphism is a function, from its domain to its range, which preserves some structural relation defined on its domain in a similar relation defined on its range. (See Partee et al. 1990 for formal discussion.) In the case of telic predicates, this relation which is preserved is the 'part-of' relation: If  $x$  is part of  $y$ , then if a telic predicate maps  $y$  (as Theme) onto event  $e$ , it must map  $x$  onto an event  $e'$  which is part of  $e$ " (Dowty 1991:567).

The most important theoretic innovation and improvement on the previous accounts of telicity (such as Verkuyl 1972, 1989; Fiengo 1974, Gruber 1967; Taylor 1977; Mourelatos 1978; Talmy 1986; Langacker 1987a and 1987b; Jackendoff 1990, among others) is the introduction of the mathematical notion of 'homomorphism' into the description of lexical semantics of verbs. In this respect Dowty builds on Hinrichs (1985) and Krifka (1986, 1989). This approach presupposes that we model the denotata of nominal and verbal predicates as lattices: a lattice of objects and events. (Notice that such a representation is motivated by the mereological characterization of nominal and verbal predicates in terms of the part-whole structure of their denotata.) We then define structure-preserving mappings between them. The relevant structure-preserving mappings are homomorphisms ('many-to-one' mappings).

Homomorphism is used to model the following well-known intuition: If I mow the lawn, I will be able to conclude something about the progress of this event from

### Chapter 3. Telicity and Noun Phrase Semantics: 137

the state of the lawn. The lawn undergoes a change in distinguishable, separate stages, it changes incrementally in lockstep with the progression of the event. "[T]he state of parts of the lawn and their part-whole relationships is reflected in the parts of the event of mowing it and ITS part-whole relationships." (Dowty 1991:567). This amounts to the following crucial claim: because of the meaning of *mow*, a **homomorphic** relation holds between the lawn, modelled as a lattice of objects, and the event of mowing the lawn, modelled as a lattice of events.

Krifka (1986, 1989, 1992) proposes that the contribution of nominal arguments to the telicity of complex verbal predicates can be characterized by defining a homomorphism between the denotata of the relevant nominal argument and the event. Homomorphism is viewed as an entailment of a group of predicates with respect to one of their arguments. This entailment is encoded in terms of a thematic role that Krifka (1986, 1992) labels 'Gradual Patient' or 'Successive Patient' and Dowty (1988, 1991) 'Incremental Theme'. This thematic role plays a crucial role in the statement of the rules that govern the contribution of nominal arguments to the telic or atelic interpretation of complex verbal predicates.

The lattice-theoretic approach is based on the mereological predicate logic and calculus of individuals as developed by Leonard & Goodman (1940) and Goodman and Quine (1947), Grätzer (1971). The lattice-theoretic analysis was first applied by Link (1983) to the analysis of mass and plural noun phrases. Hinrichs (1985), Bach (1986) and Krifka (1986, 1989, 1990 and 1992) extend Link's analysis to verbal predicates. In what follows I will give a simplified exposition of Krifka's lattice-theoretic approach (mainly based on Krifka 1990:490 and 1992).

The lattice-theoretic analysis assumes that we have two non-overlapping sorts of entities, objects and events, characterized by a predicate *O* and *E*, respectively. The extensions of *O* and *E* have the structure of a **(complete) join semi-lattice** without a bottom element.

For example, an noun phrase like *a cup of coffee* has various proper parts which are quantities of coffee of various sizes, whereby no one of these is itself *a cup of coffee*. This 'part structure' of the quantity of coffee is modelled as the lattice of objects. Given any two nodes in the lattice connected by a line, the lower one is a 'part' of the upper one. In general, the 'part' relation relates any object, which can be a single object, a group of objects or a quantity of matter, to its upper bound(s).

Similarly, *Max drank a cup of coffee* denotes an event with a part structure. We can recognize various drinking subevents (each of which has further subevents), none of which is the event of the same kind as the main event described by *Max drank a cup of coffee*.

The semi-lattice reconstruction presupposes a two-place operation **join**, written as ' $\cup$ ', and the following two-place relations: **part** ' $\subseteq$ ', **proper part** ' $\subset$ ' and **overlap** ' $\cap$ '. If we have two entities  $x$  and  $y$  of a given sort  $\Sigma$  (which is non-empty), there is a sum object or **join**  $x \cup_{\Sigma} y$ , namely the entity that consists of  $x$  and  $y$ . The join operation  $\cup_{\Sigma}$  is commutative, idempotent and associative. The entity  $x$  (and  $y$ ) is called a **part** of the object  $x \cup_{\Sigma} y$ . If an entity  $x$  is part of an entity  $y$ , then we can express it as  $x \subseteq_{\Sigma} y$ . Since  $\subseteq_{\Sigma}$  is reflexive, every entity is a part of itself. The relation of a **proper part**  $\subset_{\Sigma}$  is irreflexive. Two entities  $x$  and  $y$  **overlap**, if  $x$  and  $y$  have a common part  $z$ :  $x \cap_{\Sigma} y$ .

Moreover, it is assumed that there is no element in  $\Sigma$  which is part of every element, that is,  $\Sigma$  has **no bottom element**.<sup>5</sup> It is also assumed that the join operation is **complete**, as we can join any number of elements (even an infinite number). For any non-empty subset of  $\Sigma$  there exists an upper bound in  $\Sigma$ . We also introduce the

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<sup>5</sup> A join semi-lattice without a bottom element provides a better model for the common language usage. If we assumed a complete lattice with a bottom element, we would be committed to the undesirable view that for every two objects in a lattice there is a part, namely the null part, that they share in common. But of course, in our ordinary language use we are not committed to this view.

notion of a **supremum**, called  $\text{sup}_\Sigma$ , of a non-empty subset of  $\Sigma$  as its least upper bound, as it can be shown that the least upper bound is unique. This guarantees that for every  $x$  and  $y$  in  $\Sigma$ , there is an element  $x \cup_\Sigma y$  in  $\Sigma$ , as  $x \cup_\Sigma y$  is the least upper bound of  $\{x, y\}$ . The semi-lattice, defined in this way, is also required to be **distributive**. This is guaranteed by two claims: First, whenever  $x$  is a proper part of  $y$ , there is another part of  $y$  which does not overlap  $x$  (**witness element**). Second, whenever  $x$  is a part of the join of  $y$  and  $z$ , then  $x$  is a part of  $y$ , or of  $z$ , or partly of  $y$  and partly of  $z$  (**partition**).<sup>6</sup>

Given the above apparatus, Krifka introduces the notions of cumulative and quantized reference:

$$\forall P [\text{CUM} (P) \leftrightarrow \forall x, y [P(x) \ \& \ P(y) \rightarrow P(x \cup y)]]$$

$$\forall P [\text{QUA} (P) \leftrightarrow \forall x, y [P(x) \ \& \ P(y) \rightarrow \neg y \subset x]] \quad \text{Krifka (1992:32)}^7$$

The CUM property is defined in terms of the semantic operation for joining two individuals to form a new individual. Cumulative expressions pass the *additivity test*: if an entity is a union of parts, each of which the predicate is true of, then the predicate is true of that entity. For example, if we have two entities which are apples, then their "join" are apples.

A predicate  $P$  has the quantization property if there is no member of its extension which has a part which is also  $P$ . In other words, an expression is quantized (QUA) if it is indivisible, or conversely, if it does not pass the additivity test.

<sup>6</sup> See Krifka (1990:490-3) for a formal definition of lattice sorts.

<sup>7</sup> See Krifka (1990:493) for an alternative formulation of 'cumulativity': "for every subset of the extension of a cumulative predicate, its supremum is in the extension of that predicate as well".

Krifka uses the quantization and cumulative property to distinguish semantically between count noun phrases (*an/the/one apple, five apples*) and measure constructions (*a glass of wine*), on the one hand, from mass noun phrases such as *wine* and plural noun phrases (*apples*), on the other hand. The former are quantized, while the latter are cumulative:

- (19-a)  $apples \subseteq O \ \& \ CUM(apples)$
- (19-b)  $five.apples \subseteq O \ \& \ QUA(five.apples)$
- (19-c)  $wine \subseteq O \ \& \ CUM(wine)$
- (19-d)  $a.glass.of.wine \subseteq O \ \& \ QUA(a.glass.of.wine)$

According to (a) and (c), *apples* and *wine* are understood as cumulative predicates on objects. The noun phrase *five apples* is quantized. It denotes an entity that consists of five apples and it does not have a proper part that consists of five apples. The same property of quantization holds for measure noun phrases such as *a glass of wine*.

An atelic verbal predicator like *sing* is cumulative, while a telic verbal predicator like *sing a song* is quantized. Following Krifka (1992:34), this is represented in the following way:

- (19-c)  $sing \subseteq E \ CUM(sing)$
- (19-d)  $sing.a.song \subseteq E \ QUA(sing.a.song)$

### 3.3.2 Gradual Patient and Incremental Theme

The lattice analysis permits us to provide an explicit description of the well-known intuition (cf. Verkuyl 1972:54-97, 1989 and Dowty 1979) behind examples like the following ones:

- (20-a) *Max drank a cup of coffee.*
- (20-b) *Max drank coffee.*

When Max drinks a cup of coffee, the quantity of coffee in a cup incrementally decreases in lockstep with the progress of the drinking event. Each consumed portion of coffee can be correlated with the time interval during which the drinking of that

portion of coffee took place. In this way, the incremental change in the quantity of coffee allows us to monitor the progress of the drinking event. The drinking of coffee necessarily ends when all the available coffee is consumed. Hence, the quantity of coffee in a cup is intrinsically tied to the progress and delimitation of the event.

Since the direct object argument *a cup of coffee* is bounded, the whole verb phrase is bounded (telic), as well. However, in (b), the direct object argument *coffee* is unbounded, and hence the whole verb phrase is unbounded (atelic), as well.

Within the lattice-theoretic approach we can represent in an explicit way the relationship between the part structure of objects and events that motivates the influence of the semantic properties of nominal predicates on the semantic properties of verbal predicates. The motivation lies in mapping of the parts of the object denoted by the Incremental Theme argument into the parts of the event, and vice versa (cf. Krifka 1989:159). For example, the fact that the direct object noun phrase in (a) *Max drank a cup of coffee* and (b) *Max drank coffee* extends its boundedness property over the whole complex verbal predicate is explained by mapping the part structure of the object denoted by the direct object noun phrase into the part structure of the event.

Since *drink* is a homomorphic predicate, in (a) *Max drank a cup of coffee* it maps a definite quantity of coffee denoted by *a cup of coffee* into an event of drinking a cup of coffee. This motivates the fact that in *Max drank a cup of coffee* the denoted drinking event has a definite extent. In short, the portion of coffee is bounded, therefore *Max drank a cup of coffee* is bounded (or telic).

In (b) *Max drank coffee* we have the same homomorphic predicate. However, it maps some unspecified quantity of coffee into a corresponding event and its subevents. Hence, *Max drank coffee* is unbounded (or atelic) (cf. Dowty 1991:568).

Krifka and Dowty introduce a new thematic role for nominal arguments like *a cup of coffee* and *coffee* in the above examples: *Gradual Patient* or *Successive Patient*



in Krifka (1986, 1992) and *Incremental Theme* in Dowty (1988, 1991). They are intended to cover those nominal arguments that are entailed to undergo a *definite change of state* "in distinguishable separate stages, i.e. subevents" (Dowty 1991:568). In Krifka's and Dowty's frameworks, thematic role types are characterized as relations between individuals and events:<sup>8</sup>

- (21-a) *Max sings*  
 (21-b)  $\text{sing}'(e) \ \& \ \text{AGENT}(e, \text{max}')$

Given this understanding of thematic roles, Krifka defines the 'Gradual Patient' role in terms of the algebraic relations (or mapping conditions) that define the homomorphism between the structured denotata of nominal and verbal predicates:

(22)

$R \ [\text{GRAD} (R) \leftrightarrow \text{UNI-O} (R) \ \& \ \text{MAP-O} (R) \ \& \ \text{MAP-E} (R)]$

'GRAD' stands for Krifka's 'Gradual Theme' role. This means that a thematic role R is 'Gradual' if the following mapping conditions hold:

(22-a) **Uniqueness of objects**  
 $\forall R \ [\text{UNI-O} (R) \leftrightarrow \forall e, x, x' \ [R (e, x) \ \& \ R (e, x') \rightarrow x = x']]$

(22-b) **Mapping to objects**  
 $\forall R \ [\text{MAP-O} (R) \leftrightarrow \forall e, e', x \ [R (e, x) \ \& \ e' \subseteq e \rightarrow \exists x' \ [x' \subseteq x \ \& \ R (e', x')]]]$

(22-c) **Mapping to events**  
 $\forall R \ [\text{MAP-E} (R) \leftrightarrow \forall e, x, x' \ [R (e, x) \ \& \ x' \subseteq x \rightarrow \exists e' \ [e' \subseteq e \ \& \ R (e', x')]]]$

*Uniqueness of objects* is intended to ensure that an event is related to one specific object.<sup>9</sup> The uniqueness condition on objects is valid only for some object

<sup>8</sup> Verbal predicates are analyzed as predicates on events and the participants are related to these events by thematic relations. Also Parsons (1980, 1990) and Carlson (1984), among others, factor a verbal predicate into an event property and the thematic information.

<sup>9</sup> The uniqueness of objects corresponds to "thematic uniqueness" in Carlson (1984) and "uniqueness of role bearers" in Dowty (1988). It is also a requirement on the thematic relations understood as functions (Link 1987). Carlson (1984) also suggests that thematic roles may discriminate events from one another on the basis of this property (cf. Krifka 1992:44).

*tokens*, but not for object *types*. Type-oriented predicates like *read*, *play (a sonata)*, *copy (a file)* denote resettable situations that involve a realization of a certain type, a performance piece like a sonata, for example. The same sonata can be played many times without bringing about any (permanent) changes in the type underlying the actual performance piece.

*Mapping to objects* and *mapping to events* are two relations that constitute the core of the homomorphism from objects to events. For example, every part of a cup of coffee corresponds to a part of the drinking of that cup of coffee, and vice versa. *Mapping to objects* ensures that every part of a drinking of a cup of coffee corresponds to a proper portion of the cup of coffee.<sup>10</sup> *Mapping to events* ensures that every proper portion of the cup of coffee that is drunk corresponds to a part of the drinking event.<sup>11</sup>

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<sup>10</sup> Krifka (1992:45) observes that this mapping condition is problematic in the case of predicates that evoke a complex scenario consisting of a number of subevents. For example, with *build the house* there are parts of the event of building a house which cannot be mapped to parts of the house.

<sup>11</sup> It is not clear whether the homomorphism is to be defined in terms of a 'proper part' or 'part' relation. According to Krifka (1986, 1989), both the mapping to objects and to events are necessary in order to define the homomorphism property with proper parts. Krifka (personal communication) argues that the 'part' relation would allow for the cases that need to be excluded. For example, it would allow for a universe with only one event *e*. If we further assume that we have an entity *x* that is part of an entity *y* and both *x* and *y* stand in the appropriate relation to the event *e*, then we would still have a homomorphic relation, according to Dowty's definition. If we followed Krifka, the last part of Dowty's (1991:567) quote should contain "proper part" instead of "part" so that it would read "If *x* is A PROPER PART of *y*, then if a homomorphic predicate maps *y* (as Theme) onto event *e*, it must map *x* onto an event *e'* which IS A PROPER PART of *e*."

However, Dowty (1991:567, fn. 14) insists that "the part-of relation is not understood as 'is a proper subpart of' but is rather understood so as to allow a thing to count as a part of itself". The 'part' relation would then account for the vagueness in the interpretation of such sentences as *Max ate a sandwich*. Such a sentence can be appropriately uttered in a situation in which Max ate a whole sandwich at one gulp (all parts of the sandwich mapped onto the same event) or in the more usual situation "in which different parts of the sandwich are mapped by the eating event into the distinct subevents of eating the respective parts" (Dowty 1991:567, fn. 14). While on Dowty's view *a sandwich* counts as an Incremental Theme in both these pragmatically determined interpretations, on Krifka's view *a sandwich* is an Incremental Theme only in the gradual interpretation.

For those predicates that denote events during which the Gradual Patient participant is permanently changed, the property of *uniqueness of events* also holds:

(23) **Uniqueness of events**

$$\forall R [\text{UNI-E } (R) \leftrightarrow \forall e, e', x [R(e, x) \& R(e', x) \rightarrow e = e']]$$

Such predicates typically denote situations during which an object gradually comes into existence or disappears, as in *eat a sandwich, drink a cup of coffee, destroy a city, to compose a sonata*. They entail that a given object token can be subjected to the denoted event at most once. Consequently, the whole event is non-resettable with the same object token and an iterative interpretation is excluded. By contrast, type-oriented predicates like *play (a sonata)* have Gradual Patient relations relating an event to types. They are resettable with the same object type and they are not defined in terms of the uniqueness of events. Notice that the condition on *uniqueness of events* has reflections in grammar, for example it enters into the interpretation of sentences with durative adverbials. It motivates the difference in the acceptability in the following examples:

(24-a) *Pavarotti sang this aria with enthusiasm for three years.*

(24-b) *?Scarlatti composed this sonata for three years.*

Krifka's findings can be summarized in the following table:

(25)

example	graduality	uniqueness of events
<i>eat an apple</i>	+	+
<i>read a letter</i>	+	-
<i>drive a car</i>	-	-

Examples of objects that bear the thematic role **Incremental Theme** in Dowty (1988, 1991:568ff.) are:

- build a house, write a book, knit a pullover* ('effected object');
- destroy a presidential finding* ('destroyed object');
- eat a sandwich, drink coffee* ('consumed objects');
- paint a house, polish a shoe, proofread an article* ('affected object');
- play a sonata* ('object of performance');

*enter, exit, reach, leave, depart, abut, and abandon* (transitive verbs of directed motion with Incremental Theme subjects, cf. Dowty 1991:570);  
*melt, emerge, submerge, deflate, bloom, vaporize, decompose* (intransitive verbs with Incremental Theme subjects, cf. Dowty 1991:571);

The notion of 'Incremental Theme' is narrower than the thematic role Patient, as it does not include the relation between the verb and the direct object in such predicates as *stroke (a cat)* or *stir (a soup)*, which are not homomorphic. While stirring the soup, we are usually not concerned about what constitutes the first half of stirring that soup (unless we follow some definite step-by-step stirring procedure). After we have stirred the soup for some time, we have not stirred some specific part of the whole quantity of soup. The referent of the direct object argument in *I stirred the soup* does not typically undergo a change "in distinguishable separate stages" (Dowty 1991:568). In other words, while drinking takes place in a successive fashion, stirring the soup typically does not. Since the predicator *stir* is not homomorphic, the boundedness property of its direct object noun phrase in such sentences as *I stirred the soup* has no influence on the boundedness properties of the whole verb phrase. That is, even if *the soup* refers to some specific bounded quantity of soup, the sentence *I stirred the soup* is still atelic: cf. *I stirred the soup for ten minutes / ?in ten minutes*. In general, process predicators like *stir, stroke (a cat), see, push (a cart), drive (a car)*, state predicators like *love, own* are not homomorphic.

On the other hand, the notion 'Incremental Theme' is broader than the thematic role Patient, because it includes such cases as

(26) *At the turtle race, the winning turtle crossed the finish line in 42 seconds.*

Here the turtle is an Incremental Theme. In traditional terms, the noun phrase *the winning turtle* has the Theme role: Themes are characterized as those arguments that the verb entails to undergo a change of location or state, whether or not it is caused by Agent (Gruber 1965; Jackendoff 1972, 1974:93-95).

Other types of verbal predicates that involve a homomorphism are:

**Holistic Theme**

*walk from the bank to the post office,  
drive (a car) from New York to Chicago, run a mile;  
grow into an adult; become an architect;*

**Representation-Source Theme**

*copy a file, read a book, memorize a poem,*

In such sentences as *John drove from New York to Chicago* the Incremental Theme is not a syntactically realized argument. It is the implied Path, the prepositional phrases *from New York* and *to Chicago* refer to its beginning and end points. In *John drove from New York to Chicago* it is the part-structure of the Path that is correlated with the part-structure of the denoted motion event. *John* is a *Holistic Theme*. Holistic Themes "undergo a change of state in stages, the change is 'incremental' only because of some relationship they bear to the true Incremental Theme, not because they undergo a change part by part" (Dowty 1991:569).

Dowty (1991:569) observes that in semantically parallel examples, such as *cross the desert*, *traverse the United States (in six days)* or *drive the Blue Ridge Skyway (from beginning to end)*, the Incremental Path Theme is syntactically realized as a direct object.

In *John was becoming an architect but was interrupted before he could finish his degree*, the subject-noun phrase *John* is the Holistic Theme. Here, as Dowty observes, "the 'Path', if we want to call it that, is even more removed from syntactic expression--the stages that one goes through to reach the status of architect were partly but not exhaustively achieved, NOT 'part of John but not all of him has become an architect'" (Dowty 1991:569).

In Dowty's Proto-Role system, the Incremental Theme role is one of the contributing properties of the Patient Proto-Role. Dowty (1989:111, 1991:571ff.) argues

that linguistic theory needs to recognize only two Proto-Roles, Agent and Patient, instead of a set of discrete thematic roles, to describe the subject selection principles. The Proto-Roles Agent and Patient are cluster concepts, each characterized by a set of verbal entailments. Proto-Roles are used by the first-language learner as defaults for the meanings of transitive verbs of his language (cf. Dowty 1989:111). Dowty (1991:572) gives the following list of entailments that characterize these two Proto-Roles:

(27-a) Contributing Properties for the Agent Proto-Role:

- a. volitional involvement in the event or state
- b. sentience (and/or perception)
- c. cause event
- d. movement (relative to the position of another participant)
- e. referent exists independent of action of verb)

(27-b) Contributing Properties for the Patient Proto-Role:

- a. undergoes change of state
- b. incremental theme
- c. causally affected by event
- d. stationary relative to movement of another participant
- e. does not exist independently of the event, or not at all)

The Proto-Roles are higher order generalizations about meanings. The basic semantic concepts that characterize the Proto-Roles are not weighted or summed up under some unifying semantic criteria; rather, they are directly associated with the syntactic arguments in accordance with the following Argument Selection Principle (Dowty 1991:572):

(28) Argument Selection Principle:

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

### 3.3.3 A Comparison of Tenny's and Krifka's Approach and Remaining Problems

Both the syntactic (Tenny) and lexical (Krifka, Dowty) proposal exploit the tight connection between nominal arguments and telicity as a principle that governs the mapping between the semantic and syntactic structure. There are three main differences between them. First, Tenny's approach is couched within the Government and Binding Theory. It assumes a multistratal syntax and a uniform mapping between elements in the Lexical Conceptual Structure and syntactic d-structure. Various mismatches between semantic and grammatical relations are taken care of by the transformational movement between d-structure and s-structure. Dowty and Krifka presuppose a mono-stratal syntactic framework. Their model-theoretic approach is couched within an event semantics that is enriched with lattice structures. Their account is based on certain fine-grained lexical semantic properties of verbs.

Second, Tenny's account depends on the syntactic asymmetry between the external subject argument and the internal direct and indirect arguments in the d-structure. The telicity of complex verbal predicates is reduced to one privileged argument position in the d-structure, the internal direct object. Dowty and Krifka isolate one particular thematic property that is privileged from the point of view of telicity.

Third, both proposals are based on the intuition that the description of such sentences as *John ate an apple* involves the notion of 'cumulative' or 'gradual change'. The participant denoted by *an apple* gradually changes during the eating event, when there is no apple left, the event necessarily ends. This is related to the intuition that the participant denoted by *an apple* stands in a one-to-one relation to the denoted event. Therefore, *John ate an apple* is telic, because *an apple* denotes an entity with a definite extent. To put it in a different way, since *an apple* is bounded, *John ate an apple* is bounded, or telic, as well.

The most difficult problem is to find a semantic description for the notion of 'gradual change'. Standard propositional logic presupposes a moment-based semantics. Telic sentences involving a 'gradual change' over time cannot be adequately

represented within a such framework. Within a moment-based semantics, the notion of *change* can be defined as a change from  $\neg\phi$  at one moment to  $\phi$  at the next (cf., for example, von Wright's (1963 and 1968) formal calculus). Such a definition can only work for verbs involving instantaneous changes of state (*to recognize that S*).

Hoepelman (1981) uses the operator  $\Delta$  to analyse the semantics of accomplishment and of some achievement sentences expressing gradual change within model-theoretic semantics. The operator  $\Delta$  was introduced by Pott (1969) in order to describe the truth conditions of such sentences as *The door closed*, for example. According to Hoepelman, *The door closed* is true in a situation in which there is an event of the door becoming more and more closed during a certain interval of time and of its being finally completely closed.

Hoepelman (1981) also tries to represent the idea of a gradual change by means of a graph in which the x-axis represents moments of time and the y-axis represents the fluctuation of the truth values of a sentence during an interval of time. Where the graph goes up, the sentence becomes more true, where it goes down, the sentence becomes less true. The graph represents a "step function" which is a subcategory of "piecewise continuous functions" (Lang 1969:188). The "step function" allows one to represent telic situations which do not involve a monotonous approximation towards the resultant state, even though on the average they involve a gradual approximation towards the resultant state, such as, for example *John went to London*.

Hoepelman's account is flawed in the following respects. First, a mere introduction of an operator into a formal apparatus does not explain the facts. Second, intuitively, such a sentence as *The door closed* does not seem to denote a situation in which it becomes "more and more true" that the door is closed, as Hoepelman's account predicts. Rather, the sentence is false throughout the whole period during which the door is getting closed and it becomes true only at the moment when it is completely closed.



A far better characterization of the notion of 'gradual change' is given by Dowty (1979), because his framework presupposes interval-based semantics. Dowty suggests that the change-of-state entailments of accomplishments be represented in their logical structure by means of the atomic predicate BECOME. The sentence embedded directly under BECOME may contain a state, activity, accomplishment or achievement verb (cf. also Kenny 1963:178). BECOME sentences are represented by an interval that is bounded at one end by one particular state of affairs and at the other end by another particular state:

(29)

[BECOME  $\phi$ ] is true at  $I$  iff (1) there is an interval  $J$  containing the initial bound of  $I$  such that  $\neg\phi$  is true at  $J$ , (2) there is an interval  $K$  containing the final bound of  $I$  such that  $\phi$  is true at  $K$ , and (3) there is no non-empty interval  $I'$  such that hold for  $I'$  as well as  $I$  (Dowty 1979:141).

Dowty's definition of BECOME does not seem to work properly as far as the characterization of the  $I$  interval is concerned, the interval at which the gradual transition from one state to the next takes place. It could be made to work with a number of additional conditions (truth value gaps or pragmatic entailments).

In Tenny's account, *an apple* is associated with an argument in the Lexical Conceptual Structure that "measures out (the event)". What is meant by that is illustrated with a number of examples. However, there is no explicit definition of the notion of 'measuring out (of the event)'. The lack of a precise characterization of the 'measuring out' notion raises doubts about whether the Aspectual Interface Hypothesis can provide a rigorous connection between lexical semantics and syntax.

The most precise characterization of the notion 'gradual change' to date is given by Krifka (1986, 1989, 1992) and Hinrichs (1985). They define systematic relationships between the part structure of physical objects and the part structure of events. They achieve this by extending Link's (1983) lattice-theoretic analysis of mass terms and plural noun phrases to events. This allows them to model in an explicit way the part structure of objects and events and the thematic property associated with nominal

arguments that are responsible for the telic and atelic interpretation of complex verbal predicates.

Both Tenny's and Krifka's accounts presuppose that events involving incremental changes of state have temporally ordered parts that can be correlated with the corresponding parts of the object subjected to the event. When we say that the event of *Max's drinking of a cup of coffee was halfway completed* what do we mean by it? In establishing whether the event is at the outset, halfway through and so on, what do we measure? There are two intuitions. First, we may mean the measure of time that elapses. Second, what we measure is the amount of coffee that is consumed/left in a cup, the incremental change of the quantity of coffee in a cup. It is possible, for example, to correlate half a cup of coffee with half of the event: *half a cup of coffee = halfway through the event*.

The second intuition may be less obvious. Nevertheless, it is useful as a theoretical construct to account for the relationship between the parts of objects and parts of events. In Tenny's account, "[t]he verb's direct internal argument may be thought of as being converted into a function of time at some level of semantic representation. This is an aspectual property, because aspect refers to the internal temporal organization of an event" (Tenny 1989:7). There is "a measurable quantity or property which is not temporal, and which is associated with the direct or indirect object, which the verb converts into a temporal measure of the event" (Tenny and Heny 1993:9). Krifka (1992:33) also introduces a *temporal trace* function from the extensions of events, characterized by a predicate  $E$ , to the extension of  $T$ , times. This function maps an event to its "run time". It is a homomorphism relative to the join operation:  $\forall e, e' [t(e) \cup t(e') = t(e \cup e')]$ .

The second case, however, is complicated by the following problem: the rate at which the drinking of coffee takes place can vary during the course of the event. We cannot always establish whether the event is at its outset, halfway through or

completed, according to how much coffee is in the cup. Suppose I drink a cup of coffee and it takes me six minutes to drink the first half of the coffee in a cup and then I down the second half of the coffee in a cup in four seconds. Clearly, after the first five minutes half of the quantity of coffee is left. But would we want to say that the event was halfway through after the first six minutes? Or would it be more appropriate to say that the event was halfway through after three minutes and two seconds?

Fourth, Tenny's account and the account given by Krifka and Dowty also differ with respect to how the line is drawn between telic predicates and homomorphic predicates (or predicates with arguments that 'measure out' the event). First, telicity does not entail homomorphism. This is obvious. As Dowty (1991:568), for example, points out, telic predicates like *touch the finish line*, *recognize a face*, are not homomorphic, except in a trivial sense, because they denote punctual events.

Telicity does not entail homomorphism, and vice versa, homomorphism does not entail telicity. The latter claim may be less obvious. For example, in Tenny's framework, 'measuring-out' (which roughly corresponds to what Dowty and Krifka try to capture with the mathematical notion of 'homomorphism') entails telicity (Tenny's delimitedness). For, "aspectual structure is a structure associated with bounded events" (Tenny, 1992:4); hence "activities or states (in Vendlerian terms) do not have Aspectual Structure" (Tenny, 1992:4).

The necessity to draw a clear line between telic predicates and homomorphic predicates can be best illustrated by examples with atelic homomorphic predicates:

(30) *John drank beer.*

If we assumed that the verbal predicate *drink* is telic, then we would be forced to say that in the above sentence undetermined mass Incremental Theme argument makes a sentence with a telic verb behave as if it were atelic (cf. Dowty 1979:62-3; 1991:567).

We could explain such data directly by formulating meaning postulates, that is, by constraints on how lexical items are related to one another. The relevant meaning postulate can be roughly given as follows:

$$P_{\text{telic}} + \text{DO-NP}_{\text{unspecified quantity}} \rightarrow P_{\text{atelic}}$$

The solution in terms of such meaning postulates is ad hoc and should be rejected. Another option would be to assume that the unbounded Incremental Theme overwrites the inherently bounded specificatin of the predicate *drink*. The use of overwriting presupposes that there is a clash between the properties of the verb and its Incremental Theme argument and that the unbounded property of the Incremental Theme argument is given precedence, given the asymmetry of the interpretive rules. However, it would be counterintuitive to assume that there is a clash between the semantic properties of the verb and the Incremental Theme argument in such sentences as *John drank beer*. By choosing the overwriting option we would fail to account for the systematic and compositional nature of the data. There is an agreement that the contribution of nominal arguments to the telic and atelic interpretation of complex verbal predicates is fully predictable on the basis of the lexical meaning of the main verb and the bondedness properties of the Incremental Theme argument. Following the intentions behind Krifka's account, I propose that homomorphic predicates like *drink* are indeterminate with respect to telicity. The above observations can be summarized as follows:

Telicity does not entail homomorphism, and vice versa, homomorphism does not entail telicity.

The last point concerns Krifka's and Dowty's solution to the problem of telic-atelic 'shifts' induced by nominal arguments. Their proposal attempts to solve the problems related to "Vendler's attempt to classify surface verbs once and for all as activities and accomplishments", which Dowty (1979:60) rightly criticizes. Dowty and

Krifka's solution permits that Vendler's activities (atelic predicates) and accomplishments (telic predicates) can be reduced to two properties: the homomorphism property of verbal predicates and the boundedness property of their Incremental Theme. However, they are now faced with a new problem. Just as we cannot classify individual verbs once and for all as activities and accomplishments, so we cannot classify individual verbs once and for all as homomorphic or non-homomorphic. The homomorphism property is subject to contextual influences. Apart from the lexical semantics of verbs, it may be determined by the properties of the linguistic and extra-linguistic context.

For example, non-homomorphic predicates behave like homomorphic ones if they occur in a construction with a directional prepositional phrase:

(31-a) *Tom waltzed.*

(31-b) *Tom waltzed into the room.*

(32-a) *The old car rattled.*

(32-b) *The old car rattled down the street to the university.*<sup>12</sup>

On their own, *waltz* and *rattle* are non-homomorphic predicates, but they can be used with optional directional prepositional phrases in a sentence that is telic and that involves a mapping between the part structure of the denoted event and the part structure of the implied Path. The incremental change is measured according to the positional change of the participants denoted by the subject noun phrases (Holistic Themes in Dowty's sense) along the Path. As in Dowty's (1991:569) example *John drove from New York to Chicago*, the change is 'incremental' only because of the relationship the subject noun phrases *Tom* and *the old car* bear to the Incremental Path Theme. The meaning 'shift' from non-homomorphic atelic meaning to homomorphic telic meaning (involving directed-motion) is in particular striking in the case of *rattle* that is a verb of *sound emission* and does not entail any motion.

<sup>12</sup> The example is taken from Tenny (1992:25). B. Levin (1989) also shows that verbs of sound emission can be used in a construction conveying motion: *The elevator groaned slowly upwards.*

In sentences that denote situations involving a directed motion, it is the quantity of the Path and the Holistic Theme that together contribute to the telic or atelic reading of the complex verbal predicate.

- (33-a) *The earthquake shook a book off the shelf in a few seconds / ?for a few seconds*  
 (33-b) *The earthquake shook books off the shelf ?in a few seconds / for a few seconds.*

The directional prepositional phrase *off the shelf* indicates the Path that the moving entity denoted by the Theme *books* traverses. Given that in (a) the Path is bounded and given that the Theme denotes a definite quantity, there is also a finite succession of positional changes, and hence (a) is bounded. This is predicted by the homomorphism hypothesis. In (b) the plural Theme noun phrase 'books' generates reference to a plurality of events, one for each entity in the group of books. In other words, what here counts as the relevant 'incremental object' is the set of pairs of books and events. Since 'books' is an unbounded noun phrase, the homomorphism predicts that the complex verbal predicate is unbounded. The reason is that the pairings of books with the corresponding subevents will give rise to an indefinite number of positional changes.

A similar situation obtains in caused-motion sentences, illustrated by the following (b) examples:

- (34-a) *The critics laughed.*  
 (34-b) *The critics laughed the show out of town.*  
 (35-a) *Harry sneezed.*  
 (35-b) *Harry sneezed his handkerchief right across the room.*<sup>13</sup>

(b) examples are bounded and entail a homomorphism. By contrast, (a) examples do not have these properties. Neither *laugh* nor *sneeze* on its own entail homomorphism and motion. In (b), the Holistic Themes, *the show* and *the handkerchief*, and the

<sup>13</sup> Examples are taken from Jackendoff (1990:233). See also Gawron (1986), B. Levin (1989), Goldberg (1992/95), among many others.

directional phrases, *out of town* and *right across the room*, are not subcategorized arguments of the verbs *laugh* and *sneeze*. The *location of the handkerchief* on the Path indicated by the optional directional prepositional phrase *across the table* determines the progress of the caused-motion event.

In all the examples given so far, the Path participant with respect to which the complex predicates are homomorphisms is not a syntactically realized argument. In the following examples, the Incremental Theme is syntactically realized as a direct object, but it is not a subcategorized argument of the verb. This is shown by the so-called "fake" object in the resultative sentence (b):

(36-a) *We walked.*

(36-b) *We walked ourselves into a state of exhaustion.*

(a) is atelic. In (b) the resultative phrase *into a state of exhaustion* specifies the limit of the denoted event. Hence, (b) is telic. The part structure of the event corresponds to the degrees of a property scale that measures the exhaustion of the participant denoted by the reflexive "fake" object *ourselves*. The reflexive pronoun is associated with the Incremental Theme.

It has been shown that the homomorphism is not due merely to the lexical semantics of the main lexical verb, but also to sentence internal contextual factors. There are also cases in which the homomorphism is pragmatically determined. Consider the following example:

(37) *The doctor examined the patient for an hour / in an hour.*

This sentence has a telic interpretation if it can be construed as denoting a situation in which the doctor follows a certain established examination procedure that consists of a number of successive steps. For every part of the examination event, there is a corresponding part of the examination procedure. The telic interpretation does not depend on what is explicitly coded in the linguistic expressions, but on what the interpreter knows about the larger scenes that the linguistic material in the above

sentence evokes. This point is also illustrated by the following sentence that does not lend itself to a telic construal:

- (38) *The doctor examined his motives (?in a few minutes/for a few minutes) and decided to let the patient die.*

In view of such examples, we conclude that the homomorphism is not associated with the verb's meaning alone, but rather it is to be attributed to the predications conveyed by actual utterances and to the background of the interpreter's knowledge about the linguistic and extra-linguistic context.

To summarize, the homomorphism property has the following sources:

(i) It is determined by the relation that the verb bears to one of its subcategorized arguments, the Incremental Theme (independently of the linguistic and extra-linguistic context). The Incremental Theme is a syntactically realized argument: cf. *John drank beer* vs. *John drank a glass of beer*.

(ii) It is entailed by individual verbs, however, it is not attributable to the relation that the verb bears to one of its subcategorized arguments: cf. *John was becoming an architect but was interrupted before he could finish his degree* (cf. Dowty 1991:569). Here, the part structure of the event correlates with the steps on an implicit Path one must go through to become an architect.

(iii) It is an entailment of certain grammatical constructions, on the level of verb phrase and clause. The participant whose part structure is mapped onto the part structure of the event is not a syntactically realized argument: cf. *The old car rattled down the street to the university*, *The earthquake shook a book/books off the shelf*, *The critics laughed the show out of town*.

(iv) It is an entailment of certain grammatical constructions, on the level of verb phrase and clause. The Incremental Theme is a syntactically realized argument but it is not a subcategorized argument of the main lexical verb: cf. *We walked ourselves*



*into a state of exhaustion.*

(v) It is pragmatically determined *The doctor examined the patient (in an hour).*

Examples that illustrate (ii) - (iv) denote events in which we can isolate a participant whose part structure is correlated with the part structure of the event. Hence, the telicity can be accounted for in a straightforward way by the homomorphism hypothesis. However, the problem for Krifka-Dowty's account lies in the fact that there is not enough information in just the surface syntax of such examples and the list of thematic roles in the argument structure of the main lexical verbs to allow us to apply the homomorphism to motivate the telic and atelic interpretation. In short, the problem is how to provide an explicit account of the data that appears to be of non-compositional nature.

Dowty (1991) and Krifka (1989 and 1992) are aware of this problem. According to Dowty, a predicate is a homomorphism from its Incremental Theme argument denotations into a structured domain of events, "modulo its other arguments" (Dowty 1991:567). However, he does not elaborate on how the influence of these "other arguments" should be handled. Krifka (1992) mentions that the mapping properties are not necessarily always "'hard-wired' in the thematic relations, but follow from other knowledge sources. Furthermore, according to Krifka, the homomorphic property of such verbs as *eat* should not be taken as their grammatical feature, but as an external fact about the world (that is, by our "normal" way of eating, cf. Krifka 1992:45).

### **3.4 Alternative Proposal**

#### **3.4.1 Telicity and Frame-Creating Adjuncts**

It has been observed that telicity and homomorphism do not arise solely from the inherent semantic properties of verbs. Almost any verbal predicate that does not

entail homomorphism can participate in a construction whose interpretation involves establishing a homomorphism between the part structure of the denoted event and the part structure of one privileged participant. Whether a given verbal expression entails homomorphism and telicity is determined by the lexical semantics of its head verb, its obligatory arguments and optional adjuncts, the discourse-level linguistic context and the context of the utterance (cf. Comrie 1976:45-6, Dowty 1979:185, for example). In English the meaning 'shifts' from atelic to telic, and from non-homomorphic to homomorphic interpretation, such 'shifts' typically involve no change in the verb forms. They are induced by some properties of the linguistic or extra-linguistic context.

In this section, I will give some suggestions for describing those cases in which the homomorphism is a property of a whole clause, rather than an entailment of its lexical head verb, and in which it is due to the contribution of an optional adjunct phrase. We need to distinguish between two kinds of adjuncts. There are adjuncts that do not alter the argument structure of a verb. They supplement the existing argument structure of the verb with further arguments. Such adjuncts fit into the frame activated by the verb. They fill in the necessary or potential aspects of any situation, such as time, place, manner, reason, beneficiary, etc. Examples of such adjuncts are given in the following clauses:

- (39-a) *We danced in the living room.*
- (39-b) *She sang around midnight.*
- (39-c) *We buttered the bread with cheap margarine.*

There is another class of adjuncts that "create[s] frames of their own, to which the predicators must make some semantic accommodation" (Fillmore 1989:101). The 'frame-creating adjuncts' (cf. Fillmore 1989:101) can be illustrated by the following example given by Fillmore (1989:102):

- (40) *I wrote to my grandmother.*

Here, the prepositional phrase *to my grandmother* has a function that is not provided by the basic sense of the verb *write*, it does not fit the frame automatically activated by this verb. The *to*-phrase creates a frame of transmission of something to somebody into which the verb *write* "fits". The whole clause is interpreted in a new way shaped as much by the prepositional phrase as by the main verb, *write to* is interpreted as *correspond with*. This change is motivated by connecting the goal meaning of the *to*-phrase with the meaning of *write*.

The frame-creating adjuncts that concern us here are those that determine the telic interpretation of the complex verbal predicate. I will discuss in some detail resultative adjuncts in such sentences as the following one, for example:

(41) *The horses dragged the logs smooth.*

This resultative clause is telic, as is shown by the compatibility with temporal adverbs:

(42) *The horses dragged the logs smooth ?for two hours/in two hours.*

The sentence entail the logs undergo an incremental change, they gradually become smoother during the course of the event. The corresponding clause without the resultative adjunct *smooth* is atelic, as is shown in

(43) *The horses dragged the logs for two hours/?in two hours.*

The main verb *drag* on its own is not homomorphic.

In *The horses dragged the logs smooth* the resultative adjectival phrase *smooth* does not fit the frame automatically activated by the verb *drag*, but it 'creates' a frame into which the verb *drag* must be integrated. The combination of the verb *drag* with the resultative adjective *smooth* may be thought of as a kind of complex predicate 'smooth-drag' that is homomorphic. The resultative adjective crucially contributes to the expression of the the incremental event type associated with the resultative clause. The part structure of the event is correlated with the part structure on a

property scale associated with logs. The relevant property that incrementally changes during the course of the event is the smoothness of the logs.

The addition of an optional adjunct may create a frame that involves an incremental change. This, however, is not always sufficient for a whole clause in which the adjunct is used to be telic. In the following examples both the Holistic Theme (cf. Dowty 1991) and the Incremental Path Theme (cf. Dowty 1991) entailed by the directional *off*-phrase determine the telicity of the complex verbal predicate:

- (44-a) *The earthquake shook a book off the shelf.*
- (44-b) *The earthquake shook books off the shelf.*

The Goal adjunct indicates the Path that the Holistic Theme (*books*) traverses, the incremental change is measured according to its positional change along the Path. Given that in (a) the Path is bounded and given that the Holistic Theme denotes a definite quantity, there is also a finite succession of positional changes. Consequently, the denoted event is bounded (telic). The presence of a directional adjunct is a necessary, but not a sufficient condition on the interpretation of the sentence as telic. By contrast, in (b), the Holistic Theme is unbounded, consequently the Path has a unbounded spatial extent and the denoted event is unbounded (atelic). The same point is illustrated by the following examples:

- (45-a) *The rabbit jumped into Harriet's arms in a minute / ? all day.*
- (45-b) *Rabbits jumped into Harriet's arms all day / ?? in a minute.*

The following table summarizes the possible combinations of the (in)definite quantity of the Incremental Path Theme and the Holistic Theme. It shows that only if both the Incremental Path Theme and Holistic Theme indicate a bounded quantity, the clause to which they make their semantic contribution will be telic:

Path	+	Holistic Theme	→	(Path + Holistic Theme)
B+		B+		B+
B-		B+		B-
B+		B-		B-
B-		B-		B-

Once we determine which participant is the relevant participant whose part structure is mapped into the part structure of the event, the telic and atelic interpretation of a clause will be determined in a way analogous to that which we find in the familiar examples like *John drank wine* vs. *John drank a glass of wine* in which the Incremental Theme argument is syntactically expressed. In the above examples, the event delimiting participant is the implied Path. In light of such examples, among others, I propose that the rules governing the semantic integration of the Incremental Theme Path (expressed or implied by the adjunct) and the Holistic Theme are triggered by the *incremental event type* that is activated by the whole clause.

### 3.4.1.1 Incremental Event Type and Incremental Theme Participant

As in Krifka (1986 and 1992) and Dowty (1988 and 1991) I use the thematic role 'Incremental Theme' in order to capture the semantic commonality of verbs that are inherently homomorphic. At the same time, I allow for the possibility that a homomorphism may have other sources than just the lexical semantics of individual verbs, sources whose domain may be a verb phrase or even a whole clause. The homomorphism property can be thought of as being associated with certain patterns of thematic roles and certain patterns of morpho-syntactic structure in simple clauses. This allows us to account for the systematic way in which clauses are assigned a telic or an atelic interpretation, although they cannot be viewed as a simple projection of the lexical properties of their lexical verb heads or calculated by compositional rules on the basis of independently motivated syntactic structures (along the lines Krifka

and Dowty suggest).

The proposal that the homomorphism entailment is associated with constructions, rather than just with individual verbs, is consistent with Dowty's account. Dowty (1991) observes that "[c]ertain grammatical constructions have certain meanings associated with them (entailments or conventional implicatures) involving Proto-Agent or Proto-Patient properties, ..." (Dowty 1991:608). The possibility of such an analysis "presupposes that a grammatical construction (or some morpheme serving as head of the construction) can be analyzed as having a meaning and/or conventional implicature of its own ... " (Dowty 1991:609).

I propose that a homomorphism characterizes a fragment of conceptual structure, an *incremental event type*. An incremental event type is one of the interpretive schemas or frames (in the sense of Fillmore) against which clauses are interpreted. The status of the incremental event type in the conceptual representation of clauses is comparable to that of a *scalar model* with respect to which, for example, a *let alone* clause is interpreted (cf. Fillmore, Kay, O'Connor 1988).<sup>14</sup> The incremental event type can be evoked by a single verb, but also by a whole construction, such as the construction that contains an optional adjunct that expresses a bounded Path: *She waltzed into the room*.

Having both the Incremental Theme and the incremental event type at our disposal to represent what is a single grammatically relevant property may at first sight seem redundant. However, this is justified given that there is no one-to-one correspondence between thematic roles and participants in the denoted events (cf. also here further below). Two different verbs can assign the incremental participant of the incremental event to two different thematic roles and grammatical functions. For

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<sup>14</sup> A scalar model can be evoked by a single lexical item like *even* (Kay 1990), but also by a whole construction, such as the *let alone* construction (Fillmore, Kay, O'Connor 1988).

example, the incremental participant may be a Path in the incremental event type. In *John went to Chicago* the prepositional phrase *to Chicago* is assigned the thematic role Goal and it indicates the end-point of the implied incremental participant, the Path. In *John crossed the desert* the Path is syntactically realized as the direct object *the desert* and it is assigned the thematic role Incremental Theme. And vice versa, the Incremental Theme role may correspond to two distinct participant roles in the associated event, as in *John crossed the desert* and *John painted a house*. In short, we need to distinguish clearly between the thematic role 'Incremental Theme' and the incremental participant role.

The incremental participant role is fulfilled by that participant in the incremental event type whose properties are intrinsically tied to the temporal extent of the event.

Two main canonical types of the incremental event type are here distinguished:

1. the part structure of the situation is correlated with the part structure of one of its participants;
2. the part structure of the situation is correlated with the part structure of some property scale associated with the (incrementally changed) participant.

The first canonical type can be illustrated such predicate-argument relations as *eat a sandwich*, in which the direct object *a sandwich* is the Incremental Theme. The relevant measurable property is the spatial *extent* of the sandwich. Its decreasing quantity as it is being gradually consumed during the eating event permits us to monitor the progress of the eating event.

With verbs of creation, such as *knit*, as in *knit a sweater*, the measurable property is the increasing quantity of the referent of the Incremental Theme *a sweater* as it gradually comes into existence.

With verbs that take 'Representation-Source Theme', such as *memorize a poem*, *read a book*, the structure of the source object is correlated with the part structure of the event of producing a representation.

With transitive verbs of directed motion like *cross the desert*, the Incremental Theme is realized as a direct object. The part structure of the Path is correlated with the part structure of the event. The location of the moving Agent along the Path allows us to monitor how the event evolves in time.

Clauses with such verbs as *grow*, like *The corn grew as high as an elephant's eye*, for example, entail an implicit Path that gives the direction of change of size (cf. Jackendoff 1990:239).

The second canonical type concerns various scalar properties of participants, other than just their spatial extent. Consider examples like

- (46-a) *The candybar melted into a gooey mess.*
- (46-b) *Max darkened the photograph.*
- (46-c) *The sun ripened the fruit.*
- (46-d) *The acid dissolved the metal.*

For example, in *The candybar melted into a gooey mess* the subject *the candybar* is the Incremental Theme and the relevant changing property is the *consistency* of its referent as it is gradually melting. The different physical stages of the whole piece of candybar in the melting process can be projected onto degrees on a consistency scale. Hence, the part structure of the event corresponds to the degrees on the property scale associated with the participant that undergoes an incremental changes during the event. The final stage of the change is indicated by the resultative PP *into a gooey mess*.<sup>15</sup> Similarly

- (47) *The doctor cured the patient*

denotes an event during which the patient changes along the scale that measures his gradual recovery (cf. Tenny 1993:5).

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<sup>15</sup> Jackendoff expresses the same intuition as follows: verbs like *melt*, *freeze* have "an implicit Goal argument that encodes the final state of the Theme" (cf. Jackendoff 1990:239).



In both the types, the incremental situation is characterized in terms of a series of changes, distinguishable *incremental stages* that gradually lead up to a transition from one situation to the next. The temporal boundaries of the event are determined by the final stage of the incremental change that characterizes a given event. In *eat a sandwich*, the temporal boundaries (initial and final) of the denoted event are determined by the spatial *extent* of the sandwich. When there is no sandwich left to be eaten, the event *necessarily* ends. Of course, such an event can be interrupted any time prior to that time.

These two canonical subtypes do not constitute discrete classes. For example, *grow into an adult* can be predicated of a participant (Incremental Theme) that gradually changes along the spatial (physical extent) scale as well as in terms of its qualitative aspects (like set of beliefs, dispositions, etc.). One reason for this distinction stems from German data. The distinction is relevant for the statement of the well-formedness constraints on the German partitive construction with the partitive *an-PP*. (I will describe this construction in detail in Chapter 6.) This construction is sanctioned if the verbal predicate that takes part in it evokes an incremental situation type of the first canonical subtype.

The notion of 'incremental change' appears to be an essential category of human experience.<sup>16</sup> The core cases of the incremental event type concern such situations as creation and destruction of objects, consumption as well as the change of location of an object. Therefore, it is not surprising that the situations involving the core cases of an incremental change are also semantically privileged and that the frame specific participant that undergoes the incremental change should make its way into the argument structure of the verb.

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<sup>16</sup> The facts from the first language acquisition provide support for this view. See, for example, Clark (1978), Slobin (1985) and Bowerman (1989).

### 3.4.1.2 Approaches to Frame-Creating Adjuncts

The treatment of adjuncts that are not subcategorized by the verb and that induce the meaning 'shifts' from atelic to telic, and from non-homomorphic to homomorphic, reading is related to two issues that regard adjuncts in general. First, how should the introduction of adjuncts be treated by rules of grammar? In particular, what type of rule licenses such adjuncts? Is it a lexical (e.g., a lexical item that specifies a "constructional meaning") or an extralexical rule? Second, who selects whom? Do verbs select for adjuncts or vice versa, do adjuncts specify that they are compatible with certain verbs? We may pursue a lexical strategy and invoke *formation rules* with *zero-morphology* or we may provide meanings for verbs that are *indeterminate* with respect to the homomorphic entailment and telicity.

The first option, *formation rules* with *zero-morphology*, presupposes postulating two (or more) senses for each verb or two (or more) different lexical items. The relation between the different senses or lexical items is captured by means of a lexical rule (a kind of derivational rule with zero-morphology). This would amount to the claim that there are two different subcategorizations for such verbs as *walk* depending on whether it occurs in a telic or an atelic construction. Consider the following clauses:

(48-a)     *John drove.*

(48-b)     *John drove from New York to Chicago.*

It may be argued that there are two lexical forms of *drive*, *drive*<sub>1</sub> in (a) and *drive*<sub>2</sub> in (b), one for each syntactic frame. *Drive*<sub>1</sub> is atelic and not homomorphic. *Drive*<sub>2</sub> occurs with a locative phrase expressing the beginning and end point of a Path. The complex predicate *drive from New York to Chicago* is homomorphic and, at the same time, telic. The relation between these two forms is captured by a lexical rule. Such a rule creates a pair of syntactic frames. In the case of *drive* such a rule will create a possibility for having a homomorphic *drive* that is a two-place predicate. It takes a subject argument and a prepositional argument. A lexical rule would combine a one-

place predicate *drive* with a locative phrase to produce a new complex predicate *drive from X to Y*. In other words, the locative phrase augments the argument structure of the one-place predicate *drive*. A proposal along these lines can be found in Dowty (1979:207ff.), and also in Jackendoff (1975), Bresnan (1982) and Marantz (1984), for example.

A similar proposal for resultative predicates is provided by Levin and Rappaport (1988). They encode the difference between *wipe the dishes* and *wipe the dishes dry* through their Lexical Conceptual Structures:

(49-a) *Evelyn wiped the dishes*  
           wipe<sub>1</sub>  
           Conceptual Structure: [x 'wipe' y]

(49-b) *Evelyn wiped the dishes dry*  
           wipe<sub>2</sub>  
           Conceptual Structure: [x CAUSE [y BECOME (AT) z] BY [x 'wipe' y]]

In the resultative construction, it is the underlying "[y BECOME (AT) z]" portion of the Conceptual Structure that imparts the resultative sense.

Against the possibility of invoking such formation rules with zero-morphology, it can be objected that it leads to a proliferation of lexical entries with unmotivated and quite implausible senses for verbs. (This objection was also made by Goldberg 1992/95.) We would have to postulate a special sense for *wiggle* in *Willy wiggled into Harriet's arms*, 'to move in X by wiggling' or for *laugh* in *The critics laughed the show out of town* 'to move X out of Y by laughing', for example. Furthermore, we would miss important generalizations. Take, for example, secondary predicates. As Fillmore and Kay (1993, Ch.10) point out, verbs of 'gustation' and verbs of '(dis)liking' seem to allow patient-controlled depictive predicates, and verbs of 'affecting' patient-controlled resultative predicates.

The second option involves providing meanings for verbs that are *indeterminate* with respect to the homomorphic entailment and telicity. This could be encoded in their lexical entries with feature specifications '[homomorphic [ ]]' and '[telic [ ]]'.

It seems that almost any episodic verb that is not homomorphic and telic can be construed as homomorphic and telic in at least some contexts. This approach would amount to claiming that there is a large class of episodic verbs for which it is impossible to determine which situation type they belong to. This in turn would raise suspicions as to how useful it is to classify verbs with respect to telicity and homomorphism. Yet, independent grammatical tests show that such verbs as *find*, *arrive*, *die* are clearly telic, such verbs as *run*, *drag* atelic and *write (a book)* is homomorphic, in their basic unmarked senses. It is also well-known that verbs denoting states and processes are inherently atelic. The previous work on telicity, in particular that of Krifka, strongly suggests that only homomorphic predicates are indeterminate with respect to telicity. This allows to describe in a compositional way the systematic contribution of the Incremental Theme argument to the telic and atelic reading of the whole clause.

Another possible solution to the description of optional adjuncts is to assume that "verbs include a specification for adverbial phrases in their ADJUNCTS value-set" (Pollard and Sag 1987:161). Pollard and Sag (1987:161ff.) suggest that head verbs select their adjuncts, because "the class of signs that can be modified by a given adjunct can typically be characterized as a class of phrasal projections of some lexical category; ..." (Pollard and Sag 1987:161). They assume that "each lexical sign specifies a value (some finite set of syntactic categories) for the head feature ADJUNCTS. (...) The basic idea here is that an adjunct daughter in a head-adjunct structure is sanctioned as long as its SYNTAX unifies with one of the members of the ADJUNCTS value-set on the head daughter, which in turn is inherited from the head-daughter's lexical head" (Pollard and Sag 1987:161). The feature "adjunct" is a head-feature that percolates upwards to phrasal projections of that head. This strategy has, according to Pollard and Sag (1987) the advantage that "the proliferation of special-purpose head-adjunct rules (...) is avoided, while compatibility between heads

and adjuncts is maintained; ..." (Pollard and Sag 1987:161).

It seems that an equally convincing argument can be made for regarding the adjunct, rather than the verb, as encoding the argument structure and determining the syntax of the VP. In this approach, the verb head is an "argument", not the "functor". As Pollard and Sag (1987:160) observe it is difficult to formalize this intuition within HPSG. This intuition is implemented in Jackendoff (1990:211). He discusses three kinds of "superordinate adjuncts": 'X's Way Object' construction (*Babe Ruth homered his way into the hearts of America*)<sup>17</sup>, the directional adjunct construction (*Willy jumped into Harriet's arms*) and the resultative construction (*Charlie laughed himself silly*). At first sight, the proposal that the dependency between adjuncts and verbs is determined by some specification on the adjunct may seem flawed for the following reason. It would seem that we would have to postulate a number of homonyms. We would need a special *into*-phrase for example, for those cases in which *into*-phrase together with a manner of motion verb yields a directed motion predicate that activates the incremental event type, as in

(50) *The conductor danced into the orchestra pit.*

We would need to distinguish it from the *into*-phrase in

(51) *The conductor smiled into the orchestra pit.*

that does not entail any motion in the concrete physical domain.<sup>18</sup> *Look into the orchestra pit* is associated with the process situation type.

An even stronger argument against the proliferation of special-purpose homonymous adjuncts can be made with resultative adjective phrases. It would be

<sup>17</sup> Cf. also Jackendoff (1989), Levin and Rappaport (1988), Marantz (1989), Goldberg (1992/95), among others.

<sup>18</sup> It may be argued that there is a metaphoric Path involved in this clause. Nonetheless, we would still need some mechanism to distinguish the spatial and metaphoric Path involved in the use of the *into*-phrase.

counterintuitive to claim that there is a special adjunct *silly* in

(52) *John laughed himself silly*

that means something like 'gone over the edge' specifying the final stage of the incremental change that John undergoes.

However, Jackendoff (1990) seems to overcome this possible objection. On his account, the adjunct rule states restrictions on the appropriate class of verbs that can enter into the resultative construction. He relies on lexical entries that do not completely specify in which syntactic frames they appear and how these frames are matched to semantic structure. The matching is provided by various extralexical rules, i.e., *linking rules*. In this Jackendoff follows the lead of Carter (1984), Foley and Van Valin (1984), Grimshaw (1987), Bresnan and Kanerva (1989), among others.

In the spirit of some suggestions in Fillmore (1989:101ff.) and Fillmore and Kay (1993), I propose that the dependency between the verb and the adjunct is not determined by some specification on the verb or the adjunct. The difference between pair of sentences like *The conductor smiled into the orchestra pit* (atelic) and *The conductor danced into the orchestra pit* (telic) indicate that it is not an adjunct on its own that determines the telicity of a given clause. It is the inherent lexical semantics of the verb together with the inherent lexical semantics of the adjunct that determine whether a clause will have a telic or an atelic reading. Since the verb (its arguments) and the optional adjunct are mutually constraining, the relevant constraints should be stated over both the verb and adjunct.

I propose that adjuncts are introduced by special adjunct-licensing constructions. As Golberg suggests (1992/95), they function as arguments directly sanctioned by a construction, rather than as arguments of the verb. The complement structure of a construction with an adjunct phrase comprises both the adjunct phrase and the valence requirements of the main verb. The adjunct-licensing constructions are stipulated independently of particular verbs and adjuncts (cf. also suggestions in Fillmore

and Kay 1991; Goldberg 1992/95). The syntactic and semantic requirements of a construction are matched against the requirements of its constituting lexical items. The construction requires that its requirements be satisfied. Particular lexical items can be viewed as "fitting into" a construction. Whenever the syntactic and semantic requirements of a construction disagree with inherent lexical properties of its constituting lexical items, the requirements associated with the construction take precedence. This may trigger a 'shift' in the inherent meaning of its constituting lexical items (cf. Talmy 1986:9; Fillmore 1989:48).

This account presupposes that just as lexical entries of verbs come with their valency requirements and semantics, so constructions can be characterized by their argument structure and their associated semantics, including a particular situation type. As has been observed, not only verbs, but also verb phrases and sentences are associated with a certain situation type. The construction itself may be associated with a meaning that does not arise compositionally from the meaning of its constituents. A given verb, independently of the sentence in which it occurs, and the whole clause may be each assigned to a different situation type. For example, atelic predicates are understood as telic if they occur as complements of phasal verbs like *finish* or *stop*. (*I haven't finished looking at your term paper yet, but I'll try to finish it tonight so we can discuss it tomorrow*, cf. Dowty 1979:61.) Within the "constructional" approach to such contextually determined 'shifts', the construction may be associated with one situation type and the verb that participates in it with a different situation type. Since the verb does not automatically fit into the construction, it must make some semantic accommodation to it.

This account has the advantage that we need to posit only a single verb sense to account for the behavior of *dance*, for example, in such clauses as *Willy danced* and *Willy danced into Harriet's arms*. There is no 'shift' or 'overriding' of the meaning of the verb (including the situation type it activates) in *Willy danced into Harriet's*

*arms*. Even here, the verb *danced* retains its inherent lexical semantic properties, which it shares with *dance* in *Willy danced*, for example. The whole construction with a directional prepositional phrase is telic and it requires an atelic manner of motion verb. The result of the semantic integration of the inherent lexical meaning of the verb with the telic meaning of the construction can be paraphrased as 'Willy went/got into Harriet's arms by dancing'. Sentences with verbs that cannot be "fitted into" the manner of motion frame required by the construction are unacceptable: \**Willy joked into Harriet's arms*. Another example of the atelic-to-telic 'shift' is illustrated by the following examples:

(53-a) *The old car rattled.*

(53-b) *The old car rattled down the street to the university.*

A directional prepositional adjunct is sanctioned with manner of motion verbs (cf. Jackendoff 1990) and also with verbs of sound emission. The use of verbs of sound emission in the directed motion clause (b) seems to be licensed by establishing a causal relation between the motion and the sound emission caused by the motion. As Schmerling (1975) and Dowty (1979:209) point out such causal relationships are a matter of conversational implicature, rather than of entailment.

In such examples like those in the previous paragraph, the situation type of a complex verbal predicate or a sentence cannot be calculated from the meaning of its parts by compositional rules. The integration of the verb's meaning into the meaning of a construction is achieved by "rules of construal" (cf. Jackendoff 1991:3-4, for example). A standard example of such a rule is given by Nunberg's (1979):

(54) [One waitress says to another:] *The ham sandwich in the corner wants another cup of coffee.*

The lexical entry for *ham sandwich* does not specify a potential reading 'customer with a ham sandwich'. Moreover, the clause does not contain any other lexical item that licenses this reading. There is a rule of construal that says: 'A constituent



identifying an individual X may be used/understood to identify an individual contextually associated with X.' This rule inserts additional material into the conceptual structure of the clause, roughly 'individual contextually associated with.' According to Jackendoff (1991:4) such rules of construal "resolve otherwise ill-formed utterances".<sup>19</sup>

### 3.4.1.3 The English Resultative Construction

The English resultative construction has given rise to a number of fundamental questions in the domains of syntax, semantics and their interface. It has recently been discussed in Dowty (1979), Rothstein (1983), Simpson (1983), Jackendoff (1990), Hoekstra (1987, 1988), Tenny (1987, 1992, 1993, 1994), Bresnan and Zaenen (1990), Van Valin (1990), Rappaport and Levin (1991), Goldberg (1992/95), Napoli (1992), Carrier and Randall (1992).

Rather than trying to give a comprehensive account of the resultative construction, I will focus on four points. First, I propose that the conceptual structure of the resultative construction involves information about the incremental event type. Following some general suggestions independently made by Fillmore (1989, Ch. 6.3 *Frame-Creating Adjuncts*), the main verb that enters into the resultative construction retains its intrinsic semantic properties and the specific notions associated with its conceptual frame interact with the incremental event type associated with the whole resultative construction. The main verb need not be associated with the incremental event type independently of the resultative construction.

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<sup>19</sup> The rules of construal in Jackendoff (1991) correspond to Levin and Rappaport's (1988) rules of "lexical subordination" and to Jackendoff's (1990) "superordinate adjuncts" (applied to the way-construction and the resultative construction, for example).

Second, the rule that licenses the resultative argument is not a lexical rule, rather this argument is licensed by the resultative construction itself. This idea is explicitly proposed for the English resultative construction by Goldberg (1992/95) and it can be traced to some suggestions independently made in Fillmore (1989) and Fillmore and Kay (1991). Goldberg (1992/1995) argues that the resultative construction is associated with its own meaning and argument structure. In particular, according to Goldberg, the postverbal NP that is not a subcategorized argument of the main verb (as in *John talked himself hoarse*) functions as an argument of the resultative construction. If the postverbal NP is a subcategorized argument of the main verb, it is "fused" (cf. Jackendoff 1990:53 and elsewhere) with the postverbal NP of the resultative construction.

Fourth, I propose that the postverbal NP in the resultative construction belongs to a rather narrow subtype of "arguments which potentially undergo a change of state as a result of the action denoted by the verb" (Goldberg 1992:203), namely they are Incremental Themes (in Dowty's sense, cf. Dowty 1988, 1991). Although this idea has not been considered in any of the previous accounts of this construction<sup>20</sup>, it is clearly related to semantic accounts of the resultative construction that suggest that the resultative can only apply to a restricted class of semantic arguments (cf. Jackendoff 1990, Van Valin 1990, Goldberg 1992/95).

Fourth, resultative clauses are telic and if the main verb is in the simple (non-progressive) form they entail that the relevant end state indicated by the resultative phrase was reached. Hence, complex resultative predicates in English have a completive entailment comparable to that of perfective (aspectual) verbs in Slavic languages. I will also show that there is an affinity between the telic and completive meaning associated with the resultative construction (whose main verb is in the

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<sup>20</sup> A similar proposal was made by Tenny (1994). Given that Tenny's book appeared in the final stages of writing of this chapter, I could not compare my proposal with hers.

simple non-progressive form) and the bounded interpretation of the Incremental Theme argument.

Let us first consider the range of syntactic classes of verbs that can enter into the resultative construction. The most frequently mentioned cases are those with two-place predicates, as in the examples given by Jackendoff (1990:226):

- (55-a)     *The gardener watered the tulips flat.*  
               *(The gardener watered the tulips.)*
- (55-b)     *Harry hammered/pounded the metal flat.*  
               *(Harry hammered/pounded on the metal.)*

The clause in the parentheses indicates the "base form". In the above examples the Incremental Theme DO-NP of the resultative construction is the Patient of the "base form": it is linked to the direct object *the tulips* and to the oblique object *on the metal*. If the "base verb" is a one-place predicate that takes an Agent argument, the Incremental Theme DO-NP of the resultative construction is a reflexive pronoun co-referential with the referent of the subject:

- (55-c)     *Charlie laughed himself silly.*  
               *(Charlie laughed (\*himself).)*

The "host" of the resultative phrase is not only the direct object argument of the resultative construction, but it can also be its subject. This is the case in non-agentive resultative constructions in which the "base form" is an unaccusative predicate with an Incremental Theme argument:

- (55-e)     *The river froze solid/into a solid mass.*  
               *(The river froze.)*
- The toast burned black/to a cinder.*  
               *(The toast burned.)*

The resultant state can be encoded with an adjectival (AP) or a prepositional phrase (PP), which is not a subcategorized argument of the main lexical predicate. The resultative AP or PP specifies the end-point on a property scale associated with the participant denoted by the postverbal NP (cf. Tenny 1987:36ff., 186, 1994; Goldberg 1992/95), or the Incremental Theme. It is generally agreed that the resultative

AP cannot be a deverbal adjective: \**She painted the house reddened* (cf. Green 1972). However, the conditions on the appropriate resultative AP are difficult to state. With predicates that are inherently non-homomorphic, the resultative AP tends to be either non-gradable (*dead/alive*) or interpreted as non-gradable.<sup>21</sup> This may be supported by the fact that such adjectives as *silly*, which are typically gradable or relational, receive a non-gradable interpretation in the resultative construction with an inherently non-homomorphic predicate. For example,

(56) *Max laughed himself silly.*

entails that *Max* has "gone over the edge" by laughing (cf. Goldberg 1992/1995). Notice that the relevant end-stage of the incremental change need not necessarily be understood as the absolute end-point on a property scale associated with the Incremental Theme participant. It may merely be some well-understood and contextually-determined final stage of the denoted event.

Verbs that are associated with the incremental event type independently of the resultative construction, can be combined with a resultative AP headed by non-gradable or gradable adjectives:

(57-a) *He painted his house pink-ish.*

(57-b) *He made the table oval / dirty / damp.*

The observation that a specific combination of the verb with the resultative AP or PP is felicitous may be simply due to certain inferences that we make on the basis of our general frame-semantic knowledge. This knowledge may include certain prototypical scenarios along with their typical outcomes. For example, the activity of *wiping* is such that it makes sense to use the resultative adjuncts like *dry*, *clean*, but not *damp*, *dirty* and the like.

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<sup>21</sup> For the 'gradable vs. non-gradable' distinction see Bierwisch (1970), for example.

Notice that we can say *Bill broke the vase to pieces*, but not *\*Bill broke the vase worthless*. The difference seems to concern the type of admissible resultant state. The resultative phrase that specifies the end state of the incremental change in the properties of the Incremental Theme participant is acceptable (*to pieces*), while the resultative phrase that specifies some attribute that is imposed on it by external social facts or conventions, is not.<sup>22</sup>

Of course, there are many cases of 'lexicalized' resultative constructions in which the world knowledge is of no help in determining the acceptability of a specific resultative phrase. Consider the following examples from Green (1972) and Dowty (1979:303):

- (58-a)     ?*John hammered the metal shiny.*
- (58-b)     ?*She shot him lame.*
- (58-c)     ?*Bill blasted Al dead.*
- (58-d)     ??*She wept herself to sleep.*

Such examples are not well-formed, despite the fact that they are perfectly intelligible and apparently parallel both syntactically and semantically to completely natural examples like the following ones:

- (59-a)     *John hammered the metal flat.*
- (59-b)     *Bill shot Al dead.*
- (59-c)     *She cried herself to sleep.*

Such examples suggest that the acceptability of a given resultative PP or AP in a given resultative clause is not determined by facts about the real world, but rather it is due to the conventionalized meaning of words or certain collocations.

Semantically the resultative AP or PP can be thought of as operators that modify the Incremental Theme argument (regardless of whether it is realized as a direct object or subject). If we assume that they introduce a property scale that measures the *changes* of the participant linked to the Incremental Theme argument, we can

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<sup>22</sup> This constraint needs to be refined.

motivate the observation that they cannot co-occur with stative predications (cf. also Hoekstra 1987):

(60) \**Martin believed the idea outrageous.*

As far as episodic predicates are concerned, we first notice that predicates like *watch* cannot occur with a resultative phrase:

(61-a) \**Amy and Beth watched TV into a torpor.*

(61-b) \**Amy and Beth watched TV broken.*<sup>23</sup>

The meaning of the verb *watch* cannot be integrated with the frame created by the resultative phrase. Neither Amy and Beth nor the TV can be understood as changing and gradually approximating the end state of being in a torpor or broken.

There is a conspicuous disagreement with respect to the delimitation of the semantic class of episodic predicates that can enter into the resultative construction. Van Valin (1990:255) claims that "[a]ctivity verbs, which are inherently atelic and therefore cannot in principle code a result state or have an undergoer argument, do not take resultative phrases". By contrast, Dowty (1979:219) suggests that a resultative construction consists of "an activity verb followed by an object and then an adjective expressing the result-state that the object comes to be in as a result of the activity". Similarly as Dowty, Jackendoff (1990:240) proposes that only unbounded predicates (Dowty's "activities") can enter into the resultative construction. Who is right? It seems that neither is.

Van Valin's generalization is disqualified by such resultative sentences as the following one (cf. Jackendoff 1990:226):

(62) *The horses dragged the logs smooth.*

This sentence is well-formed, and yet the resultative predicate *smooth* is here applied to an activity predicate:

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<sup>23</sup> Examples are taken from Jackendoff (1990:226).

(63) *The horses dragged the logs.*

This can be clearly shown by the compatibility restrictions with temporal adverbials:

(64) *The horses dragged the logs for an hour / ?in an hour.*

In order to support the claim that only unbounded predicates can enter into the resultative construction, Jackendoff (1990:240) gives the following examples:

(65-a) *\*Bill broke the vase worthless.*

(65-b) *\*The vase broke worthless.*

Dowty's and Jackendoff's generalization is disqualified in view of such examples as:

(66) *You killed it stone-dead.*

(67-a) *Bill broke the vase to pieces.*

(67-b) *The vase broke to pieces.*

Predications expressed by sentences like *You killed it*, *Bill broke the vase* and *The vase broke* are not activities or processes. Rather, they denote telic situation types.

The statement of the conditions on the appropriate "input" verb that can enter into the resultative construction is complicated by a number of idiosyncratic cases in which the choice of the appropriate verb varies across one and the same semantic verb class. For example, some "surface contact" verbs, such as *pound* are welcome in the resultative construction, while others are not:

(68-a) *I pounded the table to pieces.*  
*(I pounded (on) the table.)*

(68-b) *\*I hit the table to pieces.*  
*(I hit (at) the table.)*

Yet both *pound* and *hit*, as well as a number of other such verbs (*slap*, *strike*, *bump*, *stroke*, etc.) assert "the occurrence of some physical contact between two objects, but from the use of these verbs one cannot necessarily infer that the objects have undergone any essential change" (Fillmore 1970:125).

The difference between *pound* and *hit* seems to reside in the fact that *pound* is interpreted as 'hit or drive with repeated heavy blows', that is, it is a lexically iterative verb. Since it entails repeated impact, each individual impact may be seen as

contributing to the gradual change of the impacted object.

To conclude, we cannot delimit the class of predicates to which the resultative predicate can apply in terms of their telicity (or boundedness), contrary to what Dowty (1979), Jackendoff (1990) and Van Valin (1990) propose. The most adequate generalization so far seems to be that the resultative predicate can apply to an Incremental Theme argument. That is, similarly as in Bresnan and Zaenen (1990) or Goldberg (1992/95), the rules for the application of the resultative predicate are here stated in terms of a particular argument type.

One of the most problematic and controversial issues related to the resultative construction regards the syntactic and semantic status of the NP argument in those cases in which it is not a subcategorized argument of the main lexical predicate. Such "fake" object (Simpson 1983) cases are:

- (69-a) *He talked himself hoarse.*
- (69-b) *He laughed himself silly.*
- (69-c) *Tom ran the soles off his shoes.*

In the above examples the postverbal nominal phrase bears no semantic relation to the head verb.

Bresnan and Zaenen (1990) suggest that the resultative predicate applies to an argument that is intrinsically marked with the "[-r]" feature in the a-structure.<sup>24</sup> Only subjects and direct objects are "[-r]", prepositional objects and secondary objects are "[+r]". The feature "[-r]" refers to an *unrestricted* syntactic function, that is, this function is not restricted as to its associated semantic role. An argument with the "[-r]" feature is typically associated with patientlike roles or it bears no thematic role. In resultative clauses, the argument to which the resultative is applied is associated with the Patient thematic role if it is a subcategorized argument of a verb. If this argument

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<sup>24</sup> The notion of an 'a-structure' refers to a level of representation on which the grammatically significant participant-role relations are represented (cf. Bresnan and Zaenen 1990).



is not subcategorized by the main verb, it is nonthematic. As Goldberg (1992/95) points out, the main problem related to Bresnan and Zaenen's (1990) account has to do with their treatment of "fake" objects in the resultative construction: it is not clear how a direct object that is not a subcategorized argument of a verb enters into the argument structure of the verb in the first place.

Jackendoff (1990) postulates an Adjunct Rule that can add both the postverbal NP and the resultative phrase to the basic semantic structure of the verb. "The fixed syntax of this construction suggests that, even in the transitive cases (...), the direct object as well as the predicate AP is actually an adjunct - not part of the verb's argument structure" (Jackendoff 1990:228). Jackendoff (1990) assumes that in adjunct-constructions in general it is the adjunct rather than the verb that determines the syntax of the VP (Jackendoff 1990:211ff.). Therefore, he labels such adjuncts 'superordinate adjuncts'. He supports this claim with the observation that resultative clauses can be paraphrased with clauses in which the main verb is the causative *make* or *get* (Jackendoff 1990:228). *Make* is used when the predicate is an AP and *get* when it is a PP:

- (70-a) *The gardener made the tulips flat by watering them.*  
(70-b) *Charlie got himself into a stupor by laughing.*

According to Jackendoff, such paraphrases indicate that the material in the resultative phrase constitutes the main conceptual clause, while the verb of the construction is mapped into a subordinate means constituent (Jackendoff 1990:231).

Jackendoff's suggestion is problematic given that the postverbal NP behaves like an argument, rather than an adjunct. As Goldberg (1992/95) points out, it can appear as the subject of a passive clause, as in:

- (71) *The baby was barked awake every morning by the neighbor's noisy dog.*

The postverbal NP must occur directly after the verb:

(72) \**The dog barked ferociously the baby awake.*

This, among other things, leads Goldberg (1992/95) to proposing that the resultative construction has its own argument structure which comprises the Incremental Theme and the resultative argument (realized as an AP or PP). This amounts to the claim that the postverbal NP argument that is not a subcategorized argument of the head verb of a resultative construction is an object argument of the construction itself. Moreover, the resultative phrase is not introduced by a lexical rule but it is an oblique argument directly licensed by a construction. In other words, similarly as in Fillmore and Kay (1991, 1993), the resultative construction can be viewed as a type of an adjunct-licensing construction.

The predicate that enters into the resultative construction brings along with it its own thematic structure and the conceptual frame that represents the particular knowledge evoked by its use. If the main verb activates the incremental event type independently of the resultative construction, the resultative phrase provides additional information about the entailed incremental change, in particular about the final stage at which the denoted event ends. If the main verb does *not* activate the incremental event type independently of the resultative construction, the integration of the verb's meaning into the meaning of a construction is achieved by "rules of construal" (cf. Jackendoff 1991). The resultative phrase introduces a property scale along with an end-point which is associated with the participant referred to by Incremental Theme argument. The property scale is an integral part of the incremental event type. Since it is not provided by the basic sense of the main verb, the verb is required to make some semantic accommodation to it. For example,

(73-a) *Harry hammered the metal*

does not entail that the metal was changed in any way when the denoted event was over.

By contrast the following sentence entails that the metal became flat as a result of Harry's hammering it:

(73-b) *Harry hammered the metal flat.*

With predicates that are inherently non-homomorphic, such as *hammer*, the resultative AP contributes both the property scale on which the incremental change is measured as well as the relevant end-point to the meaning of the resultative sentence. The progress of the event can be observed by following the changes in the degree of flatness of the metal. There is a stage at which the metal cannot become any flatter. The hammering event that causes the corresponding flattening of the metal cannot continue beyond this final stage of the event. It is in this sense that the resultative adjective *flat* indicates the endpoint of the "flatness" property scale. Hence, such resultative clauses as the one above are telic (under a single event, non-generic, interpretation). In addition, the whole clause has a completive entailment. It entails that the end-point on a property scale associated with the denoted piece of metal was reached. The complex resultative predicate *hammer ... flat* in the above clause has the same semantic import as comparable perfective verbs in Slavic languages, for example. By contrast, the completive entailment is not present in the corresponding progressive clause:

(73-b') *Harry was hammering the metal flat.*

By uttering this sentence, the speaker is not committed to claiming that the metal was or would eventually become flat.

For verbs like *hammer* that do not automatically fit the semantic and syntactic requirements of the resultative construction, we do not need to postulate two senses or two different verbs related by a lexical rule, as is suggested by Levin and Rappaport (1988), for example. Rather, verbs like *hammer* in *Max hammered the metal flat* retain their intrinsic semantic properties and the specific notions associated with their conceptual frame (cf. also Fillmore 1989, Goldberg 1992/95). They interact with the semantic specifications of the resultative construction. In those cases in which the

"input" verb is not associated with the incremental event type, independently of the resultative construction, the resultative construction induces no "meaning shifts" or "overriding" of the inherent lexical semantic properties of its head verb. Both the inherent lexical meaning of the "input" verb and the meaning of the resultative adjunct (and other constituents) jointly contribute to the meaning of the whole resultative construction.

Similarly, in *Max laughed himself silly* the resultative AP *silly* has a function that is not provided by the basic sense of the verb *laugh*, it does not fit the frame automatically activated by this verb. The resultative phrase 'creates' the incremental frame into which the verb *laugh* is accommodated.

The presence of the property scale introduced by the resultative argument that measures the incremental change presupposes the presence of the requisite changed entity, of the Incremental Theme argument. With predicates that take Patient or Incremental Theme, the Incremental Theme of the resultative construction is "fused" with the Patient or Incremental Theme argument of the "input" verb. The resultative construction only supplies the resultative argument: cp. *paint* (*He painted his house a dark shade of red*), *freeze*, *burn* (*The river froze solid*); *water*, *cook*, *pound* (*on*) (*He watered the tulips flat*).

The most productive thematic pattern associated with the resultative construction has the subject argument linked to Agent. There are also cases in which the subject of the resultative construction is not an Agent:

- (74-a) *The jackhammer pounded us deaf.*  
(74-b) *The alarm clock ticked the baby awake.*<sup>25</sup>
- (75-a) *The sleeping pills made me sick.*

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<sup>25</sup> Examples are taken from Randall (1983).

(75-b) *He painted his house pink-ish.*<sup>26</sup>

With one-place predicates that take the Incremental Theme argument, this argument will be linked to the subject of the (active) resultative construction. The only other argument that the construction requires is the resultative phrase. This is shown in:

(76-a) *The river froze solid/into a solid mass.*  
*(The river froze.)*

(76-b) *The toast burned black/to a cinder.*  
*(The toast burned.)*

A one-place predicate with an Agent argument can also participate in the resultative construction. As has been observed above, in such a case, the Incremental Theme argument of the resultative construction does not correspond to any subcategorized argument of the verb, but rather it is an argument of the construction.

(77-a) *He laughed himself silly.*

(77-b) *Tom ran the soles off his shoes.*

Given that also one-place predicates with an Agent argument can participate in the resultative construction, Jackendoff (1990:231) suggest that "[t]he overall condition on argument structure is therefore evidently disjunctive: either (1) the direct object of the resultative is construed as Patient of the means clause or (2) it is reflexive" (Jackendoff 1990:231).

We can simplify somewhat the disjunctive statement given by Jackendoff (1990). In both cases, the direct object of the resultative is construed as the Incremental Theme argument. If the "input" verb is a one-place agentive predicate, the referent of the Incremental Theme is co-referential with the Agent of the "input" verb that also serves as the Agent of the resultative construction. In this case, the Incremental Theme, the so-called "fake" object, is a reflexive pronoun coreferential with the

<sup>26</sup> Examples are taken from Goldberg (1992/95).

referent of the Agent argument or it is an NP that denotes an inalienable (body part)<sup>27</sup> or an alienable (clothing, for example) part of the referent of the Agent argument. Consider the following example:

(78) *He laughed himself silly.*

Here, the Incremental Theme *himself* and *he* point to the same participant that fulfills two different participant roles in the event. The participant denoted by *he* is both the Agent and the Incremental Theme.

Second, the Incremental Theme of the resultative construction points to a part of the participant selected by Agent argument. It can be an inalienable (body part), as in

(79-a) *Amy walked her feet off.*

In order to interpret (a) we need to establish that the possessive pronoun *her* in *her feet* refers to Amy denoted by the subject NP *Amy*. The Incremental Theme *her feet* picks out a part of the same participant referred to by the Agent *Amy*, which is frame-internal participant of the main lexical verb (independently of the construction). The referent of the Incremental Theme can be also some alienable part of the referent of the Agent argument, as in:

(79-b) *Tom ran the soles off his shoes.*

The restrictions on the referential properties of the Incremental Theme argument stated in the above paragraph motivate the unacceptability or marginal acceptability of the following sentences:

- (80-a) *?The rooster crowed the children awake.*  
*(The rooster crowed (??to/at the children.)*
- (80-b) *??The boxers fought their coaches into an anxious state.*  
*(The boxers fought (\*their coaches).)*  
*(The boxers fought for their coaches.)*

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<sup>27</sup> This observation was also made by Simpson (1983).

- (80-c) *?\*In the movie's longest love scene, Troilus and Cressida kiss most audiences squirmy.*  
*(Troilus and Cressida kiss (\*most audiences squirmy.))*
- (80-d) *??John washed the facecloth dirty.*  
*(John washed (\*the facecloth.))*  
*(John washed with the facecloth.)*<sup>28</sup>

The oddity of the above examples can be motivated if we assume that the referent of their Agent and Incremental Theme arguments are not coreferential.

The resultative phrase contributes a telic meaning element to the meaning of the resultative construction. This is manifested by the fact that the resultative construction requires that its Incremental Theme NP be bounded (provided that the particular resultative clause in which the Incremental Theme NP is realized is non-progressive and has a single event interpretation). To illustrate this point, consider the following examples:

- (81-a) *He painted walls.*  
 (81-b) *He painted the walls.*  
 (82-a) *(\*He painted walls blue.*  
 (82-b) *He painted the walls blue.*  
 (83-a) *?He was painting walls blue.*  
 (83-b) *He was painting the walls blue.*  
 (84-a) *He painted a/the/one wall blue.*  
 (84-b) *He painted three / several walls blue.*

*He painted walls* is atelic and *He painted the walls* is telic.

In *(\*He painted walls blue*, "*(\*)*" indicates that the clause is well-formed under a habitual reading, as in

- (85) *He painted walls blue for a living.*

On the other hand, for many speakers *He painted walls blue (?all afternoon)* is unacceptable under a single event interpretation.

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<sup>28</sup> Examples and grammaticality judgements are Jackendoff's (1990:227).

The resultative AP or PP encodes a certain final stage of the incremental change that the referent of the Incremental Theme undergoes. Due to this end-point focus, if a resultative clause denotes a single event that is paired with a single Incremental Theme, then there must also be a definite quantity of the participant denoted the Incremental Theme argument. This motivates the use of the bounded definite Incremental Theme NP in *He painted the walls blue* and in *He was painting the walls blue*.

"?" in *?He was painting walls blue* indicates that the clause is acceptable, for example, in a contrastive context:

(86) *He was painting walls blue, and she was painting ceilings red.*

It must be emphasized that in clauses that have a habitual, generic or a dispositional reading, the Incremental Theme argument need not be bounded:

(87-a) *Blood stains white cloth brown.*

(87-b) *Yeast turns milk sour.*

The resultative adjuncts can be viewed as telic markers. However, the presence of the resultative adjunct is not sufficient for conferring the completive (perfective) meaning to the resultative construction. The completive meaning is absent when the resultative is combined with the progressive construction, as in:

(88) *He was painting his house blue.*

### 3.4.2 A Revised Typology of Basic Situation Types

The approach to the semantic classification of verbal predicates outlined in this section takes as a point of departure the work of Vendler (1957; 1967), Mourelatos (1978; 1981), Dowty (1979, 1988 and 1991), Parsons (1990), Bach (1981 and 1986), Krifka (1986 and 1992). I distinguish three main categories, *states*, *processes* and



*events*. They can be further subdivided as follows:

(89)

<b>SITUATION TYPES</b>	→ <b>STATES</b>   non-states
states	→ static   episodic
non-states	→ <b>PROCESSES</b>   <b>EVENTS</b>
events	→ incremental   momentaneous
momentaneous	→ culminative   happenings

**STATES**

**static states:** *be in New York, own (a house), love (one's cat), resemble (one's uncle); tall, intelligent, sane;*

**episodic states:** *sit, stand, lie+LOC; drunk, present, sick;*

**PROCESSES:** *walk, push a cart, rain, sleep;*

**EVENTS**

**incremental events:** *build (a cabin), write a book, eat a sandwich, polish a shoe, demolish a bridge; walk to Boston; grow into an adult, melt; arrive, leave, depart, cross;*

**culminations:** *take off, lose, win, attack;*

**happenings:** *blink, flash, knock, kick, hit, pat, wink, clap, tap, snap; recognize, notice, spot, realize ; be struck by a lightning; find (a penny), lose (one's watch); burst, explode.*

I use the term 'situation (type)', instead of the term 'event (type)', because it seems to be both theoretically and ontologically the most neutral term. It has the advantage over such terms as 'aspect' (Verkuyl 1972, 1989 and elsewhere), 'aspectual classes' (Dowty 1972 and 1979), or 'inherent lexical aspect' (Comrie 1976:41ff., Van Valin 1990) in so far as it minimizes the confusion with the category 'aspect' proper, which is typically reserved for the perfective-imperfective distinction. The term 'situation type' is ontologically broader than such terms as 'event type' or 'Aktionsart' (German term meaning 'a type of action', cf. ), because it does not connote dynamicity and exclusion of states, like 'event type' does, and it does not suggest that agentivity plays an important role, as the German term 'Aktionsart' does.

The basic assumptions that underlie this approach can be outlined as follows:

First, the lexical meaning of a verbal predicator is represented in terms of one of the basic situation types. Situation types are also associated with whole clauses, or better, as Dowty (1979:185) points out, with propositions conveyed by utterances against a particular background of assumptions by the speaker and hearer about the denoted situations.

Second, situation types are subclassified in terms of their part-whole structure, and related concepts such as 'boundedness', 'change', 'temporal extent'. The distinctions between situation types are supported by various grammatical reflexes in natural languages.

Third, situation types proposed here represent cross-linguistic categories. They are motivated by basic semantic concepts from which all languages draw in constructing lexical meanings. Even though the specific grammatical criteria for distinguishing among situation types may vary across different languages, every language has at least the verbal categories proposed here. The inventory of basic concepts enables us to investigate hypotheses about what is common and what is language-specific in the domain of situation types across languages.

Fourth, situation types involve participant roles of various kinds. The grammatically significant participant roles are represented by thematic roles in the argument structure of verbs. For example, static states associated with psychological verbs like *know* have two participants: the sentient being that has the experience of knowing something and the content of that experience. The verb *know* treats that being as an

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<sup>28</sup> We may ask such questions as: Which of these situation structures represent language-specific schematizations, which are universal, and which potential structures seem to be universally excluded? In the case of shared (universal) situation structures, we may pose further questions: Which structures are due to the capacity for concept formation, which structures stem from our common experience as human beings, and which structures (if any) are specific to the language faculty?

Experiencer. Situation types and thematic roles are *partially* motivated by the properties of the conceptual frames evoked by verbs (cf. Fillmore's frame semantics<sup>29</sup>) conventional situation types, and to the extent that they are motivated in this way, they can be viewed as derivative notions.

**Static and episodic states** do not involve any change. A static state obtains at or throughout a large and vaguely defined interval of time and at all the subintervals and moments within this interval. It concerns permanent, 'atemporal' properties of individuals. By contrast, an episodic state concerns a contingent, changeable, or temporary property of individuals. The distinction between static and episodic states corresponds to Carlson's (1977) distinction between *object-level* and *stage-level* predicates that concerns objects (or individuals) and their temporally restricted *stages*, respectively.

All the other situation types involve changes. The assumption that the concept of *change* plays a crucial role in distinguishing among verbal categories has a long-standing tradition in linguistics and it underlies the basic distinction in 'stative' and 'non-stative' (or 'episodic') verbal predicates.<sup>30</sup>

**Processes and incremental events** are extended in time, while **happenings** are events about which, with some idealization, we can say that their beginning and end fall together into a single moment. They are thought of as having neither duration nor internal structure.

Processes are characterized by *indefinite changes* of state. **Culminations** and **incremental events** involve a *definite change of state*.

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<sup>29</sup> See Fillmore in many papers between 1975-1985.

<sup>30</sup> The assumption that the concept of *change* also represents an important category of experience can be supported by the fact that "sensory systems demonstrate an acute sensitivity to change, as if change carried information of great biological significance. Sensitivity to change, and a conservative tendency to attribute changes to intelligent sources, is characteristic of the perceptual system at every level of its functioning" (Miller & Johnson-Laird 1976:79).

The semantic description of predicates that denote **incremental events**, such as *build (a cabin)*, *write a book*, *eat a sandwich*, *polish a shoe*, involves a phase consisting of distinguishable *incremental stages* that gradually lead up to a transition (or a culminating stage) from one situation to the next. Building on Krifka's (1986 and 1992) and Dowty's (1988 and 1991) notion of 'Incremental Theme', I suggest that the homomorphism, the mapping between the part structure of the event and the part structure of one of its participants, is not only tied to a particular thematic role in the thematic structure of individual verbs, but it also characterizes a particular situation type associated with complex verbal predicates and clauses (cf. *She waltzed into the room.*). The introduction of the incremental event type is motivated by the fact that a homomorphism may have other sources than just the lexical semantics of individual verbs, sources whose domain may be a verb phrase or even a whole clause. We need to account for the systematic way in which clauses are assigned a telic or an atelic interpretation, although it cannot be viewed as a simple projection of the lexical properties of their lexical verb heads.

Predicates associated with **culminations** specify "a particular property of an argument [that] held at the *culmination* of the overall event" (Pustejovsky 1988:33). Pustejovsky (1988:30ff.) argues that such verbs have no semantic expression in their semantic description associated with the process preceding the culmination. As Pustejovsky (1988:30ff.) points out, the difference between culminations and incremental events is brought out by the scalar modifier *almost*. Sentences denoting incremental events like

(90) *John almost wrote a letter to his lawyer*

are ambiguous: (i) John began writing a letter, but he did not finish writing it; (ii) John had the intention of writing a letter, but changed his mind and did not even start writing it. The scalar modifier *almost* can modify either the incremental stages or the culmination stage.

By contrast, the following sentences with culmination predicates are not ambiguous, they entail that John did not die, Bill did not arrive and Mary did not win.

- (91-a) *John almost died*
- (91-b) *Bill almost arrived*
- (91-c) *Mary almost won the race*

They have only one possible reading, namely that something happened that could have led to the culmination of the event, but the (culmination of the overall) event did not come about. That is, the scalar modifier *almost* modifies the culmination stage only.<sup>31</sup>

### 3.4.2.1 Telicity

Building on the well-known parallels between the linguistic structuring of space and time, the situation types introduced in this chapter, static and episodic states, processes, incremental events, culminations and happenings, fall into two main classes: telic and atelic. The decisive criterion is the way in which a situation as a whole stands in relation to any of its parts. This is shown in the following table:

<b>ATELIC</b>	<b>TELIC</b>
static state	culmination
episodic state	happening
process	
unbounded incremental event	bounded incremental event

Complex verbal predicates that express incremental events are bounded or unbounded, depending on the boundedness of their nominal arguments and various optional adjuncts, among other contextual factors. Verbs associated with incremental

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<sup>31</sup> In Pustejovsky's subeventual structure this is encoded in such a way that "*there is no semantic expression associated with event constituent P* [that is, "preparatory stage", HF] *for the adverb to modify*" (Pustejovsky 1988:33).

events are indeterminate with respect to boundedness or telicity. This is recorded as '[telic [ ]]' in their lexical entries.

The telic-atelic distinction has proven indispensable for the description of many grammatical phenomena in English as well as in other languages. This distinction has been recognized and commented on by many linguists and philosophers and the proliferation of the labels for the two intended categories bears testimony to the continuing fascination with these categories. The following short terminological overview<sup>32</sup> illustrates this point:

(92)		
<i>telic</i>	<i>atelic</i>	Garey 1957; Dowty 1991
<i>accomplishment</i>	<i>activity</i>	Vendler 1957; 1967
<i>terminative</i>	<i>aterminative</i>	Maslov 1959
<i>performance</i>	<i>activity</i>	Kenny 1963
<i>cyclic</i>	<i>noncyclic</i>	Bull 1963
<i>event</i>	<i>process</i>	Mourelatos 1978;1981
<i>bounded</i>	<i>unbounded</i>	Allen 1966; Talmy 1986
<i>grenzbezogen</i>	<i>nicht-grenzbezogen</i>	S.-G. Andersson 1972
<i>developments</i>	<i>processes</i>	Mourelatos 1978
<i>change of state</i>	<i>activity</i>	Dowty 1979
<i>quantized</i>	<i>cumulative</i>	Krifka 1986; 1989
<i>delimited</i>	<i>non-delimited</i>	Tenny 1987

The notion 'telic' has been used in the sense of 'result state', 'goal', 'limit', 'set terminal point', 'definite endpoint', 'product', 'upshot', 'outcome', 'culmination'; If such notions are to serve as a characterizing criterion of telic predicates, then we must make sure that it is clearly distinguished from the notion of a 'causally related consequence' or a mere 'incidental consequence'. Take, for example, the situation described by the telic sentence *Kim knitted a sweater*. The situation described by this clause *necessarily* comes to an end when the result state, namely the state in which the whole sweater exists, is reached. In Dowty's decompositional analysis, we can give it the following representation:

<sup>32</sup> See S.-G. Andersson (1972) and Dahl (1981:80) for more terms and further commentary.

- (93) [[*Kim knits*] CAUSE [BECOME [*a sweater exists*]]].

The inception of the result state coincides with the *necessary end* of the denoted event. Such result states are *lexically determined*, that is, they are built into the meaning of verbal expressions.

By contrast, a 'causally related consequence' is any state of affairs that can be causally related to a given event. To illustrate this point, consider the following example:

- (94) *The balloon, which was filled with water, burst. Max was soaking wet.*

The event denoted by *The balloon burst* has one specific lexically determined result state, namely 'the balloon was burst'. Both the state 'the balloon was burst' and 'Max was soaking wet' are caused by the event of the bursting of the balloon. For in those counterfactual circumstances in which this event did not occur, the balloon would not have been burst and Max would not have been soaking wet. However, from this inferred causal connection between Max's being soaking wet and the bursting of the balloon, it does follow that the proposition expressed by *Max was soaking wet* counts as the result state entailed by the clause *The balloon burst*. In order to establish the causal connection between the balloon's bursting and Max's being soaking wet the reader must rely not only on his knowledge of the meaning of the English verb *burst* and of the way it is used in well-formed clauses, but also on his inferencing capabilities, on his knowledge of how events are causally linked. The assumption that the second clause *Max was soaking wet* describes the resultant state of the first clause *The balloon, which was filled with water, burst* has the undesirable consequence that it presupposes that there is a special sense of the verb *burst*, or that the clause *The balloon, which was filled with water, burst* has a special sense, which includes the resultant state that somebody/something becomes soaking wet. Of course, this is wrong. Another reason why such an approach is untenable has to do with the fact that any given event can be causally related to a large number (perhaps infinitely many)

other events; however, there is only one result state entailed by a given telic expression.

Telic expressions and atelic expressions denote situations that can be causally related to other situations. Consider the following examples in which process and state clauses can be interpreted as causal antecedents for the conjoined clause(s) that follow(s) it:

- (95-a) *John was drunk last night and today he is grumpy.*
- (95-b) *Mary knew the right answers and she passed the exam.*
- (95-c) *I walked on the beach, sand got into my shoes and I got sunburned.*

Without drawing a clear line between the lexically determined, specific, 'result state' 'goal', 'limit', 'set terminal point', 'definite endpoint', 'product', or 'outcome', on the one hand, and a 'causally related consequence', on the other hand, we would not be able to distinguish between telic expressions and atelic expressions.

Expressed in terms of the parallels between the linguistic structuring of space and time, situations that involve a specific 'result state' or 'set terminal point' are bounded. I use the notion 'bounded' in this narrow sense but also in a wide sense for any well-demarcated situation. It may be demarcated by an initial boundary, as the situation described by *take off* or by a durative temporal phrase *for-PP* as in *John was in New York only for two days* and *John swam for an hour*, for example. Bounded situation types fall into further subtypes according to the finer-grained properties of their internal structure: states, processes, incremental events, culminations and happenings.

### 3.4.2.2 The Mereological Approach to Situation Types

**Basic Concepts and Principles of Mereology.** The parallels between the linguistic structuring of space and time point to a single conceptual system shared by both the



### Chapter 3. Telicity and Noun Phrase Semantics: 198

nominal and verbal expressions. It has been shown (cf. Chapter 2) that the parallels concern the part-whole structure of the denoted entities (situations and individuals). The parallels discussed concern the proportion 'count:mass :: telic:atelic'. They are also extended to include pluralities of individuals and situations.

The parallels between nominal and verbal expressions motivate the systematic contribution of the Incremental Theme argument to the telic and atelic interpretation of complex verbal predicates and sentences. It will also be shown that they also allow us to motivate the semantics of the perfective-imperfective distinction and the systematic influence of aspectual operators on the interpretation of the Incremental Theme argument.

Such linguistic data indicates that we need a descriptive apparatus that cuts across the syntactic distinction between nominal and verbal expressions as well as across the ontological distinction between situations and objects. Such an apparatus would allow us to formulate the rules of semantic interpretation of clauses in such a way that they need not be sensitive to the distinction between nominal and verbal expressions.

The basic categories that have to do with the 'part' structure of objects and situations can be best reconstructed by drawing on the basic concepts of a theory of mereology, or a part-whole theory.<sup>33</sup> The formal theory of part-whole relations is classical extensional mereology that has its origins in the Calculus of Individuals developed by Leonard and Goodman (1940), Goodman and Quine (1947), Grätzer (1971) and the Mereology of Leśniewski (1916; 1927-30; 1929). I will use the term 'mereology' for any theory of part-whole relations and closely related concepts.

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<sup>33</sup> This exposition is largely based on Simons (1987) and Krifka (1989, 1992). A thorough discussion of the theories of mereology can be found in Simons (1987).

The most basic and intuitive mereological concept is that of **the relation of part to whole**. To express that the object  $x$  is a **proper part** of the object  $y$ , we use the binary relation ' $\subset$ ', as is shown in:

PROPER PART

$x \subset y$  (' $x$  is a proper part of  $y$ ')

The proper part relation can be defined as follows:

$x \subset y \leftrightarrow x \subseteq y \ \& \ \neg x = y$

The proper part relation has the following formal properties:

Nothing is a proper part of itself (*irreflexivity*).

If one thing is a proper part of another, then the second is not a proper part of the first (*asymmetry*).

If one thing is a proper part of another, and the second is a proper part of a third, then the first is a proper part of the third (*transitivity*).

The relation of proper part to whole is a *strict partial ordering*.

There are cases in which we may need to use the corresponding non-strict relation *part-of-or-equal*. If  $x$  and  $y$  are identical, then we say that  $x$  is an **improper part** of  $y$ . To express that the object  $x$  is a proper or improper part of the object  $y$ , we use the binary relation ' $\subseteq$ ', as is shown in:

IMPROPER PART

$x \subseteq y$  (' $x$  is (a) part of  $y$ ')

' $x$ ' and ' $y$ ' are singular variables that stand for *individuals*.

Two individuals **overlap** mereologically if and only if they share a common part. This includes the case where one is part of the other, and also the case of identity. For ' $x$  overlaps  $y$ ', we write

OVERLAP

$$x \circ y.$$

Overlap can be defined as follows:

$$x \circ y \leftrightarrow \exists z (z \subseteq x \ \& \ z \subseteq y)$$

Overlapping is reflexive and symmetric, but it is not transitive. In those cases in which individuals overlap, but neither is part of the other, we may speak of *proper* overlapping: for example, two intersecting roads overlap at their junction, but neither is part of the other.

Individuals are **disjoint** if and only if they do not overlap, that is if they have no part in common. Disjointness is symmetric. This may be written as

DISJOINTNESS

$$x \setminus y \text{ ('x is disjoint from y')}$$

If two individuals overlap, they have at least one part in common. In terms of the part-ordering, any such common part is a lower bound for the two individuals. Overlapping individuals have a greatest lower bound or *infimum*, which is *product* in traditional terms. The product of  $x$  and  $y$  is that individual which is part of both, and which is such that any common part of both  $x$  and  $y$  is part of it. The product is encoded as

PRODUCT

$$x * y$$

The product is the mereological counterpart of the intersection of two sets. While in set theory even two disjoint sets have an intersection, namely the null set, disjoint individuals lack any common part. Most mereological theories do not assume the existence of a null individual which is part of all individuals.

Apart from the binary '(proper) part-of' relation, the second most important binary relation is that of forming a new individual out of two or more individuals. The mereological **sum** or **join** of two individuals  $x$  and  $y$  is written as follows:

JOIN (or SUM)

$$x \cup y$$

For our purposes, we may assume that ' $x \cup y$ ' coincides with the mereological least upper bound (or *supremum*), lattice-theoretic join as the 'smallest' individual containing them both.

The join operation ' $\cup$ ' is commutative, idempotent and associative: Commutativity, idempotency and associativity are defined as follows:

$$\text{Commutativity: } \forall x, y (x \cup y = y \cup x)$$

$$\text{Idempotency: } \forall x (x \cup x = x)$$

$$\text{Associativity: } \forall x, y, z (x \cup (y \cup z) = (x \cup y) \cup z)$$

The part relation can be defined in terms of the join operation as follows:

$$x \subset y \leftrightarrow x \cup y = y$$

Classical extensional mereology has two main problems. First, it asserts the existence of certain individuals, mereological *sums*, for whose existence we have no empirical evidence. As in the case of products, the binary sum or join operator can be used to define sums of arbitrary finite numbers of individuals. Since individuals may be disjoint, spatio-temporally widely separated, and of different kinds, the claim that any two individuals possess a sum (or join), in its unconstrained form, is implausible. Second, the theory is not applicable to most objects around us, and is of little use as a formal reconstruction of the concepts of part and whole which we actually employ (cf. Simons 1987:1).<sup>34</sup>

<sup>34</sup> See Simons (1987) for the discussions of these problems and the strategies to cope with them.

Nonetheless, classical extensional mereology is useful for the description of situations and non-singular individuals, that is, classes of individuals and masses. For example, it allows us to capture the assumption that "water" is the name of an individual concept of a special kind. The extension of the individual concept "water" is the union of all things which are water at each  $(i, j)$ , whereby "i" is a world and "j" a moment of time. It is a "scattered individual". For bare plurals, a similar assumption is made. For example, the denotation of *horses* is the individual concept that has as its extension at each point  $(i, j)$  the set of all individuals to which at  $(i, j)$  the predicate *horse* can truly be applied. The theory of mereology allows us to form such 'superindividuals' (like the individual which is the union of all things that are water at a certain point) and to speak about their parts, or even about parts of parts.

**Boundedness.** Given the theory of mereology, we may define the properties of cumulativity, divisibility (Quine's 1960 distributivity) and boundedness. A given predicate  $P$  (verbal or nominal) has the divisibility property, if parts of the interpretation of  $P$  are describable by the same predicate  $P$ . For any divisible predicate  $P$  it holds that (i) any part of something which is  $P$  is also  $P$  (*divisibility*); and also (ii) any sum of parts which are  $P$  is also  $P$  (*cumulativity*).

(96-a)  $P$  is cumulative  $\leftrightarrow \forall x, y (P(x) \& P(y) \rightarrow P(x \cup y))$

(96-b)  $P$  is divisible  $\leftrightarrow \forall x, y (P(x) \& (y \subset x) \rightarrow P(y))$

A predicate  $P$  that is both cumulative and divisible is unbounded:

(96-c)  $P$  is unbounded iff  $P$  is cumulative and divisible.

A predicate  $P$  that is not cumulative and divisible is bounded. The terms 'telic' and 'atelic' are reserved for the bounded and unbounded *verbal* expressions and their denotata, respectively. The 'bounded-unbounded' distinction belongs to a finite set of

primitives that characterizes parts of conceptual structure. for the characterization of situations and individuals.

The application of the divisibility property to nominal and verbal predicates is not straightforward in all the cases. Take, for example, definite noun phrases like *the water*, *the people*, possessive noun phrases like *my friends*, noun phrases containing vague quantifiers *most of it*, *a little water* and such count noun phrases as *a ribbon* or *a chain*. Such noun phrases as *the water* and *the people* seem to be both divisible and cumulative. And yet, they behave like bounded or unbounded expressions depending on the context in which they are used. For example, the following clauses suggest that there was an unbounded stream of water or of people (cf. Jackendoff 1990:101):

(97-a) *The water was rushing out of the faucet.*

(97-b) *The people were streaming into the room.*

Jackendoff observes that the sense of unboundedness is heightened by the use of progressive aspect, "which in a sense takes a snapshot of an event in progress whose temporal boundaries are not in view. The definite article "performs only a deictic function; in these cases it designates a previously known *medium* instead of a previously known *object*. In other words, under this interpretation, the definite/indefinite distinction is orthogonal to the closed form/medium distinction and does not affect the analysis" (Jackendoff 1990:101). If the progressive is replaced by simple past, "the event may be viewed as temporally bounded. As a result, the amount of water and the number of people is also bounded, ... (Jackendoff 1990:101):

(98-a) *The water rushed out of the faucet.*

(98-b) *The people streamed into the room.*

Another problem is posed by count noun phrases like *a ribbon* or *a chain*. There are members of their extension that have parts which are also members of the extension of *a ribbon* or *a chain*. Therefore, it the property of 'divisibility' applies to them, even though they are grammatically count noun phrases.<sup>35</sup>

<sup>35</sup> This point was made by Dahl (1991:815).

Noun phrases with vague quantifiers like *a lot of*, *many*, *much* pose the following problem. They are cumulative, but they are not divisible (in a strict sense). For example, if *a* is a group of many roses and *b* is a group of many roses, then the sum of *a* and *b* is a group of many roses. However, *many roses* is not a divisible noun phrase. If *a* is a group of many roses, then a subgroup *b* of *a* need not be a group of many roses. And conversely, noun phrases with vague quantifiers like *(a)few*, *little* are divisible up to a point, but they are not cumulative. If *a* is a group of few roses and *b* is a group of few roses, then the sum of *a* and *b* is not necessarily a group of few roses.

**Iteration and habituality.** The multiplicity of situations is a dimension of conceptualization that is orthogonal to the tripartite classification of situations types into states, processes and events. The tripartite classification, along with its further divisions, concerns clauses that denote single situations: single states or episodes (processes or events). It has been observed that the rule of iterative interpretation applies to almost any type of sentence to 'pluralize' it (L. Carlson 1981:43, Talmy 1986, Jackendoff 1990:29 and 1990b:3, among others). It holds for plural NPs and iterative sentences that they "fix the 'grain size' in terms of the singular individuals making up the unbounded medium [i.e., process/substance and plural objects/plural situations], so that decomposition of the medium into parts is not as arbitrary as it is with substances and processes" (Jackendoff 1990:29).

We may distinguish between *particular episodes* expressed by clauses like

(99) *Pluto chased/was chasing the UPS truck yesterday.*

and iterative situations expressed by clauses like

(100) *The light flashed three times.*

*Three times* is a count cardinal adverbial and it ranges over a bounded number of situations of the same type (momentaneous event type). Both the clauses expressing

particular single episodes and those expressing iterative macro-events are distinguished from clauses denoting an unbounded number of situations of the same type, as in

(101) *Pluto chases UPS trucks.*

Such **generic** clauses, or more precisely **characterizing** ("habitual") clauses<sup>36</sup> denote a regularity that can be inferred from a number of particular episodes like *Pluto chased/was chasing the UPS truck yesterday*. The rule of habitual interpretation adds a modal or counterfactual condition over and above iterativity. Characterizing clauses are unbounded, as they are associated with an interval of time that is (in most cases) large and vaguely defined and that includes a vague number of occurrences of a given situation type.

Predicates in characterizing predications, such as

(102-a) *John speaks French*

and static stative predicates as in

(102-b) *John knows French*

are alike in that they are independent of particular situations, they do not depend on John's doing anything at the particular moment. They denote disposition or potential to manifest a certain behavior that counts as evidence for the generalizations they express.

Sentences with characterizing verbs differ from those with stative verbs in that only the former express a generalization over situations each of which can be denoted by the corresponding episodic clause:

(103-a) *He is speaking French.*

(103-b) *\*He is knowing French.*<sup>37</sup>

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<sup>36</sup> See Krifka et al. (1992) for a detailed account of generic clauses.



The fact that such lexical characterizing verbs as *know* that denote dispositions do not have any morphologically related episodic counterparts provides one of the arguments in support of their membership in the static situation type.

Iterative adverbials like *three times*, *several times* serve to count situations. A verbal predicate or a clause modified by an iterative adverbial denotes a series of situations that consist of a definite number of situations of the same type. Such modified verbal predicates or clauses are telic. They do not pass the divisibility and additivity tests. A sum situation denoted by *The light flashed three times* cannot be divided into situations each of which can be denoted by the same clause *The light flashed three times*. Two sum situations each denoted by *The light flashed three times* add up to a sum situation denoted *The light flashed six times*. However, *several times* is not divisible and additive in the strict sense. A proper subpart of a sum situation denoted *The light flashed several times* need not be a sum of several light flashings. If we add a sum situation denoted by *The light flashed several times* and another sum situation denoted by *The light flashed several times* we do not necessarily get a sum of several situation.

Habitual predications are atelic on the grounds that they are "simultaneously" true of an interval and of subintervals and superintervals of that interval" (Dowty 1979:173). In this respect they behave like states and processes.

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<sup>37</sup> Ryle (1949:Ch.5) motivates the lack of the episodic counterparts of stative predicates like *know* by the fact that there are many different ways in which the disposition can manifest itself. Therefore, no single episodic predicate can denote them all.

Krifka et al. (1992) emphasize the semantic similarity between these two kinds of characterizing predicates and propose to represent both with the generic operator GEN:

- (a) speak French:  $\lambda x \text{GEN } [x;s]$  ( $x$  in  $s$ ;  $x$  speaks French in  $s$ )
- (b) know French:  $\lambda x \text{GEN } [x;s]$  ( $x$  in  $s$ ;  $x$  shows knowledge of French in  $s$ )

Hence both the derived characterizing predicates and stative predicates are given a quantificational analysis. With stative predicates the GEN operator is provided in the lexicon, while with derived characterizing predicates it is introduced in the syntactic derivation.

Including iterativity and habituality, we get the following division of verbal predicates into telic and atelic:

**A TELIC**

static state  
episodic state  
process  
unbounded incremental event

unspecified number of iterated situations

habitual

**TELIC**

culmination  
happening

bounded incremental event

specified number of iterated situations

**3.4.2.3 Grammatical Tests for the Distinctions among the Situation Types**

The fine-grained classification of verbal predicates into static states, episodic states, processes, happenings and incremental events as well as the coarse-grained two-way division into telic and atelic situations can be supported by three grammatical criteria (also used in L. Carlson 1981):

1. Point temporal adverbials. They include *at that moment, at once, at 3 o'clock*.<sup>38</sup>
2. Progressive aspect.
3. Durative adverbials. Durative adverbials are those that are used in an answer to the question *For how long?* They include *for-PP* like *for a while, all day (long), from one to ten o'clock, until dawn, between May and July, since his birth on, for years*.

The tests are applied to minimal saturated predications expressed by simple clauses in the past tense. For such predications the membership in one of the

<sup>38</sup> Such point adverbials are to be kept apart from interval adverbials like *on Tuesday* or *tomorrow* that indicate a certain interval of time, that is, they have an internal structure and can be further subdivided into smaller intervals, although they can also be conceived of as a point. Point adverbials, on the other hand, indicate moments of time that are trivially indivisible and cannot be further 'compressed' into smaller moments of time.

situation categories follows from the inherent lexical semantic properties of their main predicates. The results of the tests are summarized in the following table:

(104)

	point	progressive	durative adverbial
1. static state	?	?	+
2. episodic state	+	+	+
3. process	?	+	+
4. incremental event (bounded)	?	+	?
5. culmination	+	+	?
6. happenings	+	?	?

In the table and examples further below, ‘?’ distinguishes marked cases from unmarked ones. The difference between the marked and unmarked examples is gradual and it hinges on the overall grammatical acceptability, the meaning of the main verb in a particular clause, and the range of appropriate contexts of use. Many marked examples are acceptable under a special interpretation of a clause which is shaped by the presence of one of the three grammatical criteria. Often, the special interpretation is iterative, habitual or ingressive. Various contexts of use, such as instruction, lively narrative, performative use, etc., can also make such examples acceptable.

**Point Adverbials.** Point adverbials distinguish between static states, culminations and happenings, on the one hand, and episodic states, processes and incremental events, on the other hand:

- (105-a) *?At three o'clock Boris was Russian.*
- (105-b) *At three o'clock the socks lay under the bed.*
- (105-c) *?At three o'clock the fly swam in the soup.*
- (105-d) *?At three o'clock Irv built a cabin.*
- (105-e) *At three o'clock Emily won the car race.*
- (105-f) *At three o'clock the light flashed.*
- (105-g) *At three o'clock, he found his watch.*

The main difference between states and non-states is that simple moments of time suffice for the characterization of state predicates, but not for the characterization of non-states. This in turn is motivated by the difference in the change-of-state entailments between states and non-states. Any change of state involves a transition from one situation to a different subsequent situation. Therefore, predicates that entail a change belong to situation types whose characterization requires information about the (physical) state of the world at at least two moments in time (cf. Dowty 1979:168). To illustrate this point, imagine a possible world in which the time stood still (so we would have only one time which amounts to having no time). In such a world, we could describe various states, but we would not be able to think of events as *evolving* in it (cf. Bach 1981:71). Hence, the distinctions between states and non-states would not apply in such a world.<sup>39</sup>

As *?At three o'clock Boris was Russian* shows, point adverbials are odd with predicates that attribute (more or less) permanent properties of individuals, static states. The main reason for this seems to be a pragmatic one. Given the "atemporal" nature of static states, it is not surprising that it would be odd to assert that the property obtains at one particular moment within that interval (cf. Taylor 1977; Dowty 1979:173, 179; Vlach 1981:273; Bach 1981:70). Consider also the following examples that illustrate this point:

- (106-a) *?John knew French at that moment.*  
 (106-b) *?Sue believed in God today at 3:45pm.*

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<sup>39</sup> To this it may be objected that we can take a photograph of Max's swimming at a particular instant, and anybody watching the photograph can easily infer that the photograph captures a particular instant of the process of Max's swimming. Hence, the possibility of the evaluation at a single point of time would not distinguish between states and non-states. However, it may be shown that this objection is not valid. Here, the single snapshot stands for a whole protracted event that evolves in time. Without making this inference we would not be able to understand what the snapshot represents. Moreover, the crucial point is that in a given atemporal world (a world with only one time), we could talk about states, but not about episodic situations.

(106-c) ?*I understood the relativity theory when Albert entered the room.*

On the other hand, with episodic states, it makes sense and it is informative to assert that the denoted property obtains at one particular moment: as in *At three o'clock the socks lay under the bed*. Being under the bed is a property that characterizes only a particular temporal stage of the socks. This sentence can be felicitously uttered, if the socks had been under the bed for some period preceding and extending up to three o'clock. The function of point adverbials in such stative clauses is to indicate that the property attributed to the referent of the subject-NP held for some period prior and extended up to the time point indicated by the point adverbial (cf. Vlach 1981:273).

Since point adverbials indicate individual moments of time, the smallest, indivisible intervals, they are compatible with clauses denoting happenings, such as those headed by *win, flash, find*. Other examples of verbs that are associated with happenings are 'full-cycle' verbs (cf. Talmy 1986:20) like *blink, flash, knock, kick, hit, pat, wink, clap, tap, snap*, psychological verbs like *recognize, notice, spot, realize*, and also verb phrases like *be struck by lightning, find a penny, lose one's watch* and verbs like *break, burst, explode*.<sup>40</sup>

Clauses containing predicates like *win, die, awaken, close the door* and directed motion verbs like *arrive, leave, depart, reach* that are associated with culminations are compatible with point adverbials. The point adverbial coincides with the time point when the culmination took place.

Verbal predicates that describe processes or incremental events are associated with protracted "run-times" and cannot usually occur in clauses with point adverbials. For example, ?*At three o'clock the fly swam in the soup* is odd. It is acceptable if it

<sup>40</sup> With verbal expressions denoting happenings the reaching of the terminal point is not only perceived as being momentaneous but also as not being completely within the control of the participant undergoing the denoted change.

has an iterative or ingressive (the swimming starting at three o'clock) interpretation. According to L. Carlson (1981), "the rule of ingressive interpretation applies to clauses of continuous aspect [process clauses, HF] to single out the first moment of a maximal period in which the same clauses are true in their continuous sense. An example of an ingressively understood activity is *At sunrise, I walked eastward*" (Carlson 1981:43). To temporally anchor such processes to a particular time point, we must use them in a progressive construction: *At three o'clock the fly was swimming in the soup*. The progressive clause here functions as a "time-frame"<sup>41</sup> around the moment indicated by *at three o'clock*. The same holds for incremental event clauses like *?At three o'clock Irv built a cabin* and *At three o'clock Irv was building a cabin*.

**The Progressive Aspect.** Vendler uses the occurrence in the progressive construction as a test for setting apart activities and accomplishments from achievements and states. Consider the following examples:

- (107-a) *?Boris was being Russian.*
- (107-b) *The socks were lying under the bed.*
- (107-c) *The fly was swimming in the soup.*
- (107-d) *Irv was building a cabin.*
- (107-e) *Emily was winning the car race.*
- (107-f) *The light was flashing.*
- (107-g) *?He was finding his watch.*

The first two examples show that we need to refine the characterization of the progressive so that it applies only to episodic states, but not to static states (without a special interpretation). A similar proposal was made by Carlson (1977), Dowty (1979) and Bach (1981 and 1986). The class of episodic stative verbs comprises stage-level

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<sup>41</sup> Cf. Jespersen (1954:178-180; 1973:pp.IV-178): "[T]he action or state denoted by the expanded tense [progressive aspect] is thought of as a temporal frame encompassing something."

predicates like *be drunk*, *be polite*, *be a hero*. The class of episodic stative verbs also comprises such stage-level predicates as *sit*, *stand*, *lie*, *perch*, *sprawl* that have inanimate subject-NPs. Certain episodic states contradict this general rule as they cannot enter the progressive construction: cf. *be* + locative prepositional phrase (*\*He was being in the garden/in New York*) and *\*He was being asleep*. However, since this is a very small class of predicates, they will be regarded as exceptional (at least until a principled explanation can be found for their exceptional behavior).

In its temporal aspect, the progressive can be characterized as a partitive operation in the time domain (cf. Taylor 1977, Dowty 1977 and 1979, L. Carlson 1981, Bach 1986, among others).<sup>42</sup> For example, a clause like *Irv was building a cabin* applies to events which are proper parts of events to which *Irv built a cabin* applies. Since such verbs as *blink*, *flash*, *recognize*, *find*, *notice* denote situations that take place at single moments of time, they have no proper internal parts, they are trivially indivisible, and hence the partitivity operation cannot be applied to them. Therefore, verbal predicates denoting happenings are odd with the progressive, unless we think of some unusual contexts, like a slow-motion movie, in which their beginning and end do not fall into a single moment, but instead are separated by an interval of time. Such single situation construals are highly marked. For example, a clause like *John was blinking* can be given a single event interpretation, provided that the interval that elapses between closing and reopening of one's eyes can be thought of as being spread out (as in a slow motion movie) with the distinctly gradual closing and reopening of one's eyes.

In the unmarked case, however, such verbs as *blink* or *flash* are associated with events that are typically thought of as taking place within a very short interval of time. Therefore, they are most likely to give rise to an iterative interpretation when

<sup>42</sup> The details of the progressive construction will be discussed in Chapter 4.

they are used in the progressive. The possibility of an iterative interpretation depends on the resettability of the denoted happening. 'Full-cycle' happenings denoted by such verbs as *flash* are resettable. Therefore, the most natural interpretation of (f) *The light was flashing* is an iterative one.

Happenings described by such verbs as *find* (*one's watch*), *notice*, *spot*, *explode* are thought of as not being resettable. This explains the awkwardness of such examples as *?He was finding his watch*, *?She was noticing/spotting the squirrel*, or *?The bomb was exploding*. The reason is that neither the single on-going event interpretation nor the iterative interpretation is easily accessible. We do not usually think of such events as the finding of one's watch, the noticing or spotting of the squirrel, or the exploding of a bomb as being extended in time. Moreover, such events are typically non-resettable with one and the same object token: we do not repeatedly and within short intervals of time become aware of and forget a certain fact (under normal circumstances), and we know that a bomb can explode only once. Such real world knowledge accounts for the fact that the iterative construal is not (easily) available.

Verbal predicates denoting culminations differ from happenings in so far as they freely occur in the progressive. They can give rise to an iterative interpretation when they are used in the progressive, provided they denote resettable events. Verbal predicates that denote non-resettable events, like *die*, only allow for a single-event interpretation in the progressive construction<sup>43</sup>:

(108) *He was dying.*

A clause like (e) *Emily was winning the car race* allows for either a single event or iterative interpretation. The single event interpretation applies in a situation in

<sup>43</sup> Mittwoch (1990:76) observes that the verbal expressions that are synonymous with *die* cannot occur in the progressive: *\*He is passing away/popping off/kicking the bucket*. However, it is possible to say *He is slipping away*.



which Emily takes part in a race that starts at 9:00am and ends at 9:20am. Suppose that at 9:08am Emily is ahead of everyone else and stays ahead until 9:15am. The progressive picks out this intermediary stage, so we may assert *Emily was winning at 9:10*. Hence, may assert without a contradiction *Emily was winning at 9:10, but in the end she lost the race*. In other words, the assertion *Emily was winning the car race at 9:10* does not commit the speaker to any particular outcome of the race that ended at 9:20am.

For an iterative interpretation of (e) *Emily was winning the car race* we can imagine the following situation. Suppose the car race lasts for a few weeks and at the end of every day its participants are ranked and Emily is ranked first for three consecutive days.

However, these two senses do not justify us to speak of ambiguity.<sup>44</sup> If the non-iterative reading is thought of in terms of subevents that are distributed over a set of contiguous intervals (partition), the distinction between the non-iterative and iterative reading becomes blurred. That is, the distinction between a single-event or an iterative reading is a matter of the density of the proper subevents into which the event denoted by *Emily was winning the race* can be divided. In either case, it holds that *Emily was winning the race* applies to events which are parts of events to which *Emily won the race* applies. Whether the subevent itself is internally continuous or iterative is left to be determined by various pragmatic considerations. The two purported senses are, therefore, to be seen as a matter of vagueness, a pragmatically determined variability.

**Durative Adverbials.** Durative adverbials separate telic situations from atelic ones.

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<sup>44</sup> The assumption that progressive clauses like *Emily was winning the race* are ambiguous seems to underlie Vlach's (1981:281-282) analysis.

- (109-a) *Boris was Russian for several years.*  
?Mary knew physics for three years.
- (109-b) *The socks lay under the bed for a while.*
- (109-c) *The fly swam in the soup for a while.*
- (109-d) ?Irv built a cabin for a year.
- (109-e) ?Emily won the car race for three days.
- (109-f) (?)The light flashed for an hour.
- (109-g) ?He found his watch for three days.

Following L. Carlson (1981), Bach (1981 and 1986) and Krifka (1989), I assume that durative adverbials are 'some sort of MEASURE of time' (L. Carlson 1981:46), "they stand to verbal expressions as amount expressions stand to nominal expressions" (Bach 1981:74).

The restrictions on the occurrence of durative adverbials confirm the necessity to draw a line between static states and dynamic states. Many predicates denoting static states are odd with durative adverbials (cf. Bach 1981:74; Dowty 1979:179ff.) The reason is that we view such static states as knowing physics, being intelligent are as obtaining in large and vaguely defined intervals of time, rather than being restricted to certain relatively short intervals of time.

Event predicates (including bounded incremental events) are anomalous with durative adverbials. As has been already observed, we can illustrate the anomaly with a close parallel in the domain of nominal expressions: "Just as we do not use expressions like *3 pounds of* with singular count nouns like *a horse*, we do not use the expressions that chunk up our experience already chunked up" (Bach 1981:74). Similarly, we cannot impose a bound on an event denoted by *Irv built a cabin* and *Emily won the car race*, because they denote individuated bounded events.

Notice that this intuitive motivation is not contradicted by the possibility of explicitly indicating the temporal extent of such bounded events by the time-span temporal adverbial *in-PP*, as in

- (110) *John built a cabin in three years.*

The time-span adverbial in the expression 'in-PP ( $\phi$ )' specifies that  $\phi$  obtains in some subset of the interval indicated, though not necessarily in a proper subset (cf. Dowty 1979:334). In other words, *in*-PP can mean (i) 'within, i.e., counting the time units from the beginning to the end of an interval, and (ii) 'on/at', i.e., locating a unit in a larger unit'. These two readings have parallels in the domain of countable nominal expressions. We can explicitly indicate the extent of individuated entities denoted by singular count NPs by some conventional units of measure: *The top of the table is three feet wide*. And we can situate objects within larger container-objects: *The apple is in the bowl*.

By contrast, the durative *for*-PP, and other durative adverbials, carve out bounded portions out of unbounded situations. *For*-PP requires that the situation denoted by the predicate in its scope lasts at least as long as specified by the temporal NP. That is, *The fly swam in the soup for a minute* can be felicitously uttered if the fly swam in the soup exactly for one minute as well as if it swam in the soup for three minutes.

These observations are confirmed by the following data noticed by Mittwoch (1982:120, fn. 11). The time-span adverbial *in*-PP is "downward" entailing and can be combined with *at most*, but not with *at least*: cf. *John wrote it in at most two hours* and \**John wrote it in at least two hours*. By contrast, the durative adverbial *for*-PP can be combined with both *at most* and *at least*: cf. *John read for at least two hours* and *John studied for at most two hours*.

The durative *for*-PP does not necessarily involve reference to *all* of the proper intervals (and not even to *most* of the proper intervals) of the temporal measurement phrase that *for* combines with. First, we can assert *John taught for a year* if John taught literally for twelve consecutive months and it is also appropriate to assert *John taught for a year* even if John was not engaged in teaching at virtually every subinterval of the year in question and, for example, did not teach during the three-month

summer vacation. Second, the proper intervals referred to by a *for*-PP need not be temporally contiguous. *John attended the exhibitions for a year* may be truthfully asserted even if the exhibitions were monthly or even quarterly, but not if they took place weekly in May only. There must be some vague and sufficiently large number of occasions that are properly distributed within the period denoted by the temporal measurement phrase that *for* combines with at which the situation denoted by the predicate in the scope of *for*-PP takes place. The density and distribution of such occasions depends to a large extent on the length of the interval denoted by the durative adverbial and on the type of situation denoted by the predicate in its scope.

The durative adverbial *for*-PP is comparable to the quantifier *all* that quantify over individuals as in *all the ground*. For example,

(111) *All the ground was speckled with leaves*

does not entail that there were no bare spots, "only that there were no bare spots big enough to break a pattern of speckles" (L. Carlson 1981:55).

In light of the above observations it may be proposed that durative adverbials have two inherent properties: they indicate a certain temporal measure and they have the combinatorial potential to modify unbounded sentences. How the denoted period, temporal measure, is divided in terms of its (proper) periods is not a matter of the semantics of durative adverbials, it cannot be "hard-wired" into the meaning of the adverbial itself. Rather, it is subject to a number of contextual factors: first and foremost to the lexical semantics of the predicates in its scope as well as to our general knowledge about the temporal extent and evolution of various situations in time.

For example, as L. Carlson (1981:46-7) observes, for clauses with *static* (stative) predicates, such as

(112) *I was in my room all the time,*

the only possible interpretation is one in which the set of all moments within the contextually determined interval referred to by *the time* is relevant. By contrast, for clauses with *episodic* stative predicates, process predicates, it need not be the set of all the moments.

(113-a) *Bill sat on the porch until dawn.*

(113-b) *I worked all the time.*

(113-c) *Bill read until dawn.*

Now consider the following sentences:

(114-a) *He ran for an hour.*

(114-b) *He ran for a year.*

The above pair of sentences only differ in the length of the measuring interval. While an hour full of running may be continuous without gaps, a year full of running is naturally assumed to have gaps, so (b) is most likely to have an iterative interpretation. Such examples show that one contextually determined parameter that influences the interpretation of clauses with durative adverbials is that of temporal extent. The interpretation of a clause with a durative adverbial will depend on evaluating the relative temporal extent typically associated with the situation type denoted by the predicate in the scope of the durative adverbial and the length of the temporal measurement denoted by the durative adverbial. The longer the interval denoted by the durative adverbial and the shorter the relative extent of the denoted situation are, the more likely is the iterative interpretation.

This is clearly the case with happenings, as in (?)*The light flashed for an hour.* "(?)" indicates that this sentence is not unconditionally unacceptable; it is acceptable if the light flashes sufficiently often over an hour interval.

The same restrictions constrain the interpretation of predicates denoting culminations (*awake, arrive*) in the scope of durative adverbials. The following sentence is well-formed if they are interpreted iteratively:

(115) *For three days, Mary awoke at sunrise.*

?*He found his watch for three days* is odd due to the fact that it seems implausible that somebody repeatedly loses and finds one and the same watch over a period of three days. However, if each finding is associated with a different watch or watches, the above sentence becomes acceptable: *He found watches lying on his office desk for three days.*

The iterative reading is blocked if the denoted is non-resettable, as in:

(116-a) \**The bomb exploded until dawn.*

If the corresponding clause contains a plural subject-NP that is interpreted distributively an iterative reading is easily accessible. The applicability of durative adverbials depends on the referent of the subject-NP of the clause in its scope.

(116-b) *(The) Bombs exploded until dawn.*

Bounded incremental events, cannot occur in the scope of a durative adverbial, under the most usual, unmarked, interpretation. As has been mentioned in the chapter on contextually-determined "shifts" between situation types, a frequent accommodation strategy for bounded predicates in the scope of durative adverbials is to interpret them iteratively or as unbounded (atelic) ones. (cf. Dowty 1979:78ff. and Vlach 1981:281-2). For example,

(117-a) *Mary played the same waltz for an hour.*

(117-b) *John rode the bus to work for three years.*

This first sentence, for example, it can be construed as meaning that Mary plays some parts of the waltz, rather than the whole waltz from the beginning to the end. The explanation for the 'bounded → unbounded' shift follows the same basic principles in both the nominal and verbal domains: "... expressions which carve out measures or quantities of stuff, -pounds of, portions of, etc. - cannot go with pure count-items in the singular, but demand interpretation of the count-item as mass-term or process counterpart" (Bach 1986:11).

The iterative interpretation is possible if the event is reversible, that is, if the bounded predicates entail a reversible resultant state:

- (118-a) *Sally closed the door for two hours.*  
(118-b) *Sally put the beer in the fridge for two hours.*

Such clauses are ambiguous: (i) Sally was repeatedly closing and opening the door, putting the beer in the fridge for two hours; (ii) the durative adverbial modifies the resultant state 'the door was closed', 'the beer was in the fridge'. The first reading presupposes there was an unbounded sequence of telic subevents. In the second reading, the resultant state is unbounded. Hence, in both (i) and (ii) durative adverbials modify unbounded predicates.

However, there are some predicates that only allow the iterative interpretation. Consider, for example

- (119) *Sally stacked the beer in the fridge for an hour.*

There are also bounded predicates that only allow that their resultant state be measured with the time span indicated by the durative adverbial:

- (120) *I went to my room for an hour.*

The placement of the durative adverbial in the clause initial position has a disambiguating effect:

- (121-a) *The dissidents were sent to Siberia for twenty years.*  
(121-b) *For twenty years, the dissidents were sent to Siberia.*

While the first sentence is ambiguous, the second is not. It means that for a period of twenty years dissidents were sent to Siberia and spent some unspecified periods of time there.

The differences in word order result in different scopal properties and semantic interpretation:

- (122-a) *Kim jogged for 20 minutes twice a day.*

(122-b) *Kim jogged twice a day for 20 years.*

As Pollard and Sag (1987:135) observe, in (a) 20-minute duration is a property of the situation type whose frequency is described, while in (b) the frequency is a property of the situation type whose overall duration is described.

**Summary.** Three basic semantic concepts have been used for the classification of verbal predicates into the situation type categories proposed here: the concept of 'change' (Does the denoted situation entail change?), 'boundedness' (Is the denoted situation bounded or unbounded?), temporal extent (Is the denoted situation protracted or momentaneous?) These three concepts cross-classify the situation types in the following way:

(123)

	change	bounded	temporal extent
1. static state	-	-	+
2. episodic state	-	-	+
3. process	+	-	+
4. incremental event (bounded)	+	+	+
5. culminations	+	+	+
6. happenings	+	+	-

Notice that if we based our description only on the mereologically based notion of 'boundedness' and on 'temporal extent', and did not include the concept of 'change', the distinction between states and processes would be difficult to draw, as Bach observes: "The hardest distinction to understand, so far, is that between processes and states" (Bach 1981:68).

As far as the criterion of 'temporal extent' is concerned, Verkuyl (1989) comes to the conclusion that "the *length* of a time unit involved in an event does not qualify as a meaning element that distinguishes certain verbs from others" (Verkuyl 1989:58). He argues that verbal expressions denoting happenings can be construed as protracted events in appropriate contexts. For example, an event denoted by a verb like *blink* can be given a single event interpretation, if the interval that elapses between closing and reopening of one's eyes can be thought of as being spread out. And vice versa, we can construe typical protracted events, such as *draw a circle*, as taking place at a



single of moment time, that is, as happenings. Verkuyl (1989) tries to support his claim with modern computer technology that allows us to produce a drawing of a circle on a screen by typing a single key. In such a situation, we may be able to say *He drew a circle on his Mac at three o'clock*.

However, Verkuyl's argumentation does not invalidate the usefulness of the temporal extent as a semantic criterion. Producing a drawing of a circle on a computer screen by hitting a single key does not certainly constitute an unmarked, typical, way of understanding the verbal expression *to draw a circle*. Such momentaneous construals are highly marked and they do not justify that we discard the criterion of temporal extent, as Verkuyl (1989) argues. Nor do they justify us to speak in such cases of ambiguity, as Mittwoch (1990:75) suggests.

#### 3.4.2.4 Lexical Entries

Following the common practice in Head-Driven Phrase Structure Grammar (Pollard and Sag 1987 and 1993) and Construction Grammar (cf. Fillmore and Kay 1993), lexical information is structured on the basis of a small number of word types and organized in cross-cutting hierarchies. Such hierarchies classify all the words on the basis of shared syntactic, morphological, semantic and pragmatic properties. The properties of word types are stated only once in a single place in the lexicon. The properties of words that can be predicted from their membership in types are factored out from their lexical entries so that the amount of idiosyncratic information that needs to be stipulated in individual lexical entries is reduced.

**Minimal valence.** Following some suggestions in Fillmore and Kay (1993), a minimal valence is that part of a valence structure in a lexical entry that is idiosyncratically linked to a given lexical item. Minimal valences are usually represented as a set of thematic roles.<sup>45</sup> For example, the minimal valence of the lexeme WRITE

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<sup>45</sup> Minimal valences are also known as 'thematic (argument) structures', 'θ-structures',

can be represented as follows:

(124)

**Minimal Valence**

$$\left[ \begin{array}{ll} [\text{Lexeme} & \text{WRITE}] \\ [\theta\text{-role} & [\text{Agent, Incremental Theme}]] \end{array} \right]$$

**Conceptual Frames and Situation Types.** A minimal valence is related to the conceptual part of a lexical entry which represents the meaning of a lexical item. The conceptual part of a lexical entry is represented as the value of the attribute specification 'sem'. A schematic representation of the minimal valence with the conceptual part of a lexical entry for the lexeme WRITE can be given as in:

(125)

$$\left[ \begin{array}{l} [\text{Lexeme WRITE}] \\ \left[ \begin{array}{l} \text{sem} \left[ \begin{array}{ll} [\text{frame} & \text{WRITING}] \\ [\text{sit-type} & \text{incremental event}] \\ [\text{p-role} & [\text{Part1 writer}, [\text{Part2 written product}]] \end{array} \right] \\ \text{val} \left[ \begin{array}{ll} [\theta\text{-role} & [\text{Agent, Incremental Theme}]] \end{array} \right] \end{array} \right] \end{array} \right]$$

The value of 'sem' includes the information about

- (i) the particular conceptual frame or scene evoked by the lexical item, encoded by the value of the attribute 'frame';
- (ii) the number and type of frame-specific participant roles, encoded by the value of the attribute 'p-role', that is, by 'part1', 'part2' and their respective values;
- (iii) the situation type, encoded as the value of the feature attribute 'sit' that stands for a 'situation type'.

The conceptual frame, the frame-specific participants and situation type, interact in determining the verb's meaning. The lexical information conveyed by verbs can be argument structures.

factored out into cross-linguistic and language-particular schematization.

It is one of the tenets of frame semantics that *meanings are relativized to conceptual scenes or frames* (cf. Fillmore 1977a:59). Such scenes or frames are understood

"in a maximally general sense, including not only visual scenes but also familiar kinds of interpersonal transactions, standard scenarios defined by the culture, institutional structures, enactive experiences, body image, and, in general, any kind of coherent segment of human beliefs, actions, experiences or imaginings" (Fillmore 1975:124).

The notation WRITING, written in upper case letters, stands for the conceptual analysis of the particular knowledge that the English lexeme *write* evokes. It can be characterized as evoking a frame with such participant roles as the writer, the pointed trace-leaving implement or some other writing device, the surface on which the traces are left and the product. The writer ('part 1') performs a purposeful action by using the writing device on the surface on which the traces are left. As a result of this action a written product ('part 2') comes into existence. The values of 'part1' and 'part2', here indicated with frame specific participant roles 'writer' and 'written product', respectively, stand for the conceptual representation of the relevant participant roles.

Verbal lexemes are cross-classified on the basis of their situation type. In the minimal lexical entry of the verb *write*, the attribute 'sit-type' (which stands for a 'situation type') takes the value feature 'incremental event'. This encodes the homomorphism entailment of the verb *write* (cf. Hinrichs 1985; Krifka 1986 and 1989; Dowty 1991), along with the thematic role 'Incremental Theme', which will be discussed further below. Verbs that are inherently homomorphic like *write* share the feature attribute 'incremental event' in the conceptual part of their lexical entry that characterizes them as members of a particular situation type. The value 'incremental event' of the attribute 'sit' is to be understood as a mere place-holder with an abbreviating function. It points to that place in the lexicon where all the relevant properties

of incremental event type are defined. By stating the information about the properties of the incremental event type explicitly and in full only once and for all in a single place in the lexicon, rather than specifying it in each and every lexical entry of a verb, we avoid redundancy and capture the grammatically significant commonality shared by all the verbs that are associated with the incremental event type. The information provided by the incremental situation type can be thought of as providing the setting or scaffolding that is filled in by the specific notions associated with a conceptual frame that represents the knowledge carried by a particular lexical item. (encoded by the value of the attribute 'frame', as 'WRITING', for example).

Through the conceptual part of lexical entries, lexical items access a knowledge base that includes a hierarchy of frames. For example, the conceptual frame of WRITING also includes information that it inherits from the general *causation* and *creation* conceptual frames. The lexeme *write* shares these two general frames with other lexemes that have the same frame specific roles, such as *imprint*, *inscribe*, *stamp*, *tattoo*, *chalk*, *copy*, *doodle*, *draw*, *pencil*, *paint*, *print*, *type*, *record*, *scratch*, *scrawl*, *scribble*, *sketch*, *stencil*, *trace* and *transcribe*. The lexeme *write* shares the general *causation* and *creation* frames with other classes of lexemes that have different frame specific roles, for example verbs of material composition and creation like *assemble*, *bake*, *carve*, *chisel*, *cook*, *knit*, *make*, *sew*, *compose*, *create*, *fabricate*, *manufacture*, *form*, *produce*. Any one of these verbs is capable of accessing the entire *creation frame*, which in turn is a special case of an *incremental event type*. Any clause containing one of the verbs evoking a creation frame can introduce other frames. For example, the English verb *write* simultaneously activates an additional *language frame*, as the product of an act of writing must be something linguistic.

Languages differ in the conceptual frames that are associated with their lexical items, that is in their language-particular lexicalization patterns. Fillmore (1975, 1977b) observes that the Japanese verb *kaku* and the English verb *write* are frequently

acceptable translations of each other, but the frame analysis of the two words suggests that they are partly different. They overlap in having the frame specific participants the writer, the pointed trace-leaving implement (or some other writing device) and the surface. In the case of the Japanese *kaku*, the nature of the resulting trace is left more or less unspecified. The English verb *write* has an additional scene associated with it, for which there is a language frame: the product of an act of writing must be something linguistic.<sup>46</sup>

**Frame-Specific Participant Roles and Thematic Roles.** In the lexicon, each verbal lexeme is associated with two tiers of semantic structure: the frame specific participant roles in the conceptual frame and the thematic structure (' $\theta$ -structure').

The frame specific participant roles are determined by the meanings of individual verbs. In the collection of the lexemes that evoke the same conceptual frame each lexeme is associated with the same set of frame specific participant roles.

The commonality in the semantic structure of the lexemes that evoke the same conceptual frame is accounted for by the partial identity of their associated thematic roles or minimal valencies (cf. Fillmore and Kay 1993). A given thematic pattern can be thought of as an outline of the meaning of the verbal predicator, its details are filled in by the associated conceptual frame. The thematic roles do not provide an exhaustive account of all the semantic aspects of single-clause predications. The thematic roles pick out the grammatically significant participant roles in the structure of conceptual frames. A thematic structure is a particular shared "knowledge structure" that enables us to communicate information about conceptual frames. It is

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<sup>46</sup> To take another example, Talmy (1985) compares the different lexicalization patterns of motion verbs in Germanic languages, on the one hand, and in Romance and Semitic languages, on the other hand. The Germanic type conflates the motion and manner with independent marking of path, and the Romance and Semitic type conflates the motion and path and independently marks the manner of motion.

crucial to the general organization of the grammatical structure of clauses.

Each thematic argument structure (each set of thematic roles) represents a very general linguistic schema of a particular situation type. For example, static states associated with psychological verbs like *know* have two participants: the sentient being that has the experience of knowing something, and the content of that experience. The verb *know* treats that being as an Experiencer. The participant that is an animate, active instigator of the situation and that has control over the situation, is typically associated with the Agent thematic role. The participant that is subjected to a given event and undergoes various changes in its physical state is often associated with the Incremental Theme role. For example, the verb *build*, treats the writer as the Agent and the built-object as the Incremental Theme.

We need to distinguish arguments from each other on the level of linguistic expressions and we must also distinguish frame-specific participants in the frames evoked by linguistic expressions. In other words, it is necessary to individuate arguments relative to argument-positions as well as relative to frames. One reason is that two different linguistic expressions may point to the same framal participant and, vice versa, one linguistic expression may pick more than one framal participant. For example, in a sentence with a reflexive pronoun, such as *John kills himself* both the Agent and Patient arguments select the same participant in the event.

In *Lexical Functional Grammar* (Kaplan and Bresnan 1982), *Government and Binding Theory* (Chomsky 1981; van Riemsdijk and Williams 1986) and in Jackendoff's work, *Agent, Patient, Source, Goal*, etc. are just arbitrary and distinct labels that serve to distinguish various arguments of a predicate from one another. Such labels have no semantic content. By linking semantic roles to framal participants, we also imply that semantic roles *semantically* distinguish one argument from another; they are not merely syntactic labels, they have semantic content. Similarly as in Dowty (1989), one argument is semantically distinguished from another in so far

as

"it permits (real-world, non-linguistic) objects to be distinguished from one another by virtue of the distinctive properties they have as they participate in an event named by a verb, properties that can be identified ('in the real world') independently of a language or its 'semantic representations'" (Dowty 1989:73).

Thematic roles are partially independent of lexical semantics, that is, they are not fully predictable by the properties of the conceptual frames. They are not automatically computable on the basis the conceptual frames.<sup>47</sup> One of the reasons is that two different verbs can assign the same frame-specific participant role to distinct thematic roles (cf. Fillmore and Kay 1992:4.14). For example, *Minnie* in (i) *Minnie sold the car to Max* is Agent and while in (ii) *Max bought the car from Minnie Minnie* is Source. And vice versa, either the seller (*Minnie*) or buyer (*Max*) can be associated with the Agent thematic role, as is shown by (i) and (ii). Within Construction Grammar, it is assumed that thematic roles exist in relational perspectives to frames. As has been shown, a given kind of situation can be perspectivized by more than one thematic argument structure.

**Fully Specified Lexical Entries.** The linking between thematic roles and grammatical functions is determined by linking constructions.<sup>48</sup> All else being equal, in a

<sup>47</sup> Jackendoff (1990:47ff.), for example, assumes that thematic roles "are not primitives of semantic theory. Rather, they are relational notions defined structurally over conceptual structure, with a status precisely comparable to that of the notions Subject and Object in many syntactic theories (e.g. Standard Theory, Extended Standard Theory, GB Theory, but not Lexical-Functional Grammar (LFG) and Relational Grammar). In particular, they are not marked as annotations to D-Structure (GB Theory) or to predicate argument structure (LFG; see Bresnan 1982d, 293)". And similarly, Pustejovsky (1988a and 1988b) proposes that the grammar does not simply specify a set of roles which are associated with a lexical item. Rather there is a much richer lexical structure (like Jackendoff's 1983 and 1987) conceptual structure, from which the courser-grained thematic relations are computable. Thematic relations are, therefore, derivative notions.

<sup>48</sup> Jackendoff (1972:35) suggests that "The lexical entry of a verb must correlate gram-

construction with an active lexical form, the Agent is linked with the subject grammatical function (cf. Fillmore 1968, *subject selection* principle) and the Patient is linked with the direct object. An example of a *fully specified valence* in the lexical entry of an active lexical form *build* showing the linking of frame-specific roles, theta-roles and grammatical functions can be given as in:

#### Fully-Specified Valence

[Lexeme WRITE]			
[syn [cat V, lex +]]			
[sem	[[frame	WRITING]	
	[sit-type	incremental event]	
	[p-role	[Part1 writer], [Part2 written product]]	]]
[val	[θ-role	[Agent,	Incremental Theme]]
	[gf	[subject,	direct object]]
			]]

(The value of the attribute "syn" indicates the external syntactic properties of the lexeme WRITE.) Homomorphic predicates do not license the omission of the thematic role Incremental Theme under the lexically definite null instantiation (DNI) interpretation. Fillmore and Kay (1992, 7.5, 12/3) characterize the *lexically definite null instantiation* in the following way:

"Some lexical predicates license the omission of specific valence elements only when the speaker assumes that the hearer already knows what entity in the discourse context fits the frame element corresponding to the omitted valence element."<sup>49</sup>

atical and thematic relations". Following the most recent developments in the linking theory, it is assumed that there are general principles that correlate the semantics of an argument with its categorial or grammatical status, and that the correlation is an idiosyncratic property which may vary from one lexical item to another.

<sup>49</sup> Cf. also Fillmore (1986) and Fillmore and Kay (1992: 7.5, 12/3): "Sentences that are instances of DNI omission cannot be the opening contribution to a conversation in which the conversants know nothing about each other. There has to be something 'in the air' which is shared by both conversants. Such clauses require that the speaker be able to take for granted that the hearer knows the identity of certain things that the speaker has in mind."



This is illustrated by the following examples:

(126-a) *Jane repaired the window.*

(126-b) *\*Jane repaired.*

(127-a) *John built the house.*

(127-b) *\*John built.*

(128-a) *John melted the butter.*

(128-b) *(\*John melted.*

The clause *John melted* is well-formed only if we understand it as meaning that John underwent the melting event (cf. Tenny and Heny 1993:16).

Verbs that take the Incremental Theme share this restriction with verbs that take the Patient argument. Verbs like *break*, *burst*, *explode* and verbs of impact by contact (*bash*, *batter*, *bump*, *beat*), for example, that do not have omissible Patients under DNI interpretations.

Verbs taking the Incremental Theme seem to differ from verbs taking the Patient in that they more often license the indefinite null instantiation (INI) of their Incremental Theme argument, as in:

(129) *Uncle Harry ought to stop drinking.*

Fillmore (1986:96) points out that INI

"appears to include two distinguishable phenomena (...), one involving a semantic object of considerable generality, the other requiring the specification of various degrees of semantic specialization". In the latter case, "the missing element is considered to be of particular type (limited to a subtype of the possible types of objects)" (Fillmore and Kay, 7.3, 12/3).

For example, the unexpressed Incremental Theme of *drink* in *Uncle Harry ought to stop drinking* is not identifiable by the hearer, nevertheless it is understood to be restricted to alcohol. No specific sort of food or drink is assumed in interpreting

(130) *With my tongue so swollen I can't eat or drink.*

In the following example, the missing object includes breads or pastries (but not potatoes or hams, for example)<sup>50</sup>:

(131) *I spent the afternoon baking.*

The occurrence as a complement of *spend  $\alpha$ -time  $\phi$ ing* indicates that such verbal expressions in which the omitted Incremental Theme NP (under the INI interpretation) is considered to be of particular type are atelic (process).

The unexpressed Incremental Theme of *eat* in

(132) *I have already eaten*

is understood to be a particular meal, a well-demarcated entity. Hence such a clause is understood as telic. In such examples it is both the conventionalized meanings of words as well as the context of the utterance that enforce the bounded interpretation of a clause.

The above examples strongly suggest that the increasing specificity of the omitted Incremental Theme (under INI interpretations) seems to be correlated with the increasing likelihood of the whole complex verbal expression to be interpreted as telic.

As in the case of other adjuncts that provide further specifications to the incremental event type described by verbs or that introduce the incremental event type into the semantics of a complex verbal predicate, the presence of the resultative adjunct is not sufficient for conferring the completive (perfective) meaning to the resultative construction. The completive meaning is absent when the resultative is combined with the progressive construction, as in:

(133) *He was painting his house pink-ish.*

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<sup>50</sup> This is has been pointed out by McCawley (see Fillmore 1986:97).

### 3.5 Conclusion

Two distinct approaches have been recently advanced to the description of the influence of nominal arguments on the telic and atelic interpretation of complex verbal predicates. Tenny (1987, 1992, 1993) reduces this phenomenon to a direct object argument position in the d-structure. By contrast, Krifka (1986, 1989, 1992) and Dowty (1988, 1991) reduce it to a particular thematic relation that the relevant nominal arguments bear to their governing verb. This motivates the introduction of a new thematic role that Dowty labels as *Incremental Theme* and Krifka *Gradual Patient* or *Successive Patient*. This move has important consequences for the theory of thematic roles in general, which are explicitly spelled out in Dowty (1988 and 1991). Moreover, the intuition that the boundedness properties of the Incremental Theme noun phrase "spread" over the complex verbal predicate is explicitly represented by establishing a homomorphic mapping between the part structure of the denotations of the Incremental Theme argument and the part structure of the event denoted by the complex predicate. This representation presupposes an event semantics with lattice structures and it is directly related to the lattice-theoretic representation of mass and plural terms in Link (1983).

I extend Krifka's and Dowty's approach to account also for those cases in which a telic and an atelic interpretation of verb phrases and clauses can be assigned in a systematic way, although it is not calculated on the basis of the lexical properties of a lexical head verb and the semantic properties of its subcategorized Incremental Theme argument. In such cases the telic and atelic interpretation of a verb phrase or a clause cannot be viewed as a simple projection of the lexical properties of its lexical head verb and calculated by compositional rules on the basis of independently motivated syntactic structures (along the lines Krifka and Dowty suggest). As in Krifka (1986 and 1992) and Dowty (1988 and 1991) I use the thematic role 'Incremental Theme' in order to capture the semantic commonality of verbs that are

inherently homomorphic. At the same time, I allow for the possibility that the homomorphic mapping may have other sources than just the lexical semantics of individual verbs, sources whose domain may be a verb phrase or even a whole clause. This approach relies on the notion of the 'incremental event type'. It assumes that the incremental event type can be associated with a single lexical item, a verb, but also with a whole construction. This is consistent with the proposals made in Dowty (1991:609). Following Fillmore and Kay (1993), this account presupposes that just as lexical entries of verbs specify valency requirements and semantics, so constructions can be characterized by their argument structure and associated semantics, including a particular situation type.

Finally, I introduce a revised typology of situation types that includes the incremental event type. In general, situation types represent part of the lexical meaning of verbs and they are also associated with certain patterns of thematic roles and certain patterns of morpho-syntactic structure in simple clauses. In this connection I discuss the structure of the lexical information provided by lexical entries and the place of the situation types in lexical entries of verbs.

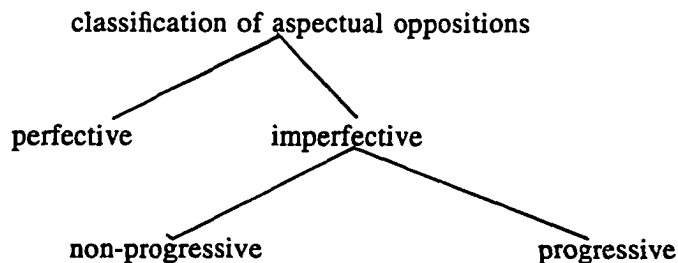
## Chapter 4

### Aspect

#### 4.1 Introduction

The term 'aspect' is traditionally used for the perfective-imperfective distinction expressed by some morpheme on the verb or by a special periphrastic verb construction. The imperfective aspect is further divided into progressive and non-progressive.

(1)



Aspectual systems, both in terms of their formal expression and semantic distinctions they encode, dramatically differ across languages (cf. Comrie 1976; Dahl 1985; Binnick 1991, for example). The perfective and imperfective aspect is not uniquely tied to verbs (or verbal constructions), but it is also conveyed by case markings on the noun (cf. Finnish) or by various construction with a locative and partitive origin (cf. the German *an*-NP construction), for example. In terms of its formal expression, we need to distinguish between two main strategies: 'verb-centered' and

'noun-centered' expressions of aspect. While in Slavic languages and English the expression of aspect is verb-centered, in Finnish and German it is noun-centered.

It has been observed that the telic-atelic distinction concerns the representation of situations as bounded or unbounded. The aspectual perfective-imperfective distinction allows us to make an assertion about all or a part of a given situation. Telicity and aspect are two semantic dimensions in the domain of verbal semantics that are clearly orthogonal to each other.

I propose that the semantic core of many, possibly all, aspectual systems can be characterized in terms of the partitive-holistic distinction in the domain of situations. This, however, does not mean that the meaning of aspectual systems in all languages is reducible just to this distinction. There is no single set of universal concepts and no single concept that is equally applicable to all languages. Rather, I suggest that the category 'aspect' is characterized in terms of aspectual prototypes 'on-going situation' and 'result'. The prototypes 'on-going situation' and 'result' are two extreme categories of aspectual meaning. They stand for clusters of aspectual properties, whereby partitivity is one of the contributing properties of the 'on-going situation' prototype and the holistic meaning of the 'result' prototype.

The English progressive aspect instantiates one extreme category of aspectual meaning, namely the 'on-going situation' prototype, while the Slavic perfective aspect is situated close to the opposite extreme, the 'result' prototype. Taking recent accounts of the English progressive as my point of departure, I will propose a characterization of aspect in Slavic languages, focusing mainly on Czech. This order was chosen mainly for expository and historic reasons. The English aspectual category has a regular verb morphology. In Czech aspect is overtly marked by verb affixes, but its expression is far less systematic. For example, we cannot isolate affixes that invariably indicate perfective and imperfective aspect. One of the distinguishing features of the Slavic perfective and imperfective categories is their lexical-derivational

character, rather than an inflectional character (cf. Dahl 1985, Spencer 1991). According to Dahl (1984 and 1985), viewed from a broad typological perspective Slavic aspectual systems are idiosyncratic in many respects.

Starting in the late sixties, there has been a number of studies on the semantics of the progressive that explicitly relate it to the Vendler-Dowty typology of situation types discussed in the previous chapter. Such studies significantly contribute to our understanding of how aspectual meaning interacts with the inherent lexical semantic properties of verbs, verb phrases and sentences. Since the inception of aspect studies, it has been emphasized that an adequate description of aspect must account for such a systematic interaction.

As far as the characterization of aspect is concerned, I mainly follow some suggestions made with respect to the English progressive in Bach (1981 and 1986b). He proposes that the English progressive can be viewed in terms of a partitive operation in the domain of situations. This view can be traced back to Partee and Bennett (1972/78). Bach's mereologically-based view of aspect dovetails nicely with the view common in Slavic linguistics that the imperfective aspect "looks at the situation from inside" (Comrie 1976:3-4, cf. also Isačenko 1962) while the perfective aspect presents a situation holistically, as 'an indivisible whole' (cf. Maslov 1959:309, for example). Bach's observations and aspect studies in Slavic linguistics lead me to proposing that (part of) aspectual semantics can be characterized in terms of part-whole relations in the domain of situations.

In the second half of this chapter I will give a brief introduction into the morphology of Czech verbs. I will also give a description of their salient semantic and syntactic features. I will focus on those phenomena that relate to aspect and situation types.

## 4.2 Perfective and Imperfective Aspect

### 4.2.1 Aspectual Meaning

The semantics of the category 'aspect' is grounded in certain basic ontological properties that are motivated, among others, by language-acquisition facts (Slobin 1985). Such a view of aspect allows us to compare typologically distinct languages and to describe parallels that so far have largely been undetected. Slobin (1985) claims that "[b]asic Child Grammar orients to two major temporal Perspectives, which we can characterize as Result (punctual, completive) versus Process (nonpunctual, noncompletive, ongoing). This distinction is marked early on by the perfective-imperfective forms of verbs in Slavic languages, by the present (-*lyor*) - past (-*dI*) forms in Turkish, by the progressive-past forms in English (-*ing* vs. -*ed*) and Japanese -*te iru* vs. -*ta*), etc. (...)" (Slobin 1985:1184).

According to the developmental sequence that Slobin proposes, children first use grammatical markers to differentiate "extreme" categories of meaning; later they discover which semantic properties of these extremes are critical for their language, and they determine how these properties interact with other properties to define (in this case) a language-specific tense-aspect system.

For example, the English-speaking child must learn to mark events in the past differently depending on whether he views them as ongoing, without information about their beginning or end, but not on the basis of whether he views them as completed and culminating in some resultant state: cf. *He was fighting* vs. *He fought*. By contrast, the Polish-speaking child "will have to attend to completion (perfective aspect) but not the ongoing progress of a past event" (Slobin 1985:1184).

Slobin's finding in first-language acquisition is in accord with the results in theoretical studies on aspect. For example, within the markedness theory, the progressive in English (e.g., *he was fighting*) is considered to be the marked member in the aspectual opposition. It is contrasted with the unmarked non-progressive or simple member (e.g., *he fought*). In Slavic languages, the perfective form is marked in the opposition 'perfective-imperfective'.



Building on the literature on aspect in linguistics and also on Slobin's (1985) findings, I suggest that (on-going) 'on-going situation' and 'result' are two semantic prototypes in the domain of aspect. They are abbreviations for clusters of particular constellations of properties, rather than discrete categories.

- Some of the contributing properties of 'on-going situation':
  - 'part-of' relation (or 'partitivity')
  - extension along the temporal axis
  - dynamicity
  - temporary, contingent, potentially changeable situation
  - expression of a situation without regard to its boundaries
- Some of the contributing properties of 'result':
  - 'whole-of' relation (or 'closure')
  - limited duration (short or punctual event)
  - completed transition from one state to another state

Contributing properties that characterize the aspectual prototypes 'on-going situation' and 'result' form clusters that are associated with the grammatical expression of imperfective and perfective aspect. The prototypes 'on-going situation' and 'result' are two extreme categories of aspectual meaning. The systematic expression of aspect in any given language can be understood as realizing at least some of the properties that contribute to the prototypes 'on-going situation' and 'result'. The more of these properties are grammaticalized in a given language-specific aspectual category, the closer it is to the prototype 'on-going situation' or 'result'.

The prototype view of aspect has the advantage that it does not presuppose that there is any one set of universal concepts that are equally applicable to all languages (cf. Dahl 1985). It does not also imply that the aspect category in a given language is necessarily reducible to a single semantic 'invariant' property (or a pair of such properties), contrary to the proposals of the structuralist approaches to aspect. Comrie (1976:16ff.) and Binnick (1991:135ff.), for example, discuss a number of notions that

have been proposed for characterizing the semantic features of the perfective aspect: 'short duration', 'limited duration', 'completed action', 'successful completion of an action' or 'resultative meaning', among others. Comrie (1976) concludes that there are counterexamples to all of them.

The 'on-going situation' prototype involves partitivity and the 'result' prototype the holistic meaning as one of its contributing properties. This reflects the long-standing intuition that perfective and imperfective verbs allow us to make an assertion about all and a part of a situation, respectively. I propose that the partitive-holistic distinction constitutes the semantic core of many, possibly all, aspectual systems. However, this does not mean that the semantics of the perfective-imperfective distinction in any particular language and across different languages can be reduced to the 'part-of' and 'whole-of' relations, to only these two concepts that characterize the two aspectual prototypes.

This aspectual core lends itself naturally to a description within the theories of *mereology*, or the logic of part-whole relations. The holistic-partitive distinction, which represents the semantic core of aspectual systems across languages, sets aspect clearly apart from the telic-atelic distinction, which concerns the representation of situations as bounded and unbounded. It has been proposed that at least some of the properties of the telic and atelic verbal predicates can be described in mereological terms (cf. Bach 1981). Such a mereologically-based characterization of aspect and telicity has the advantage that it allows us to describe in a straightforward way the integration of aspect and telicity in sentence's semantics. Aspect interacts in a systematic way with telicity and an adequate description of aspect must account for this systematic interaction.

If we assume that the partitive-holistic distinction constitutes the semantic core of aspectual systems in natural languages, then we can also describe in a straightforward way the parallels between various aspectual systems regardless whether they are

express aspect by means of verbs or some periphrastic verbal constructions or by means of nouns, noun phrases and various constructions with a locative or partitive origin. For example, the comparison of English Czech, German and Finnish shows that their different strategies for expressing aspect can be viewed in terms of a difference in the grammatical encoding of the cross-categorial and cross-linguistic partitive-holistic distinction.

As examples for the application of the prototype view to aspect, I will discuss the English progressive and the Czech perfective aspect and then extend it to the description of aspect in German and Finnish. The progressive aspect, one of the sub-categories of the imperfective aspect (cf. Comrie 1976:25), is characterized in terms of partitivity in the temporal domain: the progressive operator relates situations to their proper parts (see Bennett and Partee 1972 and 1978; Taylor 1977; Dowty 1977 and 1979; Carlson 1981; Timberlake 1982; Bach 1981 and 1986b; Krifka 1992, Smith 1995, among others). For example, a progressive sentence like *Irv was building a cabin in Nova Scotia last August* describes a situation that is a part of a situation described by the corresponding non-progressive sentence: *Irv built a cabin in Nova Scotia last August*. In traditional terms, *Irv was building a cabin in Nova Scotia last August* describes an ongoing situation, without regard to its beginning or outcome. A speaker can utter felicitously *Irv was building a cabin in Nova Scotia last August* even if the building of a cabin was never completed.

This view of the progressive operator fits well with the observation that many typologically different languages tend to transfer partitive and locative operations from the domain of individuals to the domain of situations in order to convey imperfective aspect, especially progressive aspect.<sup>1</sup>

"[T]he only requirement is that we should be able to transpose from space to time, and languages do this quite readily already in the use of originally locative prepositions, etc., as temporal: *on the table, on Friday* (Comrie 1976:103).

This form of expression can be characterized by a paraphrase of the type 'he is in/at work(ing)', 'being in a state'. The notion of 'partitivity' involved in the progressive operator requires that a predicate in its scope denotes a situation that has a certain duration. Only a protracted situation can be thought of as having proper parts.

Although 'partitivity' and 'temporal extent' seem to be necessary characteristics of the semantics of the progressive operator, they are not on their own sufficient to constrain the use of this operator. Not all the predicates that denote situations associated with extended temporal intervals can occur in the scope of the progressive operator. Predicates that are associated with static states (or *object-level* predicates) like *know* and *believe* are extended in time. They are associated with an interval of time that is (in most cases) large and vaguely defined and they typically predicate an unchangeable, permanent property of some noun phrase in a sentence. Such stative predicates do not usually occur in the progressive (except with special interpretations), as they are not easily conceptualized in terms of their proper parts, that is, in terms of situations that are their temporary manifestations (cf. Carlson 1977, Bach 1981:78). Clearly, "the metrical parameter of durativity must be distinguished from the topological parameter of progressivity" (Timberlake 1982:315). Apart from 'partitivity', and 'extension along the temporal axis', the progressive in English and other languages involves a dynamic feature (cf. Comrie 1976, Timberlake 1982, Smith 1995).<sup>2</sup> In other words, the progressive operator requires an episodic predicate. An episodic predicate denotes a non-stative situation that involves a change or it denotes a contingent, temporary state that is potentially changeable in time. Due to this potential to change, such a state is regarded as dynamic (cf. Comrie 1976, Carlson 1977, Bach 1981, for example).<sup>3</sup>

<sup>1</sup> Less frequently, the locative form of the verb is also used with a habitual meaning.

<sup>2</sup> According to Timberlake (1982:311), "the progressive requires change on the activity dimension. The progressive, then, expresses dynamicity with respect to the aspect locus at the propositional level"

<sup>3</sup> "The type of state that is of particular interest for present purposes is one that is tem-

Every episodic situation, a situation which involves changes or is potentially changeable, has, in principle, a beginning, a certain extent, and an end. Every episodic situation may be conceived of as having a temporal limit, as being "closed along the temporal dimension" (Timberlake 1982:311). In general, the perfective operator relates a given situation to a bounded temporal frame, which contains all the parts of its "natural" or prototypical "run-time". Another way to say just that is to say that a perfective sentence presents a situation as single whole.

The bounded temporal frame associated with the perfective operator coincides with the inherent boundaries entailed by telic predicates. The semantic contribution of the perfective operator to the meaning of an affirmative sentence with a telic predicate is the entailment that the inherent (final) boundary of the telic predicate was (or will be) reached. A speaker who uses a perfective sentence like *Postavil<sup>P</sup> chatu* - 'He built a/the weekend cottage' commits himself to the assertion that the construction of the cottage was completed. According to Slobin (1985), this "completive perspective" or "resultative perspective" is one of the "extreme" categories of perfective meaning (cf. Slobin 1985).

Some verbal morphemes that serve to derive perfective verbs are specialized to indicate the initial or final subevent of a larger situation. For example, the imperfective verb *běžet<sup>I</sup>* 'run' has the perfective counterpart *roz-běhnout<sup>P</sup> se* 'start running' and *do-běhnout<sup>P</sup> (do cíle)* 'reach the finish line'. The initial and final subevent each are represented as a single whole.

The examples in the preceding paragraph also show that perfective operators impose boundaries on atelic situations, which are on their own unbounded. To take a different example, by applying the prefix *za-* to the imperfective verb *plavat* 'swim',

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porary, or contingent, rather than temporally unrestricted, or absolute. The distinction between absolute and contingent state is made in Irish and Scots Gaelic ..." (Comrie 1976:103).

we carve out a bounded portion of the swimming situation:

(2)	<b>imperfective</b> <i>plavat</i> 'swim'	<b>perfective</b> <i>zaplavat si</i> <sup>4</sup> 'have a swim'
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Also episodic states have derivationally related perfective counterparts. Episodic states concern contingent, changeable characteristics of individuals. They can be acquired, entered into and end. Hence, it is cognitively significant to mark grammatically the transitions that result in a certain state or activity or in their ending. Such transitions, however, are distinct from the atelic (state or activity) situation itself. This can be clearly shown in Slavic languages that have prefixes that are specialized to focus on the beginnings and endings of situations. Consider the following pairs of verbs in Czech:

(3)	<b>imperfective</b> <i>stonat</i> 'be sick'	<b>perfective</b> <i>roz-stonat se</i> 'become sick'
	<i>milovat</i> 'love'	<i>za-milovat se do</i> 'fall in love with'

In the above table, the imperfective verbs are atelic, while the perfective counterparts derived with the prefixes *roz-* and *za-* are telic. The perfective verb focuses on the change that results in somebody's being sick and being in love. The particular change itself is represented as a whole telic event.

<sup>4</sup> In *zaplavat*<sup>P</sup> *si* 'have a swim', *si* is a dative reflexive.

### 4.2.2 Formal Expression of Perfective and Imperfective Aspect

Aspectual systems differ across languages in terms of their formal expression (cf. Comrie 1976; Dahl 1985; Binnick 1991, for example). In terms of the formal expression of aspect, we can classify languages into four main groups along the following parameters:

- (i) encoding by means of a special morpheme (synthetic means) or a grammatical construction (syntactic or analytic means);
- (ii) verb-centered or noun-centered encoding of the aspectual distinction;

Examples are given in the following table:

primary expression of aspect	language
verb-centered and syntactic	English
verb-centered and morphological	Czech
noun-centered and syntactic	German
noun-centered and morphological	Finnish

These four main classes are to be understood as a useful way in which we may organize data from different languages. In some cases it is difficult to decide whether a given formal expression of aspect is morphological or syntactic (cf. Comrie 1976:87). A clear example of a syntactic expression of aspect is the progressive construction in English, as in *I am writing*.

Languages that have morphological means for the expression of aspect can be divided into those that have "a clearly identifiable marker of aspect (or of one member of an aspectual opposition), the forms of the verb being otherwise the same for both aspects, and those languages where this is not so" (Comrie 1976:88). For example, among those languages with an invariable affix that indicates aspect are

Chinese *-zhe* (progressive) and Persian *mi-* (imperfective). Slavic languages also mark perfective and imperfective aspect by affixes on the verb, but their expression of aspect is less systematic than in Chinese or Persian. Prefixation is one of the most common ways of deriving perfective verbs from imperfective verbs. Adding a prefix to an imperfective verb always yields a perfective verb. However, prefixation also typically results in a change in the lexical meaning and in the valency requirements of a derived verb. One of the distinguishing features of the Slavic perfective and imperfective categories is their lexical-derivational character (cf. Dahl 1985).

Aspect can be expressed not only by a marker on the verb or by a periphrastic verbal construction, but it also may be expressed by a case marking on the noun or by a prepositional case marking on an NP. For ease of exposition I will distinguish between 'verb-centered' and 'noun-centered' expressions of aspect. While in Slavic languages and English the expression of aspect is verb-centered, in Finnish and German it is noun-centered. For example, the Finnish partitive case is used both as a partitive quantifier over individuals and as a marker of the imperfective aspect. The accusative case functions as a universal quantifier 'all' or 'whole' over individuals and at the same time it can also function as a marker of the perfective aspect.

- (4-a)
- |                          |                |   |                        |                 |
|--------------------------|----------------|---|------------------------|-----------------|
| <i>Join</i>              | <i>kahvia.</i> | - | <i>Luin</i>            | <i>kirjoja.</i> |
| drank-1SG                | coffee-PART    | - | read-1SG               | books-PL-PART   |
| 'I was drinking coffee.' |                |   | 'I was reading books.' |                 |
- (4-b)
- |                                |                |   |                           |                |
|--------------------------------|----------------|---|---------------------------|----------------|
| <i>Join</i>                    | <i>kahvin.</i> | - | <i>Luin</i>               | <i>kirjat.</i> |
| drank-1SG                      | coffee-ACC     | - | read-1SG                  | books-PL-ACC   |
| 'I drank up (all) the coffee.' |                |   | 'I read (all) the books.' |                |

The German *an*-construction is an illustration of a similarity between the semantics of locative adverbial phrases, partitivity and imperfective aspect. The *an*-construction is exemplified by the following sentence:



(5)

<i>Alex</i>	<i>baute</i>	<i>an</i>	<i>einem</i>	<i>Haus.</i>
Alex	built	on-PREP	a-SG-DAT	house-SG-DAT
'Alex was building a house.'				

This sentence denotes an event which is a proper part of an event of building a whole house.

Apart from their primary grammatical means for the expression of aspect, many languages have minor subsystems that can also convey aspectual distinctions. Such subsystems are not fully productive and manifest various degrees of lexicalization. In English, for example, apart from the progressive construction, the prepositions *at*, *on*, *for*, *from* can also be regarded as special partitive markers. Consider the following examples:

(6-a) *He read his speech.*(6-b) *He read from his speech.*

The sentence (a), with *his speech* in the direct object function suggests that the entire speech was read. The sentence (b) has a partitive interpretation, it asserts that only a part of the speech was read at the relevant reference time (cf. also Fillmore 1977:70). While partitive prepositional constructions are not very frequent in English, it is systematically used in other Germanic languages (German, Dutch, Swedish). The progressive/non-progressive distinction and the partitive subsystem in English are independent of each other and they may co-occur:

(7) *He was reading from his speech.*

This shows that the progressive/non-progressive distinction and the partitive/non-partitive distinction carried by certain prepositional constructions (and their absence) need to be distinguished from each other.

### 4.3 Aspect in English: The Progressive

In the next two sections I will discuss two main approaches to the description of the English progressive: the tense-logical approach and the event-based approach. The main problem that these approaches struggle with is the following one: How is the meaning of a progressive sentence related to the meaning of the corresponding simple sentence? How is the meaning of PROG [ $\phi$ ] related to the meaning of  $\phi$ ? Matters are further complicated by the fact that PROG [ $\phi$ ] does not have a uniform characterization, because its semantic properties vary according to the situation type of  $\phi$ . For example, an atelic progressive sentence like

(8-a) *Max is swimming*

entails

(8-b) *Max has swum.*

By contrast, a telic progressive sentence like

(9-a) *Max is crossing a street*

does not entail

(9-b) *Max has crossed a street,*

unless *Max is crossing a street* has a habitual reading (cf. also Dowty 1979:61). The problem stems from the fact that *Max was crossing the street* can be felicitously uttered in a situation in which Max was halfway across the street and the truck hit him and Max did not cross the street. The actual crossing of the street is only a possible outcome of the event denoted *Max is crossing a street*. Since Dowty's (1977 and 1979) work, the problem posed by such progressive sentences as *Max is crossing a street* has become known as 'imperfective paradox'. How can we account for the fact that for atelic predications in the scope of PROG the entailment from 'x is V-ing' to 'x has V-ed' is valid, while for telic ones it is not?

### 4.3.1 Temporally-Based Descriptions of the English Progressive

Temporally-based descriptions of the English progressive can be traced back to Montague (1968), Scott (1970) and to Bennet and Partee (1972; 1978):

Prog[ $\phi$ ] is true at an instant  $t$  if and only if  $\phi$  is true at every instant in some open interval containing  $t$ . (Montague 1968 and Scott 1970)

"[PROG  $\phi$ ] is true at  $I$  iff there exists an interval  $I'$  such that  $I \subset I'$ ,  $I$  is not a final subinterval of  $I'$ , and  $\phi$  is true at  $I'$ . (Bennett and Partee 1972; 1978)

According to Montague's and Scott's definition, *Max is swimming* is true at time  $t$  just in case there is an open interval of time surrounding  $t$  such that *Max swims* is true at each moment in that interval.

This formal analysis of the progressive captures the traditional characterization of the progressive aspect as a "time-frame" that can be found in Jespersen (1954:178-180; 1973: pp. IV-178): "the action or state denoted by the expanded tense [progressive aspect] is thought of as a temporal frame encompassing something". For example, in the following sentence the denoted reading event can be seen as forming a temporal frame within which the event of entering took place.

(10) *John was reading when I entered his office.*

Montague's (1968) and Scott's (1970) definition of the progressive works fairly well for the progressive operator with an atelic  $\phi$ : PROG ( $\phi_{\text{atelic}}$ ). For example, their generalization does have some validity for such sentences as

(11) *Max was swimming.*

However, Montague's and Scott's definition fails to account for those cases in which PROG has a telic  $\phi$  in its scope. The reason is that the set of moments at which Prog [ $\phi$ ] is true cannot be a function of the set of moments at which  $\phi$  is true. Therefore, *Max was crossing the street* does not entail *Max crossed the street*, contrary to Montague's and Scott's definition of the progressive. To illustrate this point, consider the following often cited example:

(12) *Max was crossing the street.*

Suppose Max starts crossing the street at 9am and is on the other side of the street at 9:13am. Then there will be a (moment of) time in between 9am and 9:13am, say 9:11am, at which *Max was crossing a street* is a felicitous utterance, but *Max crossed a street* is not. *Max crossed a street* can be felicitously uttered only at 9:13am when Max is actually on the other side of the street. Suppose Max was crossing the street and at 9:12am was halfway across when a truck hit him. In this scenario, Max will never have crossed the street. It is not the case that if *Max was crossing the street* is true at  $t$ , then there is an open interval of times around  $t$ , and the corresponding simple sentence *Max crossed the street* is true at every point in that interval.

The crucial contribution of Bennett and Partee (1972; 1978) to the formal analysis of the progressive tense is the idea that the truth of an atomic sentence is relative to an interval, rather than to a time point (as in Montague's 1968 and Scott's 1970 account). Bennett and Partee's (1972; 1978) definition predicts that *Max was crossing the street* is true at an interval  $I$  just in case there is an interval of time  $I'$  that properly includes  $I$  and extends beyond  $I$  at which the sentence *Max crossed the street* is true. This formulation of the progressive is an improvement on Montague's and Scott's definition in so far as it does not require for its truth at  $I$  that there be any interval prior to  $I$  at which the non-progressive sentence is true. However, Bennett and Partee's definition also fails, because it predicts that if *Max was crossing the street*, then it will be true at some later time that Max will have crossed the street. However, if Max was crossing the street, he may never actually reach the other side of the street. In other words, a progressive sentence, such as *Max was crossing the street* can be true at an interval  $I$  without there existing an interval  $I'$ , including and extending beyond  $I$ , at which the corresponding simple sentence *Max crossed the street* is true.

Building on the *interval semantic* approach of Bennett and Partee (1972; 1978), Dowty (1977 and 1979) argues for a further fundamental revision of the analysis of the progressive. In order to solve the 'imperfective paradox' and to account for the "mixed modal-temporal" (Dowty 1979:246) nature of the progressive operator, he argues that it is imperative to reject all the extensional analyses of the progressive. Dowty (1979:133ff.) illustrates the 'imperfective paradox' with telic progressive sentences like the following one:

(13) *Max was drawing a horse.*

"Verbs of creation" in the scope of Prog give rise to the following complication: If a speaker asserts that Max was, is or will be drawing a horse, then he does not commit himself to the coming into existence of a drawing of a horse, nor to any other particular outcome of the denoted event. What is crucial for the analysis of progressive sentences is the epistemic position of the speaker. Hence we may say without a contradiction *John was drawing a horse but he never finished drawing it*. Therefore, it is crucial for the interpretation of such progressive sentences that there is no existential quantification over *a horse*. By contrast, if the speaker asserts that John drew, draws or will draw a horse, then he commits himself to the coming into existence of a drawing of a horse at some time (cf. Dowty 1979:246).

On the basis of examples that exhibit the 'imperfective paradox', Dowty (1977; 1979) concludes that the progressive operator can only be formalized within an intensional framework.<sup>5</sup> In order to solve the 'imperfective paradox', Dowty (1977; 1979) introduces possible worlds other than the actual one and suggests that a progressive sentence should be true at a given interval *I* just in case the corresponding non-progressive sentence is true in all the non-exceptional continuations of *I*, that is in all

<sup>5</sup> Cf. Dowty's (1979) criticism of Taylor's account that assumes Davidsonian 'extensional' semantics as being "in principle unable to accommodate the modal treatment of the progressive I have proposed, and does not present any solution to the imperfective paradox" (Dowty 1979:166).

the possible *inertia worlds* (abbreviated as *Inr*). Dowty formulates this idea as follows:

"[PROG  $\phi$ ] is true at  $\langle I, w \rangle$  iff for some interval  $I'$  such that  $I \subset I'$  and  $I$  is not a final subinterval for  $I'$ , and for all  $w'$  such that  $w' \in Inr(\langle I, w \rangle)$ ,  $\phi$  is true at  $\langle I', w' \rangle$ ." (Dowty 1979:249)

Following Lewis's suggestion, Dowty characterizes the notion of 'inertia worlds' as possible worlds which are exactly like the actual world "up to the time in question and in which the future course of events after this time develops in ways most compatible with the past course of events" (Dowty 1979:248). In other words, the progressive sentence is true just in case the corresponding simple sentence would be true in any situation like this one that proceeded "normally". The advantage of this approach is that it requires of the inertia worlds in which  $\phi$  is true that they bear a specific relation to the actual world. The main problem connected to this analysis is the appropriate characterization of alternative continuations (or *inertia worlds*) or the appropriate limitation of the natural course of events.<sup>6</sup>

Another problem related to Dowty's (1977 and 1979) account is that it wrongly predicts that progressive sentences have the subinterval property. If a given sentence  $\phi$  is true at an interval  $I$ , it does not follow that the progressive of  $\phi$  is true at every instant in  $I$ , or for every noninstantaneous subinterval of  $I$  (with the exception of the final subinterval of  $I$ ). For example, during an intermission in a theatre, if someone points at an empty seat next to me and asks *Is someone sitting here?*, I can answer with *This seat is occupied, my friend is sitting here*, although no one is sitting there at the moment of speaking. In other words, the predication expressed by a progressive sentence can be true for the interval but not true at each and every moment within that interval (cf. Vlach 1981:280). However, Dowty's analysis of the English progressive does not account for such empirical data.<sup>7</sup>

<sup>6</sup> See Vlach (1981:279, fn.13; 285) for problems connected to Dowty's (1977 and 1979) definition of the progressive.

<sup>7</sup> Dowty (1977:50; 1979) notices the lack of the subinterval property with respect to sim-

### 4.3.2 Event-Based Descriptions of the English Progressive

Event-based descriptions of the English progressive can be found in Vlach (1981), Bach (1981 and 1986b), and in Parsons (1990), among others. In what follows I will discuss Vlach's and Bach's approach. The description of aspect that I develop for Slavic languages is based on Bach (1981 and 1986b).

#### 4.3.2.1 Vlach (1981)

Vlach (1981:271) argues that the truth conditions for the progressive of a sentence  $\phi$  cannot be defined in terms of the set of moments and/or intervals at which  $\phi$  is true, as in Montague (1968), Scott (1970), Bennett and Partee (1972; 1978) and Dowty (1977 and 1979), among others.<sup>8</sup> Instead, he proposes an event-based approach within which a unified analysis for all the types of progressive sentence can be given. This analysis is based on the notion of 'on-going situation':

"The process that must be going on in order to make the progressive of a sentence  $\phi$  true is always a process that is connected with the truth of  $\phi$ " (Vlach 1981:291).

Vlach defines the operator 'Prog' in the following way:

"Prog [ $\phi$ ] if and only if Stat[ Proc [ $\phi$ ] goes on]" (Vlach 1981:287).

The operators "Stat" and "Proc" reflect the double life of the progressive operator. According to Vlach, the progressive construction is stative, and, at the same time, it asserts the existence of a process that is a realization of (or that brings about) the situation denoted by the corresponding non-progressive construction.

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ple sentences in the scope of the durative *for*-PP, but fails to notice it with respect to the progressive. Dowty (1979:60) suggests that ' $\phi$  for an hour' entails ' $\phi$  at all times in the hour'. Dowty observes that if "we are to use the universal quantifier to represent durational adverbs like *for six weeks* in a natural logic at all, then the moments it quantifies over must be something like 'relevant psychological moments' which are both vaguely specified and also contextually determined" (Dowty 1979:81).

<sup>8</sup> In this respect, Vlach (1981) agrees with Bach (1981), for example, who argues that events in general cannot be understood in terms of properties of moments or intervals of time.

Vlach's main reason for regarding the progressive construction as stative is the fact that stative and progressive sentences behave in the same way with respect to specifications of time viewed as points. This can be shown by the following sentences:

(14-a) *Max was here when I arrived.*

(14-b) *Max was running when I arrived.*

A stative sentence is defined in the following way:

(15) A sentence  $\phi$  is stative if and only if the truth of (Past  $\phi$ ) *when I arrived* requires that  $\phi$  was true for some period leading up to the time of my arrival.

Therefore, on Vlach's view, *Max ran* denotes a process, whereas *Max was running* denotes a state.

Vlach's definition of the progressive operator amounts to the claim that progressive sentences are stative sentences. This has, according to him the advantage, that it explains the incompatibility of the progressive operator with stative predications and that there can be no progressives of progressives:

(16) *\*I am knowing the answer.*

(17) *\*John was being running.*

"[t]he function of the progressive operator is to make stative sentences, and, therefore, there is no reason for the progressive to apply to sentences that are already stative" (Vlach 1981:274).

A similar description of the progressive can be also found in Taylor (1977).<sup>9</sup>

<sup>9</sup> According to Taylor, the function of the progressive is "to mark the presence of time  $t$  (typically a moment) which, *though not itself a time of application of the tensed verb*, occurs within a more inclusive time which *is a period of the verb's application*" (Taylor 1977:206). By the time of *application of a verb P* Taylor means the time at which the atomic sentence  $P(x)$  is true, as opposed to the time at which the tensed sentence is true. In contrast to non-stative sentences, statives can be true at a moment of time and they can occur in simple present tense sentences with point adverbials. Given these properties of stative predicates, Taylor explains the fact that stative verbs usually do not occur in the progressive construction in the following way: "every time within a period of application of such a verb itself being a time of its application, there is no place for tenses designed to register the existence of times of non-application of the verb within broader periods of its application" (Taylor 1977:206). In other words, the progressive form marks the presence of time  $t$  (typically a moment) and it also marks that the corresponding simple sentence is not true at  $t$ .



In support of the assumption that the operator "Stat" in the definition of the progressive operator only applies to process sentences, Vlach adduces historical evidence: One of the constructions that gave rise to the progressive in modern English was a construction *John is on/at/a- hunting*. According to Vlach the preposition *at* should be interpreted as *engaged in* or *in the process of*.

According to Vlach (1981:288), Proc [ $\phi$ ] does not have a uniform characterization, rather its truth conditions vary according to the truth conditions for  $\phi$ . For telic  $\phi$  "Proc [ $\phi$ ] is a process that leads to the truth of  $\phi$ . We can say that a process  $P$  leads to the truth of  $\phi$  if and only if the continuation of  $P$  would eventually cause  $\phi$  to become true" (Vlach 1981:288).

Although Vlach's (1981) criticism of tense-logical descriptions of the English progressive is well-founded, and his event-based approach is preferable to the temporally-based descriptions, his proposal that the progressive construction expresses a state is not convincing. There are two main problems with Vlach's proposal. The first problem has to do with Vlach's restriction of the progressive to stative predications. The second problem has to do with the specifiability of the process 'Proc [ $\phi$ ]' that leads to the truth of  $\phi$ .

Vlach's characterization of "progressives as statives" is flawed by his lack to recognize the distinction between episodic and static states. His characterization of the progressive would exclude episodic state predications which are acceptable in the scope of the progressive operator. Consider the following examples:

(18-a) *The socks are lying under the bed.*

(18-b) *I am living in California.*

Predicates like *be lying under the bed* and *be living in California* denote episodic states (*stage-level* states, Carlson 1977; *interval stative* verbs, Dowty 1979:180; *dynamic states*, Bach 1981). They describe a 'temporary state'. As has been pointed out above, the progressive form of a sentence focuses on periods of some dynamic,

contingent, temporary condition. This condition may further be motivated by such notions as 'agentivity': cf. *John is being a hero by standing still and refusing to budge* (Dowty 1979:185) with the so-called *be* of action (cf. Parsons 1990:35, for example). The acceptability of episodic states in the scope of the progressive seems to depend on the degree to which the referent of the subject-NP is moveable, "or to be more exact, (...) has recently moved, might be expected to move in the near future, or might possibly have moved in a slightly different situation" (Dowty 1979:175).

In a similar vein, Comrie (1976:38) claims that progressive constructions with stative predicates show that in English the meaning of the progressive has extended well beyond the original definition of progressivity as the combination of continuous meaning and non-stativity. Comrie (1976:38) suggests that "the basic meaning of the English Progressive is to indicate a contingent situation (...). This may well be the direction in which the English Progressive is developing diachronically, but does not give a complete characterization of its function in the modern language" (Comrie 1976:38). Only static stative verbs that do not take the progressive aspect except under restricted circumstances in which they are interpreted in a special episodic sense: *I am really loving the play*.

Stative clauses and progressive clauses have different interpretations in the context of a temporal *when*-clause. Consider the following examples:

(19-a) *Max was happy when I arrived.*

(19-b) *Max was running when I arrived.*

The first sentence may mean that Max became happy when I arrived, and there may possibly be a causal connection between the two clauses: Max became happy because of my arrival. In short, the first sentence can be felicitously uttered even if the state denoted by *Max was happy* was *not* true for some period leading up to the time of my arrival, contrary to what Vlach claims. However, the progressive clause in the second sentence denotes a situation that must be true for some period prior to the time of my arrival.

Moreover, processes cannot be compared with the whole class of states. Notice that static stative predicates are odd with specifications of time viewed as points:

(20) ? *Max was intelligent when I arrived.*

The reason is that *be intelligent* is typically considered to denote a (more or less) permanent property of individuals. Therefore, it seems odd to assert that the property obtains at one particular moment. The following sentences illustrate the same point: ?*John knew French at that moment.* ?*Sue believed in God today at 3:45pm.* ?*I understood the relativity theory when Albert entered the room.*

Vlach's definition of the progressive presupposes the existence of a process "Proc [ $\phi$ ]" that leads to the truth of  $\phi$ . As Dowty (in Parsons 1990:172ff.) observes, for causative verbs, it is often difficult to specify the causing process entailed by the progressive. Consider Dowty's example, *John is making me a millionaire*. Such a progressive sentence requires for its truth that a certain process causes my becoming a millionaire. Which causing process is it? There can be a number of different processes none of which has any predictable relationship to my eventually becoming a millionaire. Similarly, *John is opening a door* is traditionally (cf. Green 1970 and 1972; McCawley 1971; Dowty 1979:93ff.) analyzed as follows: John is now engaged in some activity of some kind that is now causing the door to become open, independently of whether the door eventually becomes open. One may open the door by pushing, kicking, striking it, by throwing something at it, by setting off an electronic device or maybe even by saying a magic word (cf. Dowty 1979:92). In short, in the case of causative verbs, it is difficult to determine which situation causes another situation of the appropriate kind. This problem that is related to the analysis of the causative verbs seems to carry over to Vlach's analysis of the progressive construction.

### 4.3.2.2 Bach (1981, 1986)

It has been observed that there are parallels between nominal and verbal expressions that concern the proportion 'count : mass :: telic : atelic'. Parallels between nominal expressions and verbal expressions can be extended to the description of aspect. The parallels may be roughly characterized with the following proportion: 'part : whole :: imperfective : perfective'.

The view that the English progressive involves a partitive operation in the temporal domain goes back to Bennett and Partee (1972 and 1978). The most succinct description of this intuition can be found in Bach (1986b:12ff.). He illustrates the similarities between the progressive and partitive constructions in English with the following example:

- (21) *This is part of a paper on natural language metaphysics.*  
 (22) *We found part of a Roman aqueduct.*

In analogy to what Dowty (1977 and 1979) calls 'imperfective paradox', the above examples illustrate what Bach (1986b) calls the 'partitive puzzle': the above sentences with count noun phrases *a paper* and *a Roman aqueduct* are true even if the paper was never finished, or the construction of the aqueduct was never completed.

By contrast, the following sentence with the mass noun phrase *apple* does not exhibit the 'partitive puzzle':

- (23) *There is apple in the salad.*

According to Link (1983), this sentence is interpreted in the following way: there are some apples, such that some of the stuff making them up is present in the salad. It is crucial for the interpretation that there is an existential quantification over apples. The reason is that the sentence could not be true in a history which never had any apples in it.<sup>10</sup>

<sup>10</sup> Link's account of count predicates (*an apple*) that are used as mass predicates (*apple*) presupposes a direct relation between the individuated entities denoted by count predicates

In the case of nominal expressions, a partitive operator like 'part of' relates particular individuals to their proper parts: *a paper - part of a paper*. Following Krifka (1992:47), the partitivity relation in the nominal domain can be represented in terms of a 'part-of' relation as follows:

$$(24) \quad \text{PART} = \lambda P \lambda x' \exists x (P(x) \ \& \ x' \subseteq x)$$

A 'proper-part-of' relation can be defined as follows:

$$(25) \quad \text{PART} = \lambda P \lambda x' \exists x (P(x) \ \& \ x' \subset x)$$

As Bach (1986b), among others, suggests, the semantic function of the progressive operator can be seen as being analogous to the function of the partitive operator in the nominal domain. In the case of verbal expressions, the progressive operator relates situations denoted by simple sentences to their proper parts. For example, by saying that the situation denoted by

$$(26) \quad \textit{Max was crossing the street}$$

we make an assertion about a (contextually specified) proper part of a whole situation associated with the simple telic situation denoted by

$$(27) \quad \textit{Max crossed the street.}$$

Following Krifka's (1992:47) suggestion, the progressive operator as a partitive operator in the domain of situations can be represented as follows:

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and the stuff denoted by the corresponding mass predicates. To this account Bach (1986b:12-3) objects that "there could surely be a world in which it was possible to artificially manufacture apple without there being any apples, (...) we need to allow for a more indirect relation between the denotation of a mass predicative mass term and the corresponding count predicate. Basically, we need to be able to say when certain stuff is of the right kind to qualify as falling under the extension of the mass term, or better we need to *assume* that we can say when this is the case. To actually give criteria is no part of linguistics (cf. Putnam, *passim*)."

(28)  $\text{PROG} = \lambda P \lambda s' \exists s (P(s) \ \& \ s' \subseteq s)$

### 4.3.2.3 A Modified Approach to the Progressive Aspect

Building mainly on Bach (1981 and 1986b), the meaning of English progressive predicates is characterized as follows:

Progressive predicates (e.g., *be crossing the street*) denote situations that are proper parts of situations denoted by the corresponding simple predicates (e.g., *cross the street*).

The progressive operator is treated here as expressing a 'proper-part' relation in the domain situations, rather than a 'part' relation. The reason is that in asserting *Max was crossing the street* the speaker explicitly excludes the final part of the situation, namely, that subpart of the situation that has Max on the other side of the street. Drawing on Kenny's (1963) entailment tests, *Max was crossing the street* does not entail *Max crossed the street*.

With "verbs of creation", as in

(29) *Max was building a house,*

the intermediate stages of the created object, which comes into existence during the course of the event, are seen as parts of the whole entity produced: We may view what is asserted by such sentences as *Max was building a house* as metonymically standing for the whole prototypical scenario of building of a house: It consists of an initial state, a sequence of incremental stages (whereby intermediate stages may be viewed as separate subevents), and a final state. A crucial role in the interpretation of progressive sentences is played by the notion of 'prototype' or 'paradigm case' inherent in interpretive frames associated with linguistic expressions.

"By the term 'frame' I have in mind any system of concepts related in such a way that to understand any one of them you have to understand the whole structure in which it fits; when one of the things in such a structure is introduced into a text, or into a conversation, all of the others are automatically made available. I intend the word 'frame' as used here to be a general cover term for the set of concepts variously known, in the literature on

natural language understanding, as 'schema', 'script', 'scenario', 'ideational scaffolding', 'cognitive model', or 'folk theory'" (Fillmore 1977b:57).

"(...) linguistically encoded categories (not just words and fixed phrases, but also various kinds of grammatical features and syntactic patterns) presuppose particular structured understandings of cultural institutions, beliefs about the world, shared experiences, standard or familiar ways of doing things and ways of seeing things. Lexical items can be seen as serving discriminating, situating, classifying, or naming functions, or perhaps merely a category-acknowledging function, within, or against the background of, such structures". (Fillmore 1985:231-2).

The event-based approach enriched with certain assumptions of Fillmore's Frame Semantics seems to avoid the 'imperfective paradox'. The 'imperfective paradox' arises because of certain theory-internal assumptions that Dowty (1977 and 1979) and others make. Montague's principle that common nouns are 'logically determinate' (rigid designation), that they "will have extensions invariant with respect to possible worlds and moments of time" (PTQ, p. 263) cannot be upheld, given such sentences as *John was building a house*. What is the appropriate way of expressing, for example, a concept of a house as a series of entities which are considered as successive stages of a house? And by the same token, how do we identify a certain situation as being a part of a larger situation?

There does not seem to be anything paradoxical about making an assertion about a part of a situation that involves a definite end-stage. We make such assertions all the time. We make assertions about proper parts of bounded objects, and even of such bounded objects that may have never existed or will never exist in their entirety. As Parsons (1990) points out, "[t]he question is not ontological--everyone agrees that the thing in question exists. The issue is whether it is a house. I take this to be primarily a question of the proper use of words--whether an unfinished house is properly called 'a house'" (cf. Parsons 1990:174). When we talk about various states of affairs we categorize them in terms of idealized scenarios or frames. The categorization also involves judgments that a certain on-going situation is a part of a larger situation of a certain type. We make assertions about proper parts of bounded situations, despite the fact that a given described situation may have never run or will

never run its whole course and reach its final boundary. In general, the existence of a part of an entity does not presuppose the existence of a whole bounded entity, rather it merely allows for the possible existence of a (contextually) relevant additional quantity or continuation.

*There is pear vinaigrette in the salad* instantiates a partitive construction with a mass noun phrase. In languages, that have a special partitive marker applied to nouns, such a marker is commonly applied to mass nouns: cf. Finnish *maitoa*, milk-PART, '(some) milk'. It has been observed that both mass noun phrases and atelic verbal expressions (states and processes) are divisible and cumulative (or additive). How does the progressive operator, as a partitive operator in the domain of situations, behave with respect to atelic (stative and process) predicates?

Consider the following progressive sentence:

(30) *Max was driving a white Toyota.*

Since *driving a car* denotes an unbounded (atelic) situation, what does it mean to say that *Max was driving a white Toyota* denotes a proper part of the (single) situation denoted by *Max drove a white Toyota*? Here, the partitivity conveyed by the progressive is to be interpreted as allowing for the possible existence of a (contextually) relevant continuation of the denoted situation. In other words, the temporal period *I* associated with the progressive sentence *Max was driving a white Toyota* allows for (but does not require) the existence of the temporal period *I'* associated with the non-progressive sentence *Max drove a white Toyota* within which *I* is properly included.

Based on parallels between mass noun phrases and stative verbal expressions, it should, in principle, be possible to apply a partitive operator like the English progressive to any stative verb. However, this is not always possible, as Carlson (1977), Bach (1981), among many others, have shown. How do we explain the fact that the progressive operator cannot always be applied to stative predications?



I have proposed that one of the contributing properties of the aspectual 'on-going situation' prototype is that the denoted situation is temporary or contingent. Following Carlson (1977) we may assume that a progressive predicate denotes a property of being an individual such that there is a temporary manifestation (or realization) of that individual of which the basic predicate holds.<sup>11</sup> In mereological terms, Bach (1981:78) identifies the temporary manifestation of an individual with some temporally limited proper part of the individual. For example, the progressive of a stative predicate *be a hero* expresses a temporary situation related to the meaning of the basic non-progressive predicate *be a hero*:

(31) *John is being a hero (by standing still and refusing to budge).*<sup>12</sup>

This temporary situation could be interpreted as meaning 'to act in an heroic way'. The basic non-progressive predicate *be hero* itself expresses a property (a disposition or a potential) that holds permanently of an individual.

To take a different example, let us consider *I am understanding more about quantum mechanics as each day goes by* (Comrie 1976:36-7). In this example, the reference is to an incremental change in the degree of understanding. We may distinguish individual temporary stages of this process that are essentially different from one another. In other words, *understand* combined with the progressive operator has

<sup>11</sup> Carlson blocks the progressive from occurring with statives by syntactically restricting the progressive to the stage-level predicate category. The progressive auxiliary *be* combines only with verb-phrases that represent properties of stages but not with those that represent properties of individuals. This is done by sorting: *be* is only defined for the appropriate kind of property. This treatment of the progressive presupposes a distinction between individual-level and stage-level predicates. This distinction can be roughly described as a distinction between predicates that hold more or less permanently or that can be predicated atemporally of their arguments and predicates that are episodic, namely those predicates that Carlson analyzes as applying to a spatiotemporal slice of an individual. The distinction between *individuals* and their temporally restricted *stages* can be illustrated with adjectival predicates: *tall, intelligent, sane* apply to individuals and *drunk, present, sick* to their temporary manifestations. The notion of *stage* is crucial in Carlson's framework for giving a formal account of the difference between stative verbs (like *love*) which do not normally allow the use of the progressive, and non-stative verbs (like *run* and *build*) which do.

<sup>12</sup> Cf. Dowty (1979:185).

an episodic, incremental event, interpretation.

However, there are static predicates denoting properties that cannot be construed as being related to some of their temporary manifestations expressed by the corresponding progressive sentence. Hence, the progressive of such static predicates are not well-formed, as in:

(32-a)     ?*I am knowing the answer.*

(32-b)     \**I am knowing French.*

Ryle (1949:Ch.5) motivates the lack of progressive counterparts with such static predicates like *know* by the fact that there are many different ways in which the disposition can manifest itself. From this it follows that no single manifestation can cover them all. However, this is just another way of saying that we cannot relate the situations denoted by such static predicates as *knowing French* to their proper parts.

The mereological 'part-of' relation relates any individual or situation to its proper parts. Within the mereological account, we can easily describe proper parts of individuals that can be further subdivided to their proper parts. If we assume that the progressive operator in English in its core temporal aspect is a partitive operator, how do we motivate the lack of a progressive of a progressive? Bach (1981:79) explains the fact that such sentences as

(33)        ?*Max is being swimming in the lake.*

are unacceptable on the grounds that they are "sortally incongruous". That is, in Carlson's (1977) terms, "[ma]nifestations cannot stand in the realization relation to manifestations" (Bach 1981:79). To illustrate this point, consider the above sentence. A sentence like *?Max is being swimming in the lake* would assert that there is a Max-manifestation that has the property of being an individual such that some manifestation of that individual swims.

In the opposition 'progressive' vs. 'non-progressive' the progressive form is the marked category. While the progressive form marks partitivity in the temporal

domain, the non-progressive, simple, form is unmarked in this respect. Due to the unmarked nature of the non-progressive form, non-progressive sentences can denote all or part of a situation. The crucial determinant is the situation type described by a given predicate as well as the context in which it is used. Past tense sentences that are telic have a completive entailment. For example, *I wrote a message to Dan* entails that I finished writing the message. This can be shown by the fact that we cannot negate the final stage of such an event without a contradiction:

(34)        *\*I wrote a message to Dan, but I did not finish writing it.*

With processes and states the question of completion does not arise. Since they do not specify any definite final stage at which they necessarily end, it simply does not make sense to say either

(35-a)     *\*I drove my car, but I did not finish driving it.*

or

(35-b)     *\*I drove my car and I finished driving it.*

### 4.3.3 Independence of Aspect and Situation Types

In the domain of objects (or individuals), we distinguish between bounded and unbounded objects. Moreover, we can talk about objects in terms of their parts and wholes.

[BOUNDED +]	[PART +] a part of a letter	[WHOLE +] a whole letter
[BOUNDED -]	There was sand on the floor	(does not occur)

By analogy, in the domain of situations, we distinguish between bounded or telic and unbounded or atelic situations. Orthogonal to telicity is the category aspect which

allows us to talk about situations in terms of their parts and wholes.

	[PART +]	[WHOLE +]
[BOUNDED +]	a part of a letter I was writing a letter	a whole letter I wrote a (whole) letter (up)
[BOUNDED -]	There was sand on the floor I was running on the beach (I ran on the beach)	(does not occur) (does not occur)

The above tables contain one systematic gap: \*[whole+, bounded -]. It is motivated by the general constraint that an entity, an individual or a situation, which is viewed in its entirety must be bounded. It would be impossible to assert something about a whole object or a situation, if we did not view it as an individuated entity, as an entity with boundaries.

Implicit in the above observations is the assumption that we need to draw a clear line between the bounded-unbounded distinction and the partitive-holistic distinction in the domain of individuals and situations. In particular, in the domain of situations this translates into drawing a clear line between telicity and aspect. This distinction is not always clearly drawn. It is blurred in those accounts of aspectual semantics that characterize aspect in terms of situation types.

For example, Mourelatos (1981:197) claims that the distinction between activities and accomplishments is marked morphologically by the use of the progressive forms and their absence, respectively.<sup>13</sup> Bennett (1981:15) proposes that "the progressive always describes an activity". This is reflected in his work by the requirement

<sup>13</sup> Mourelatos (1977; 1981) argues that "regardless as to whether a mile is or fails to be run, any substretch of running-a-mile activity divides homogeneously into substretches of the same" (Mourelatos 1981:197). Mourelatos believes that this view is implied in Vendler's passage: "But even if it is true that a runner has run a mile in four minutes, it cannot be true that he has run a mile in any period which is a real part of that time, although it remains true that he was running, or that he was engaged in running a mile, during any substretch of these four minutes" (Vendler 1967:101). However, it does not seem that this passage of Vendler provides any clear support for Mourelatos's claim.

that the truth conditions for the progressive be defined with respect to an open interval. The open interval condition should guarantee that "*Jones is leaving* neither implies *Jones has left* nor *Jones will have left*, because we cannot conclude from *Jones is leaving* that a performance of leaving has, or will have, taken place" (Bennett 1981:15).

Another popular characterization of the progressive has been based on the similarity of progressive predicates with stative predicates. It can be found in Vlach (1981) who suggests that "progressives are statives". A similar proposal can be also found in Taylor (1977), Saurer (1984) and Parsons (1990), among others. Parsons (1990:170) gives the following characterization of the progressive: "If 'A' is an event verb, then 'be A-ing' is to be treated semantically as a state verb; otherwise, 'be A-ing' is to be treated the same as 'A'".

Although progressives seem to pattern like states and processes/activities, the similarities are not as clear cut as they should be in order to justify the characterization of progressives in terms of states or processes/activities. There does not seem to be any single semantic or syntactic property that progressives share with all the states or with all the activities.

It has been claimed (cf. Dowty 1979, for example) that progressives share with states and activities/processes the subinterval property. However, strictly speaking, the subinterval property only applies to static states. Episodic states, processes and progressives allow for gaps, and hence the subinterval property cannot be applied to them, at least not in its strong interpretation.

Progressives have in common with states and processes that they are unbounded. However, they are unbounded for different reasons. States and processes have no boundaries. The progressive presents a situation without regard to any boundaries.

Progressives share distributional characteristics with states and processes. They can be modified with durative *for*-PPs. However, this is not possible for all the

states, static states cannot be modified with *for*-PPs that indicate relatively short periods of time (e.g., ?*He knew physics for a week.*) Although progressive predicates and episodic predicates allow a modification with time-point adverbials, they have different interpretations in this context (See the discussion in the section on Vlach's event-based characterization of aspect.)

The claim that we need to draw a clear line between telicity and aspect can be best illustrated by examples in which a telic predication is combined with the progressive aspect, as in *I was writing a letter*. Such sentences, which exhibit what Dowty (1977 and 1979) calls the 'imperfective paradox', clearly suggest that the 'telic-atelic' distinction and the 'part-whole' relations represent two different dimensions in the domain of situations. Any adequate description of such sentences *I was writing a letter* must account for two facts: First, the verb phrase *be writing a letter* is telic. This follows from Krifka-Dowty's account of telicity. At the same time, we must account for the contribution of the progressive aspect to the meaning of the whole sentence: the assertion concerns only a part of the situation denoted by the corresponding non-progressive predicate.

Another argument for the independence of the 'progressive vs. non-progressive' distinction and the 'telic vs. atelic' distinction draws on phrasal verbs in English. As I will show below, phrasal verbs in English constitute complex predicates that are telic. The verbal particle system in English and the progressive vs. non-progressive distinction are independent of each other and they co-occur: *He was thinking the problem through* is distinct in meaning from both *He was thinking about the problem*, which is atelic, and *He thought the problem through*, which is telic and has a complete entailment.

## 4.4 Aspect in Czech

### 4.4.1 Basic Morphological Facts

In Slavic languages verbs are often morphologically complex and verbal affixes carry a heavy informational load. The hierarchical structure of the verb form can be represented as follows:

(36)

Hierarchical structure of the verb form in Czech

$$[[\text{Prefix} [\text{ROOT}] \text{Suffix}]_{\text{stem}} [\text{Inflection}]]_{\text{verb form}}$$

$$\text{affix} \in \{\text{prefix, suffix}\}$$

The stem is derived from a lexical root by prefixation and/or suffixation. There are about twenty prefixes and several suffixes that are used to derive verbs in Czech. In some cases, two prefixes can build a complex prefix. There are two main schemas for deriving verbs:

(37) Two main schemas for verbal affixation (derivation) in Czech

**Prefixation:**  $V^n \rightarrow \text{prefix } V^n$

**Suffixation:**  $V^n \rightarrow Y^n \text{ suffix}$

where "n" stands for a root or stem, "Y" stands for a verb, a noun, an adjective, an adverb, an interjection

Derivational affixes create a new verb by changing the category and/or the meaning of the base to which they are applied. Czech, and other Slavic languages, has a rich inventory of verbal affixes that are applied to verb roots and add further specifications to the identity of the situation described by verb roots. Verbal affixes incorporate indications of manner, intensity, intention, quantity, measure temporal extent, and other factors.

Verbs are inflected for tense, mood, number, person and gender. The markers of grammatical categories are often fused, common paradigms have frequent portman-teau morphs.

Affixes and inflections are associated with phonological processes (vowel alternation, consonant mutation, truncation).

The majority of Czech verb forms (finite verb forms and many non-finite verb forms, imperative, infinitive and certain participial forms, as well) can be classified as perfective or imperfective. Perfective and imperfective verbs are related in two main ways:

- **The perfective verb is a prefixed derivative of the simple imperfective verb:**

**simple imperfective verb**

psát 'write'/'be writing'

**prefixed perfective verb**

ZA-psát 'note down', 'record'

- **The imperfective verb is a suffixal derivative of the perfective verb:**

**perfective**

zapsat 'note down', 'record'

**secondary imperfective**

zapisovat 'note down', 'record'

'be noting down', 'be recording'

Secondary imperfective verbs are formed by adding the derivational suffix *-va-*. Originally, this suffix had a habitual meaning.



Imperfective and perfective verbs can also be related in the following ways:

- Imperfective verbs are suffixal derivatives of basic (non-derived) perfective verbs:

<b>perfective</b>	<b>secondary imperfective</b>
<i>dát</i> 'give'	<i>dávat</i> 'give', 'be giving'

- Secondary imperfective verbs are derived from prefixed perfective verbs by changing the extension added to the stem<sup>14</sup>:

<b>imperfective simplex</b>	<i>mluvit</i> 'say', 'speak' ('be saying', 'be speaking')
<b>prefixed perfective</b>	<i>přemluvit</i> 'persuade'
<b>secondary imperfective</b>	<i>přemlouvát</i> 'try to persuade' ('be trying to persuade')

- Perfective verbs are derived from imperfective verbs by changing of the stem extension:

<b>Imperfective</b>	<b>Perfective</b>
<i>skákat</i> 'jump' (repeatedly)	<i>skočit</i> 'jump' (once)
<i>chytat</i> 'chase'	<i>chytil</i> 'catch'

- Perfective verbs are derived from simple imperfective verbs by suffixing. In the following example, the perfective verb is derived from the imperfective with the suffix *-nou-*:

<b>Imperfective</b>	<b>Perfective</b>
<i>kývat</i> 'nod' (repeatedly)	<i>kývNOUť</i> 'nod' (once)

The perfective form with the suffix *-nou-* incorporates the notion of quantity: 'one' instantiation of a situation ("semelfactive" meaning). The corresponding simple imperfective verb form can be used in contexts that enforce a single event or an

<sup>14</sup> In Slavic conjugational systems a verb typically consists of a root morpheme followed by a conjugational marker that is often referred to as a 'theme' or 'extension' (cf. Spencer 1991:11, 195).

iterative interpretation.

- A few verbs are related by a suppletive formation:

**Imperfective**

*brát*  
*klást*

**Perfective**

*vzít* 'take'  
*položit* 'place'

Aspect is marked directly in the lexical entries of verbs. The aspect of a whole clause is directly projected from the lexicon, in that it is determined by the aspect of its lexical head verb. Sentences with perfective verbs have a perfective operator and those with imperfective verbs have an imperfective operator in their semantic description. However, neither the perfective nor imperfective operator corresponds to a separate verbal affix. There is no special purpose perfective and imperfective affix that is associated with the whole class of perfective and the whole class of imperfective verbs, respectively. Only certain affixes are consistently associated with imperfective or perfective verbs. For example, the imperfectivizing suffix *-va-* occurs only in secondary imperfective verbs and the semelfactive affix *-nou-* occurs only in perfective verbs. However, other such affixes are hard to find. For example, there is no single all-purpose neutral prefix that would serve to derive all perfective verbs from imperfective ones. Moreover, prefixes cannot be considered as inherent markers of perfectivity, because they also occur in secondary imperfective verbs.

Morphological processes that are involved in the imperfective-perfective distinction in Czech are: prefixation, suffixation, change of the stem extension and suppletion.<sup>15</sup> There is a clear asymmetry in the relation between perfective and imperfective verbs: if an imperfective verb is a suffixal derivative of a perfective verb (prefixed or simple), the meaning change is regular and predictable, it is restricted to the change

<sup>15</sup> See Isačenko (1962:350-81) for a detailed discussion of the morphology of the aspect system of Slavic languages (especially Russian). A brief historical discussion can be found Forsyth (1970).

in aspect: perfective → imperfective. However, if we derive a perfective verb from a simple imperfective verb by a prefix, the meaning change is often not systematic and predictable. Prefixes that serve to derive perfective verbs typically alter lexical semantic properties of verbs, including their situation type, as well as their aspectual properties. The change in lexical semantics of derived verbs has effects on the argument structure of verbs.

To summarize, a perfective and an imperfective verb that are derivationally related may differ in (at least) the following respects:

- (i) aspect;
- (ii) lexical meaning, including a change in the situation type;
- (iii) valence and/or (morphological) case government, which in turn may lead to changes in the grammatical function status of arguments.

#### 4.4.2 Grammatical Tests for the Distinction between the Perfective and Imperfective Aspect

**Durative and time-span adverbials.** Perfective and imperfective verbs can be clearly distinguished on the basis of their different distributional properties. First, they differ in their compatibility with temporal adverbials. In Czech the choice of a durative or time-span adverbial depends solely on the aspect of the lexical head verb of the phrase which it modifies. An imperfective verb sanctions durative temporal adverbials: *hodinu* 'for an hour', *dlouho* 'for a long time', *krátce* 'for a short time', *do rána* 'until morning'. By contrast, a perfective verb licenses an expression of duration by means of time-span adverbials, such as *za deset minut* 'in ten minutes'.

This is shown by following examples:

(38-a) *Psal<sup>I</sup> deset minut / \*za deset minut.*

- wrote-3SG      ten minutes / \*in ten minutes  
'He had been writing for ten minutes.'
- (38-b)      *Psal*<sup>I</sup>              *dopis*              *deset minut / \*za deset minut.*  
wrote-3SG      letter-SG-ACC      ten minutes / \*in ten minutes  
'He had been writing a/the letter for ten minutes.'
- (38-c)      *Napsal*<sup>P</sup>              *dopis*              \**deset minut / za deset minut.*  
PREF-wrote-3SG      letter-SG-ACC      \*ten minutes / in ten minutes  
'He wrote a/the letter in ten minutes.'

According to the standard criteria, (a) is atelic and (b) is telic. Nevertheless, despite the difference in telicity, in both these sentences a durative adverbial is required due to the presence of the imperfective verb. In (c), the perfective verb is compatible only with the time-span adverbial 'in ten minutes'.<sup>16</sup>

In Czech and other Slavic languages temporal adverbials are blind to the telicity of verbal expressions, they only "see" the aspect of the main lexical verb:

- (39-a)      imperfective verb + durative adverbial ('for-PP')  
(39-b)      perfective verb + time-span adverbial ('in-PP')

By contrast, in English temporal adverbials are sensitive to telicity as well as to aspect of verbal expressions. Atelic verbal expressions in English can only be modified by durative adverbial phrases of the type '*FOR NP<sub>extent-of-time</sub>*', like 'for an hour', as is shown in:

- (40)      *John drank wine for an hour / ? in an hour.*

Simple (non-progressive) telic verbal predicates, in non-iterative interpretations, can only be modified by time-span adverbial phrases of the type '*IN NP<sub>extent-of-time</sub>*', like 'in an hour', as is shown in:

<sup>16</sup> However, there are exceptions to the rules 'imperfective verb + durative adverbial' and 'perfective verb + time-span adverbial'. Further below two classes of perfective verbs, namely those with the prefix *po-* and *pro-*, will be discussed that are compatible only with durative adverbials.

(41) *John drank a glass of wine ? for an hour / in an hour.*

Progressive (perfect) predicates are modified with durative phrases, regardless whether they are telic or atelic:

(42-a) *John has been drinking for an hour / \* in an hour.*

(42-b) *John has been drinking a glass of wine for an hour / \* in an hour.*

**Tense.** Tense is a deictic category, it is a "grammaticalized location in time" (cf. Comrie 1985), aspect is a non-deictic category. Often categories that are considered to be aspectual are constrained with respect to tense and temporal reference. The tense in which the aspectual distinctions are most frequently and distinctly manifested is the past tense.<sup>17</sup>

In Slavic languages, perfective and imperfective verbs have past and non-past forms. The perfective non-past verbs cannot usually refer to the moment of speech. A sentence with a perfective present tense verb form is understood as referring to future time in its most natural reading. Imperfective verbs have a special future tense. The future tense for imperfective verbs is periphrastic. In Czech, it is formed with the future form of the verb *být* 'be': cf. for example, *bude psát<sup>I</sup>* 'he/she/it will write'. The future auxiliary cannot be used with the perfective aspect: *\*bude napsat<sup>P</sup>*.

	imperfective	perfective
past tense	(on) <i>psal</i>	(on) <i>napsal</i>

<sup>17</sup> According to Dahl (1985), "[t]here is strong tendency for PFV [perfective] categories to be restricted to past time reference. (...) In other words, for all languages it holds that 'past time reference' characterizes prototypical uses of PFV - single, completed events will in the 'typical cases' be located in the past. Languages will differ, however, in the extent to which they allow uses of PFV with non-past time reference. Also, within one and the same language, the 'past time reference' restriction may hold with unequal force in different contexts" (Dahl 1985:80). "Thus in many Indo-European languages, and also in Georgian, the difference between the Aorist and the Imperfect exists only in the Past Tense, and there is no corresponding distinction in other tenses ..." (Comrie 1976:71). Among languages that do not restrict their perfective category to past time reference, are Slavic languages, Japanese, Modern Greek and some Bantu languages, e.g. Zulu and Sotho (Dahl 1985:80).

	'he wrote'/'he was writing'	'he wrote'
non-past tense	(on) <i>píše</i> 'he writes'/'he is writing'	(on) <i>napiše</i> 'he will write'
future tense	(on) <i>bude psát</i> 'he will write'/'he will be writing'	--

The fact that Slavic perfective verbs in the non-past tense do not have present time reference is often interpreted as a consequence of the semantics of this aspect. Given that a perfective verb form denotes a situation in its entirety and given that what evolves at the moment of speech is necessarily on-going rather than viewed as a single whole, a perfective present tense cannot refer to the moment of speech. Hence, the perfective non-past verb forms are restricted to future time reference.<sup>18</sup> Combined with such indexical adverbials as 'right now', 'at this moment', perfective non-past tense forms have an immediate future reference (except in the so-called reportive present and with performatives, which can be said to have a present tense reference). Due to the interaction of aspect with future tense, I will restrict my discussion to past tense sentences.

Related to the difference in tense is the fact that only imperfective verbs, but not perfective verbs, admit progressive reading in an appropriate context. This can be shown in sentences with the temporal connective *když* 'when'. Combined with an imperfective verb in a subordinate clause, it results in a simultaneous reading with the situation expressed in the main clause. However, combined with a perfective verb in a subordinate clause, it yields a sequential reading.

Apart from the compatibility with temporal adverbials and tense, there are other syntactic and semantic criteria that allow us to distinguish between perfective and

<sup>18</sup> "In languages where the basic tense distinction is between past and non-past, we have strictly speaking not the possibility of a perfective present, but rather of a perfective non-past, i.e. of the perfective of the present-future" (Comrie 1976:66).

imperfective verbs. Imperfective verbs, but not perfective verbs, occur as non-finite complements of phasal verbs like *začít<sup>P</sup>* 'start', 'begin', *přestat<sup>P</sup>* 'stop', *skončit<sup>P</sup>* 'finish'.

### 4.4.3 The Semantics of Aspect

#### 4.4.3.1 Perfective Aspect

Derivational verbal affixes provide speakers of Slavic languages with elaborate means to mark situations as whole demarcated entities. In contrast to English, for example, there are no special markers on the verb to indicate that the denoted situation is to be viewed as on-going. Consider the following pairs of sentences:

(43-a)  
*Maloval<sup>I</sup> obraz.*  
 drew-3SG picture-SG-ACC  
 'He drew/was drawing a/the picture.'

(43-b)  
*Namaloval<sup>P</sup> obraz.*  
 PREF-drew-3SG picture-SG-ACC  
 'He drew a/the picture.' [i.e., he finished drawing it]

The perfective sentence entails that the whole painting existed when the event was completed. The final boundary of the temporal frame imposed by the perfective operator coincides with the inherent boundary of the telic predicate 'write the/a letter'.

By contrast, this entailment is not present in the corresponding imperfective sentence *Maloval<sup>I</sup> obraz* - 'He drew/was drawing a/the picture'. The imperfective sentence leaves it open what the ultimate outcome of the denoted event was. In an appropriate context, it may mean that the drawing was only partially completed. It may have only been attempted and unsuccessful ("conative" imperfective). Moreover, the imperfective sentence can have a contextually determined progressive and habitual use.

As a point of departure, I take the characterization of perfective aspect as presenting "a situation as a single whole" (Comrie 1976:16), "an indivisible whole" (Maslov 1959:309), "the totality of the situation referred to" (Comrie 1976:3).<sup>19</sup> I suggest the following characterization for the perfective operator:

**[PERFECTIVE  $\phi$ ] presents a situation as a single whole.**

In terms of the part-whole relations of classical extensional mereology, the perfective operator can be viewed as a 'whole-of' functor. The adjective 'holistic' will be used to refer to the perfective meaning.

Implicitly, the above characterization includes the notion of 'limit' or 'boundary'. The view that the notion of 'limit' or 'boundary' is crucial to the semantics of aspect has been taken at least since V. V. Vinogradov (1947:497).<sup>20</sup> In general, if a situation is viewed in its entirety, as 'closed', there must be some limits imposed on its (temporal or spatial) extent, it must be bounded. In other words, perfective verbs are telic. (cf. Timberlake (1982:311): "A topological figure can be characterized as closed, when it includes its limit, ...").

The semantic domain of perfective verbs can be divided into three main types of bounded events:

- (i) ingressive bounded event: a perfective verb denotes an event of entering or putting into a situation;

<sup>19</sup> Notice that the other formulation that Comrie also draws upon may lead to a confusion with the category of tense: "aspects are different ways of viewing the internal temporal constituency of a situation (...) the imperfective looks at the situation from inside (...) the perfective looks at the situation from outside" (Comrie 1976:3-4). At the same time, the difference between aspect and tense can be stated as the difference "between situation-internal time (aspect) and situation-external time (tense)" (Comrie 1976:5). The problem here lies with the possible confusion of "looking at the situation from outside" (perfective aspect) with "situation-external time (tense)".

<sup>20</sup> Cf. also Dahl (1985:76).



- (ii) bounded event with focus on its termination;
- (iii) measured bounded event: a perfective verb demarcates some bounded portion of a given situation, the affix that derives a perfective verb may incorporate quantitative evaluation that regards temporal extent of the situation or some properties of its participant(s).

A perfective verb that denotes an ingressive event focuses on the change that results in the initiation of a certain situation. The particular change itself is represented as a whole telic event:

<b>imperfective atelic</b>	<b>perfective telic</b>
<i>smát se</i> 'laugh', 'be laughing'	<i>rozesmát se</i> 'start to laugh', 'burst out laughing'
<i>stonat</i> 'be sick'	<i>rozstonat se</i> 'become sick'
<i>milovat</i> 'love'	<i>zamilovat se do</i> 'fall in love with'

Second, there are a number of prefixes that focus on the termination or completion of a situation. In many cases we have here what is labeled in standard grammar manuals as *prosté dokonání děje* 'simple completion of the event' (cf. Petr 1986, Vol.1, for example). Consider the following examples:

<b>imperfective atelic</b>	<b>perfective telic</b>
<i>nutit</i> 'force' 'be forcing'	<i>donutit</i> 'succeed in getting somebody to do something'
<i>žehlit</i> 'iron' 'be ironing'	<i>vyžehlit</i> 'finish ironing'

The element of termination or completion may be combined with other specifications

of the situation, such as manner, intentionality, etc.:

<b>imperfective atelic</b>	<b>perfective telic</b>
<i>kroutit</i> 'turn', 'twist', 'be turning', 'be twisting'	<i>překroutit</i> 'damage by turning or twisting'
<i>říci</i> 'say', 'be saying'	<i>přeřici se</i> 'utter as a slip of the tongue'

Third, a perfective verb 'measures' the denoted event. Typically, it is derived with an affix that incorporates some quantitative evaluation along the 'short-long' temporal scale according to how much time the event 'fills', along the 'good-bad' scale that measures the negative or positive impact of the event on one of its participants (typically, the Agent or Experiencer participant). This can be best shown with the prefixes *po-* and *pro-*:

<b>imperfective atelic</b>	<b>perfective telic</b>
<i>stát</i> 'stand', 'be standing'	<i>postát</i> 'stand a relatively short time'
	<i>prostát</i> 'stand a relatively long time'

As a special case of this perfective type we may consider perfective verbs denoting 'happenings' whose beginning and end fall into a single moment: cf. *spatřit*<sup>P</sup> 'notice'.

#### 4.4.3.2 Imperfective Aspect

Imperfective sentences lack the properties that characterize perfective sentences. In particular, they lack the holistic entailment. In its most neutral use, the imperfective is used "to name the type of action, to identify it lexically, along with the

grammatical meaning of the form concerned - past tense, future tense, imperative, etc. - but without reference to perfectivity. This is such a common use of imperfective (...) it can in fact be argued that this is the essential and only *inherent* meaning of the imperfective, from which the other 'meanings' mentioned above are derived" (Forsyth 1970:6). This 'general factual' or 'simple denotative' use of the imperfective can be illustrated by the use of the following example:

- (44)
- |   |                                 |                   |
|---|---------------------------------|-------------------|
| <i>Tento týden</i>                        | <i>jsme platili<sup>I</sup></i> | <i>elektřinu.</i> |
| this week                                 | AUX-1PL paid-1PL                | electricity bill  |
| 'We paid the electricity bill this week.' |                                 |                   |

In the 'general factual' or 'simple denotative' use of the imperfective aspect, there is no specific reference to the completion of the event and 'the speaker is simply interested in expressing the bare fact that such and such an event did take place, without any further implications, and in particular without any implication of progressive or habitual meaning; sentence-stress falls on the verb" (Comrie 1976:113).

In an appropriate context, the imperfective may be used to express situations that have a partitive entailment. This is the case, for example, in those contexts in which the imperfective and perfective verbs are explicitly contrasted, as in

- (45)
- |  |                              |  |
|--|------------------------------|--|
| <i>Řešil<sup>I</sup></i>   | <i>problém,</i>              |  |
| solved-3SG   | problem-SG-ACC               |  |
| <i>ale nakonec ho</i>  | <i>nevyřešil<sup>P</sup></i> |  |
| but in-the-end it-SG-MASC-ACC  | NEG-PREF-solve-3SG           |  |
| 'He tried to solve the problem, but he did not manage to solve it in the end.' |                              |  |

The above sentence asserts that the solving of the problem was only partially completed. For example, it may only be attempted and unsuccessful ("conative" imperfective, cf. Forsyth 1970:71ff.). On its own, however, the imperfective sentence *Řešil<sup>I</sup> problém* does not have this entailment.

In contrast to English progressive sentences, imperfective sentences in Slavic languages explicitly allow for the denoted situation *not* to be viewed in its entirety.

Since imperfective sentences do not explicitly exclude the limits at which the denoted situation can be considered as being closed, they can be used in contexts and with functions typically conveyed by perfective sentences: most prominently, to convey a completed event. This can be shown by the use of the imperfective verb *řešil*<sup>I</sup> in the following context:

[Context: I want to give Max a problem to solve, but I don't know which. I ask you whether there is any of the problems on the sheet that I am showing you that he already solved. You may point at one of the problems and answer:]

- (46)
- |   |                |            |           |                           |
|---|----------------|------------|-----------|---------------------------|
| <i>Tento</i>                              | <i>problém</i> | <i>Max</i> | <i>už</i> | <i>řešil</i> <sup>I</sup> |
| this-SG-ACC                               | problem-SG-ACC | Max        | already   | solved-3SG                |
| 'This problem, Max (has) already solved.' |                |            |           |                           |

For example, we use an imperfective verb in questions like the following one, even though it is obvious from the situation that the sewing of a dress is completed at the moment of utterance:

- (47)
- |                         |                         |           |              |
|-------------------------|-------------------------|-----------|--------------|
| <i>Kdo</i>              | <i>šil</i> <sup>I</sup> | <i>ty</i> | <i>šaty?</i> |
| who                     | sewed-3SG               | this      | dress        |
| 'Who sewed this dress?' |                         |           |              |

Similarly, in the following sentences imperfective verbs are used to denote completed events.

- (48-a) *Tento film jsem viděl*<sup>I</sup> *už před 10 lety.*  
'I saw this movie 10 years ago.'
- (48-b) *Petr už šel*<sup>I</sup> *domů.*  
'Peter already went home.'
- (48-c) *Napsal*<sup>P</sup> *jsem ten článek, ale nerad. - Tak proč jsi ho psal*<sup>I</sup>?  
'I wrote that article, but I did not like writing it. - So why did you write it?'

The imperfective can be also used to express on-going processes (progressive use) and habitual situations in an appropriate context.

Given the wide range of contextually-determined use of the imperfective aspect in Slavic languages like Czech, I propose that the partitivity involved in

imperfectivity in Slavic languages is to be best understood in terms of an *improper part* relation, rather than in terms of a *proper part* relation involved in the English progressive. The imperfective operator can be characterized as follows:

**[IMPERFECTIVE  $\phi$ ] allows for the denoted situation NOT to be viewed in its entirety.**

This can be also represented in terms of an 'improper-part' relation as follows:

$$(49) \quad \text{IMPERFECTIVE} = \lambda P \lambda e' \exists e (P(e) \ \& \ e' \subseteq e)$$

The two place relation 'improper part' is a non-strict relation that can be circumscribed as 'part-of-or-equal'.<sup>21</sup> The adjective 'partitive' will be used to refer to the meaning of the imperfective aspect with the understanding that we mean by it the 'improper-part' relation.

Since the imperfective involves the notion of 'partitivity', imperfective sentences must denote situations that are extended along the temporal axis. These two contributing properties ('partitivity' and 'extension along the temporal axis') of the 'on-going situation' aspectual prototype are sufficient and necessary for the characterization of the Slavic imperfective. Unlike the English progressive, the Slavic imperfective does not require that the predicate in its scope denotes a dynamic, temporary situation. By contrast, the perfective aspect of a verb indicates that it denotes an episodic situation (except for such verbs as *unést*<sup>P</sup> 'be able to carry' and a few other perfective verbs). This may be viewed as motivating the fact that static stative verbs have no perfective counterparts. As has been observed above, they attribute 'atemporal' properties to individuals. In Slavic languages, they are so-called 'imperfectiva tantum', such as *vypadat*<sup>I</sup> 'look', 'appear', as in *Vypadal<sup>I</sup> jako strašák* - 'He looked like a scarecrow'. Modal verbs are also imperfective and have no perfective counterparts.

<sup>21</sup> It is a difficult question what this 'or-equal' means. "An essential characteristic of *extensional mereology* is that it mean 'or-identical'" (Simons 1987:11).

### 4.4.3.3 Aspect, Parts and Wholes

Assuming that perfective sentences denote situations in their entirety, it is easy to see that perfective sentences denote situations that are telic. Like other bounded expressions they are indivisible and not cumulative (or additive). They are indivisible, because a given perfective sentence denotes a situation that has no proper parts that are situations of the same type as the situation denoted by that perfective sentence. A sum of situations denoted by two or more perfective sentences does not yield one situation of the same type. Hence, perfective sentences are not cumulative.

Imperfective sentences lack the holistic entailment. Atelic imperfective sentences are divisible and cumulative. Telic perfective sentences are indivisible and they are not cumulative.

### 4.4.3.4 Aspect and Markedness

Implicit behind the characterization of imperfective sentences as lacking the properties that characterize perfective sentences is the view that the Slavic imperfective aspect is the unmarked member and the perfective aspect the marked member in the aspectual opposition. This view is well established in Slavic aspectology. The principle of contrast on which it is based, namely the *privative opposition*, goes back to the Praguean markedness analysis (cf. Jakobson 1936/71).<sup>22</sup> The relationship between the marked and unmarked forms in the privative opposition can be schematically

<sup>22</sup> Jakobson formulated this concept of 'privative opposition' in the following way: "A linguist, in considering a pair of contrasting morphological categories, often starts from the assumption that both categories have equal rights (*seien gleichberechtigt*) and that each possesses its own positive meaning: category I has the meaning A, and category II the meaning B; or at least, that I means A, and II expresses the lack or negation of A. In fact the general meanings of correlative categories are distributed in a different way: if category I expresses the presence of meaning A, then category II does not express the presence of meaning A, i.e. it does not state whether A is present or not. The general meaning of category II compared with category I is limited to the absence of 'A-indication'. If in a given context category II expresses the absence of meaning A, this is merely one of the uses

represented in the following way (cf. Kučera 1981:179):

MARKED	=	lexical meaning + $\alpha$
UNMARKED	=	lexical meaning (no indication of $\alpha$ )
		$\alpha$ = 'distinctive feature'

The marked member of the morphological opposition is defined positively, in terms of its essential and inherent meaning ('distinctive feature'),<sup>23</sup> and it is more restricted in meaning than the unmarked category. The unmarked member is defined as not opposing any positive or negative meaning to that of the marked member.

However, the unmarked member may, in specific contexts, take on the opposite semantic value of the perfective (cf. Jakobson 1932:74; Comrie 1976:113). This is the case, for example, in those contexts in which the imperfective and perfective verbs are explicitly contrasted and the imperfective has a 'conative' or progressive meaning. The view of the aspect as a privative opposition in which the imperfective is the unmarked member is supported by the fact that the imperfective can be used in the contexts and with a function that normally is reserved for the perfective (a single

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of the category in question: the meaning is here conditioned by the situation, and even if this meaning is the most common function of this category, the investigator nevertheless must not equate the statistically predominant meaning of the category with its general meaning ... (...) By regarding as an essential relationship something which within the system of the language merely has the status of a possible relationship, grammarians end up by making rules with a great number of exceptions" (Jakobson 1932, translation by Forsyth 1970:7).

<sup>23</sup> Morphological markedness theory requires the identification of this distinctive feature. The goal in Slavic structuralist aspectology based on the markedness theory of Jakobson was for many years to find this distinctive feature that represents the *invariant* meaning that is supposed to cover all the contextual variants and to hold for all the verbs of the system regardless of their lexico-semantic class. The invariant distinctive feature is not merely a descriptive summary of contextual variation, rather it is a primitive element of grammar. Structuralism claims that the invariant values of categories are central and primary, while the semantic properties these categories encode are peripheral and secondary. The existence of the invariant meaning was also a crucial argument for the claim that aspect is a grammatical category. Although the difference in meaning is intuitively clear to Slavic speakers, the "stalking [of] the wild invariant" (Timberlake 1982:305ff.) has proven to be extremely frustrating.

total event), whereas the perfective cannot replace the imperfective in implying repeated action, a continuous process, or have a 'conative' use, for example (cf. Forsyth 1970:350). According to Comrie, it is the 'general factual' or 'simple denotative' use of the imperfective that is 'perhaps the strongest single piece of evidence in Russian (and similarly in the other Slavonic languages) for considering the Perfective to be the marked form'.

#### 4.4.4 Aspect as a Lexical-Derivational Category

**Aspectual pairs and empty prefixes.** The majority of Slavic verbs can be classified as perfective or imperfective. However, it does not hold that nearly all verbs come in 'aspectual pairs'. Although this view is incorrect, it is widespread and can be found, for example, in Forsyth: "generally speaking there exist two parallel sets of verb forms carrying identical lexical meaning, i.e. denoting one and the same type of action" (Forsyth 1970:1). Also Binnick (1991) observes that "[w]ith few exceptions, all verbs in Russian (to take one Slavic language as an example) have two complete sets of tense forms, called respectively *imperfective* and *perfective*" (Binnick 1991:136). This view goes hand in hand with another commonly held and erroneous assumption that there is a fairly large number of prefixes that are semantically empty, serving merely to mark perfective aspect (cf. Binnick 1991:137).

We have an aspectual pair in those cases in which a perfective and an imperfective verb that are derivationally related have the same lexical meaning. There are only certain perfective and imperfective derivationally related verbs that can be considered to be aspectual pairs. There is an agreement that the pairs formed by secondary imperfectivization are the indisputable aspectual pairs (cf. Zaliznjak 1977, for example):



*zapsat*<sup>P</sup> 'note', 'record' →

*zapisovat*<sup>I</sup> 'note', 'record'/'be noting', 'be recording'

Another example is the pair *chytat* (ipf.) 'chase' - *chytil* (pf.) 'catch'.<sup>24</sup>

There is a clear asymmetry in the relation between perfective and imperfective verbs. If an imperfective verb is a suffixal derivative of a perfective verb (prefixed or simple), the meaning change is regular and predictable, it is restricted to the change in aspect: perfective → imperfective. However, if we derive a perfective verb from a simple imperfective verb, the meaning change is often not systematic and predictable. The situation is notoriously complicated in the case of prefixes that derive perfective verbs from imperfective verbs. In Czech, there are about twenty prefixes that serve to derive perfective verbs from simple imperfective verbs:

1. *do-*, 2. *na-*, 3. *nad-*, 4. *o-*, 5. *ob-*, 6. *od-*, 7. *po-*, 8. *pod-*, 9. *pro-*, 10. *pře-*,
11. *před-*, 12. *při-*, 13. *roz-*, 14. *s-(sou-)*, 15. *u-*, 16. *v-*, 17. *vy-*, 18. *vz-*, 19. *z-*,
20. *za-* (cf. Šmilauer 1968; 1971:165).

There is no single all-purpose neutral prefix that would serve to derive perfective verbs from imperfective ones. While it holds without an exception that adding a prefix to a simple imperfective verb yields a perfective verb, apart from this regular change in aspect, other meaning changes that are induced by prefixation are difficult to predict and have so far escaped any truly systematic and revealing description.

The relation between a given imperfective verb and its prefixed perfective counterpart involves a great deal of morphological and lexical idiosyncrasy. There are two main reasons: (i) polysemy of prefixes; and (ii) the meaning of the derived verb often does not arise compositionally from the meaning of a prefix and the root.

<sup>24</sup> Notice that the same relation in Russian and in English is lexicalized: Russian has *lov-it'* (I) - *pojmat'* (P) and English *chase* - *catch*.

For example, depending on which verb it is applied to, the prefix *u-* seems to assume the following meanings:

partitive:	<i>U-pít<sup>P</sup> kávu/kávy</i> PREF-drink coffee-SG-ACC/coffee-SG-GEN 'drink some small quantity out of a larger quantity coffee'
	<i>U-sypat<sup>P</sup> mouku/mouky</i> PREF-pour flour-SG-ACC/flour-SG-GEN 'pour some small quantity of flour out of some larger quantity'
	<i>U-jíst<sup>P</sup> chleba</i> PREF-eat bread-SG-GEN 'eat a little from (the) bread'
completive:	<i>U-plést<sup>P</sup></i> PREF-knit 'knit', 'finish knitting'
unintentional:	<i>U-řeknout<sup>P</sup> se</i> PREF-say REFL 'blab out' (unintentionally)
root modality: (capability)	<i>U-nést<sup>P</sup></i> PREF-carry 'be able to carry'

In general, it is difficult to predict for a given prefix what meaning it will assume with different verbs or classes of verbs. In structuralist approaches, all the different uses of a given prefix are considered to be contextually determined variants of one abstract feature. Such variants are usually listed as separate items. They are connected to each other in so far as it is assumed that all of them are somehow related to the postulated common feature. However, the nature of this relation 'common feature - contextually determined feature(s)' remains somewhat mysterious. In many cases it is not at all obvious what the semantic relation is between the assumed common feature and the contextually determined feature(s) or meaning(s). Clearly, such an approach must be rejected.

Different prefixes when applied to the same verb root induce different restrictions on the meaning of the derived verb. This is illustrated by some of the verbs

derived from the imperfective *psát* 'write':

Imperfective	Perfective
<i>psát</i> 'write'/'be writing'	<i>napsat</i> 'write (up)'
	<i>nadepsat</i> 'write above', 'entitle'
	<i>dopsat</i> 'finish writing'
	<i>obepsat</i> 'write all around'
	<i>odepsat</i> 'reply in writing'
	<i>opsat</i> 'copy'
	<i>popsat</i> 'cover with writing', 'describe'
	<i>přepsat</i> 'write over/again', 'copy'
	<i>předepsat</i> 'prescribe'
	<i>připsat</i> 'add by writing'
	<i>rozepsat</i> 'write out'
	<i>sepsat</i> 'write up'
	<i>vepsat</i> 'write in between', 'insert'
	<i>vypsat</i> 'write out', 'excerpt'; 'use up by writing'
	<i>zapsat</i> 'note down, record'

Apart from the prefix *na-* in *napsat*<sup>P</sup> 'write down', 'finish writing', in all the other cases of prefixation in the above examples, the meaning of the derived perfective verb is clearly different from that of the simple imperfective verb *psát*<sup>I</sup> 'write', 'be writing'. The difference is both in aspect and in the lexical meaning. This type of relation between verbs is clearly derivational. This is shown, for example, in:

(50)

<i>psát</i> <sup>I</sup>	
write	'write'/'be writing'

*PŘEpsat*<sup>P</sup> 'write over/again', 'copy'  
 PREF-write

In this case, the meaning of the prefixed verb is derived compositionally: the prefix *pře-* 'over', 'across', 'again' is related to the spatial preposition *přes* 'across', 'over'. This is interpreted temporally as 'again' in the related prefix *pře-* by the common transposition from space to time. Hence, the perfective verb *přepsat*<sup>P</sup> means 'write over/again', 'copy'. The prefix contributes an iterative, temporal, component to the meaning of the whole verb.

In other cases the meaning is partly or fully lexicalized, as in *předepsat*<sup>P</sup> 'prescribe'. We can use the prefixed verb as the base for further derivation. For instance, from *předepsat*<sup>P</sup> we derive *předpis* 'prescription'.

Linguists still disagree as to whether there are 'empty' prefixes at all, and if there are 'empty' prefixes, when exactly we can identify a given prefix as 'empty'.<sup>25</sup> In Modern Russian, the prefix *po-*, as in *postroit*<sup>P</sup> 'build', is considered "the most neutral prefix semantically" (Comrie 1976:89).<sup>26</sup> Other classic examples of perfective verbs with 'empty' prefixes in Russian are *na-*, as in *napisat*<sup>P</sup> 'write', *s-*, as in *sdelat*<sup>P</sup> 'do'.

<sup>25</sup> In traditional and structuralist Slavic linguistics, the discussion that concerned 'true aspectual pairs' hinged on the existence and nature of the 'empty prefixes'. Adherents of the empty prefix hypothesis believed that there are 'empty' prefixes that do not change the lexical meaning of the verb, they carry no lexical meaning except for the invariant 'perfective' meaning. Adherents of the empty prefix hypothesis, Tixonov (1962) and Avilova (1959), for example, claim that prefixes that have lost their spatial meaning are candidates for empty prefixes. They also claim that despite the fact that the alleged empty-prefixed perfective verb is more limited in semantic scope than the simplex imperfective verb, the prefixed verb is semantically equal to its simplex base verb. In other words, semantic identity of the prefixed perfective verb with the base verb is *not* a necessary condition for the existence of empty prefixes and in some instantiations a prefix can be more empty than in others. Given this, it is unclear how an empty prefix is to be identified.

<sup>26</sup> See also V. V. Vinogradov (1947:553ff.) and Townsend (1968:117) for expressing the same view. Flier (1977:224) observes that "[t]he prefix *po-* is often considered the perfectivizing prefix par excellence, and understandably so; its feature hierarchy traces the inceptive, lateral, and terminal limits of a domain, thus likening it to +PERFECTIVE in its totalizing role. The two must not be confounded, however. Verbs with *po-* are not necessarily perfective."

According to Šmilauer (1971:166), the most frequently used prefixes in Czech are *po-*, *vy-*, *za-*, and also *u-*, *na-* and *s-*. Such prefixes are also considered to be 'empty' in such verbs as

*postavit*<sup>P</sup> 'build', *pozdravit*<sup>P</sup> 'say hello', *pochválit*<sup>P</sup> 'praise', *poradit*<sup>P</sup> 'give advice';  
*napsat*<sup>P</sup> 'write', *nasnídat se*<sup>P</sup> 'have breakfast';  
*udělat*<sup>P</sup> 'do', *uvěřit*<sup>P</sup> 'believe'.

However, in many cases in which a given prefixed perfective verb and the corresponding simple imperfective verb seem to have the same lexical meaning and differ only in aspect, a fine-grained semantic analysis reveals that the prefix simply reiterates some inherent semantic feature of the verb (cf. Comrie 1976:89, among others). Since the meanings of the prefix and the verb root overlap, the prefix appears to be empty, although it is actually not semantically empty. This can be illustrated with the prefix *na-*, as in

(51-a)

<i>psát</i> <sup>I</sup>	<i>něco</i>	<i>NA</i>	<i>papír</i>
write/be writing	something	on-PREP	paper

(51-b)

<i>NApsat</i> <sup>P</sup>	<i>něco</i>	<i>NA</i>	<i>papír</i>
PREF-write	something	on-PREP	paper

The imperfective verb *psát* is associated with a scene in which a writer guides a pointed trace-leaving implement or uses some other instrument (type-writer, etc.) that leaves traces on some surface. The prefix *na-* is associated with two dominant senses: (a) locational sense: 'on' or directional 'onto' and (b) accumulative or measure sense (related to the temporal or spatial domain).<sup>27</sup> One way of interpreting the contribution

<sup>27</sup> Cf. J. Petr. 1986. *Mluvnice Češtiny. Part I: Fonetika, Fonologie, Morfonologie a morfemika, Tvoření slov.* Praha: Academia. p. 396.

of the prefix *na-* in the perfective verb *napsat*<sup>P</sup> is to think of it as having its locational meaning 'on' and as overlapping with locational relation between the writing instrument and the flat surface that is present in the frame associated with the corresponding imperfective verb *psát*<sup>I</sup>.

A similar situation arises with other perfectivizing prefixes in Slavic languages that developed from prepositions and/or adverbs with locative/directional meaning that is synchronically still detectable.<sup>28</sup> In this respect, the prefixes in Slavic languages are similar in origin to the derivational prefixes or verbal particles in other Indo-European languages. Take, for example, the prefixes and particles in the following English examples: *rewrite*, *underwrite*, *write in*, *write down*, *write up*, *write out*, etc.

One of the crucial arguments in support of the existence of empty prefixes revolves around the status of secondary imperfective verbs derived from prefixed perfective verbs. It is argued that perfective verbs with 'empty' prefixes do not form derived imperfectives (cf. Forsyth 1970). So we get

- (52-a)
- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| <i>PŘE-psat</i> <sup>P</sup>      | ‘write over/again’, ‘copy’            |
| <i>PŘE-pis-ova-t</i> <sup>P</sup> | ‘write over/again’, ‘copy’            |
|                                   | ‘be writing over/again’, ‘be copying’ |

but not

- (52-b)
- |                                   |              |
|-----------------------------------|--------------|
| <i>NA-psat</i> <sup>P</sup>       | ‘write (up)’ |
| <i>*NA-pis-ova-t</i> <sup>P</sup> |              |

<sup>28</sup> "At an early stage in the development of the Slavonic languages, it is probable that prefixing a simple verb did not in itself lead to perfectivisation, and Modern Russian still contains a number of prefixed simple verbs without perfective meaning, often borrowed from Old Church Slavonic, the earliest attested Slavonic language, e.g., *pred-videt* 'foresee', *so-stajat* 'consist'. Subsequently, certain prefixal usages came to be interpreted as specifically perfective, although the opposition Perfective/Imperfective was certainly not yet a fully developed system offering two aspectual forms for all (or nearly all) verbs, so that those verbs that did not have specifically prefixed forms had no specifically Perfective forms" (Comrie 1976:89).

Forsyth (1970) argues that "[i]f any 'new' meaning were perceptible in such [Russian] perfectives as *sdelat'*, *napisat'* and *razbudit'*, imperfectives such as *\*sdělyvat'*, *\*napisyvat'*, *\*razbuždat'*/*razbuživat'* would have come into general use" (Forsyth 1970:41). However, this is a rather weak argument for the existence of 'empty' prefixes. Since there are only a few prefixed verbs that have no secondary imperfective counterparts, such a delimitation of 'empty' prefixes would drastically reduce their number so that their existence would be a marginal phenomenon.<sup>29</sup> Therefore, prefixes should be viewed mainly as lexical-derivational devices.

The existence of 'empty' prefixes was denied by Van Schooneveld (1958) and Isačenko (1962:358-63), for example. (See also Forsyth (1970:36-43), for a discussion on 'empty' prefixes.) The view that prefixes do in most cases induce a clear change of meaning in the derived verb, led to the rise of the research on Aktionsart. (The German term 'Aktionsart' means 'a manner of action'.) In Russian linguistics, the corresponding term is *sposoby dejstvija*. The restriction of the term 'Aktionsart' to the lexicalization of various 'manners of action' by means of derivational morphology goes back to Agrell (1908). In this narrow morphological sense, 'Aktionsart' was used in structuralist linguistics, in particular in the work of Isačenko (1960; 1962:385-418)<sup>30</sup> and Maslov (1959), to categorize the semantic contribution of individual affixes to the meaning of derived verb. Here are just a few representative examples of Czech prefixes and their 'Aktionsart' in perfective prefixed verbs:

<sup>29</sup> Tixonov (1958) argues that secondary imperfectives can be derived from perfective verbs with 'empty' prefixes and such secondary imperfectives are synonyms with the corresponding bases, although their usage is more limited. On the other hand, according to Isačenko (1962), secondary imperfectives (*pročityvat'*) are not semantically identical to the simplex bases (*čítat'*). If they were semantically identical to the corresponding base verbs, why would Russian derive them in the first place?

<sup>30</sup> Isačenko (1960; 1962:385-418) gives for a detailed account of Aktionsarten in Russian and Slovak.

Aktionsart	PREFIX+verb
inceptive	<i>ROZplakat se</i> 'burst into tears'
absorptive	<i>ZApovídat se</i> 'become absorbed in conversation'
attenuative	<i>POhoupat</i> 'swing a little'
terminative	<i>DOhořet</i> 'burn out'
totalizing	<i>PROvrtat</i> 'drill through'
delimitative	<i>POspat si</i> 'have a (little) sleep', 'take a nap'
perdurative	<i>PROspat</i> 'sleep for a quite a while'
distributive	<i>POzamykat</i> 'lock one after another'

As can be seen from the above examples, 'Aktionsart' includes degrees of intensity, measure ('perdurative') as well as such quantificational notions as 'iterativity' and 'distributivity'.

'Aktionsart' differences can be found in other languages, as well. For example, the category of intensivity 'attenuative' can be found in German, as in *lieben* 'love' and *liebeln* 'love superficially' *lachen* 'laugh' and *lächeln* 'smile', as well as in English, as in *spark* and *sparkle*, *suck* and *suckle*; *wag* and *waggle*.<sup>31</sup>

To conclude, prefixation induces aspect shift and in most cases also some change of lexical meaning. This observation and others mentioned in this section make it sufficiently clear why the verb morphology of Slavic languages raises a number of difficult theoretical questions. The most controversial ones regard the distinction between inflection and derivation (cf. Spencer 1991:196-7) and the relation between

<sup>31</sup> The notion of 'Aktionsart' has recently been extended beyond the narrow, morphologically based, understanding (cf. Hoepelman 1981, Hinrichs 1985, Zaenen 1989, Veters and Vandeweghe (eds.) 1990, Legendre 1991, Wechsler 1991, among others). It has been used for the distinctions that underlie the typology of situation types introduced by into modern linguistics Vendler (1957/1967) and Dowty (1972 and 1979). It concerns the semantics of individual verbs, VPs and sentences.



grammar and lexicon.

Slavic linguistics, especially during the structuralist era, is distinguished by the effort to characterize aspect and Aktionsart and precisely delimit their domains of application. The line is most often drawn between aspect as a grammatical category and Aktionsart as a lexical-derivational category. Maslov (1959:160) states that the Aktionsarten (procedurals or *sposoby dejstvija*) and aspect describe the manner in which the action proceeds. Given that we need to draw a line between Aktionsart and aspect, such a semantic observation is not helpful. According to Maslov, the main difference between these two categories is that Aktionsart is a lexical category, whereas aspect is a grammatical category. However, in view of the complexities of the Slavic verbal system, this claim seems to amount to a mere postulation, a methodological assumption that follows from structuralist doctrines. One may wonder about its status as an empirical hypothesis. Nevertheless, Maslov's view still seems to be popular in Slavic linguistics and can be found in standard reference grammars. Along these lines, Andersson (1972), for example, claims that Russian aspect is an inflectional rather than a derivational category. However, the picture is not as simple as that. Perfective and imperfective verbs are related by derivational processes that have effects on the aspectual properties of verbs they operate on. Since derivation creates new lexemes, any derivationally expressed category would have to be lexical rather than grammatical.

There does not seem to be any ready answer to the question whether aspect is an inflectional or a derivational category. According to Dahl (1985), Slavic perfective and imperfective categories are not to be seen as inflectional categories, but rather mainly as lexical-derivational categories that are partially grammaticalized (cf. Dahl 1985): "The semantic differences that we have seen might then reflect the fact that the Slavonic categories grammaticalize *perfectivity* : *imperfectivity* on the lexical rather than on the level of inflectional morphology" (Dahl 1983:19). The lexical-

derivational character of the Slavic perfective and imperfective categories, among others, leads Dahl (1984 and 1985:84) to the conclusion that the Slavic aspectual systems are idiosyncratic in many respects, and it casts doubts on the long cherished assumption that the Slavic aspectual systems are to be taken as prototypical exemplars of aspectual systems<sup>32</sup>.

According to Spencer (1991:197), Slavic aspectual distinction in verbs provides an excellent example of the fuzziness of the inflection-derivation distinction. Spencer (1991) concludes that "Russian aspect provides an example of what appears at first sight to be inflectional morphology behaving like derivational morphology. (...) Faced with these and other kinds of conundrums, many linguists have chosen to abandon the distinction between inflection and derivation. A more positive reason for this choice is the fact that there never seems to be a principled morphological distinction between the two types of morphological processes, in the sense that the morphological devices of affixation, phonological processes and so on are just as likely to be used for derivation as for inflection" (Spencer 1991:197).

#### 4.4.5 Aspect and Situation Types

<sup>32</sup> The importance of the Slavic aspectual systems in discussions of aspect in general linguistics has to a large extent to do with the history of the aspect research. The term 'aspect' appeared in English for the first time in 1853, according to the *Oxford English Dictionary* (see Binnick 1991:135). The term itself was imported into the Western grammatical tradition from the study of Slavic grammar in the early nineteenth century. The term 'aspect' is a loan translation from the Slavic. The Slavic term 'vid' is etymologically cognate with the words *view* and *vision*, while the etymological root of *aspect* is *spect-* which means 'see, look (at), view' (cf. *prospect*, *inspect*, *spectacle*, etc.). The term 'vid' first appeared in an early seventeenth century work by Meletiy Smetritskiy (cf. Binnick 1991:139). The view of aspect as consisting in the opposition of perfective and imperfective can be traced back to Miklosich's *Vergleichende Grammatik der slavischen Sprachen (Comparative Grammar of the Slavic Languages)* of 1868-74. This modern concept of aspect became established through the work of Jakobson (1932, *Zur Struktur des russischen Verbums - On the Structure of the Russian Verb*).

As has been observed in the previous section, perfective and imperfective verbs are related by derivational processes that have effects on the aspectual properties of verbs they operate on. They also have effects on the situation type of new lexemes that are 'outputs' of such derivational processes. In Slavic languages, morphological processes overtly marked on the verb often induce 'shifts' in the situation type. By contrast, in English 'shifts' between telic and atelic verbal expressions are not typically marked on the verb forms. Such 'shifts' are enforced by various contextual factors.

There have been two attempts to provide a typology of situation types for Czech that are based on categories proposed by Vendler (1957): Kučera's (1983) and Eckert's (1984, 1985).<sup>33</sup> The typology of situation types suggested in Chapter 3 differs from both these proposals. I will show that the typology of the six situation types proposed here is applicable to Czech, as well. Although the empirical data and tests to motivate it were taken from English, it is assumed that these situation types are cross-linguistic categories. Most languages have (possibly every language has) at least the verbal categories proposed here. The specific linguistic expressions and criteria for distinctions among situation types may vary across different languages.

The classification into situation types--states, processes and events--suggested here concerns individual verbs, complex verbal predicates and clauses that denote single situations: single states or episodes. This means that the large and productive class of Czech habitual verbs falls outside the typology suggested here. These are verbs that are formed with the suffix *-va-* from simple and derived imperfective verbs: (53-a)

<b>simple imperfective verb</b>	→	<b>derived imperfective VA-verb</b>
<i>psát</i> 'to write'		<i>psávat</i>

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<sup>33</sup> By comparison, there have been many more attempts to provide similar typologies for Russian (cf. Hoepelman 1981, Brecht 1985, Timberlake 1985, among others).

(53-b)

**derived imperfective verb** → **derived imperfective VA-verb**  
*zapisovat* 'to note, to record' → *zapisovávat*<sup>34</sup>

Consider the minimal pairs in the following table:

SITUATION TYPE	ASPECT	
static state	IPF: <i>mít rád</i> 'love', 'like' PF: --	ATELIC
episodic state	IPF: <i>stát</i> 'stand' PF: <i>postát</i> 'stand (for a short time)'	ATELIC TELIC
process	IPF: <i>spát</i> 'sleep' PF: <i>prospat</i> 'sleep (for a long time)'	ATELIC TELIC
incremental event	IPF: <i>vysvětlovat</i> 'explain' PF: <i>vysvětlit</i> 'explain'	(indeterminate) TELIC
culmination	IPF: <i>vyhrávat</i> 'win' PF: <i>vyhrát</i> 'win'	TELIC TELIC
happening	IPF: -- PF: <i>spatřit</i> 'notice', 'spot'	TELIC

As the above table shows, just like in English, so in Czech we distinguish between aspect and situation types. Situation types fall into two main types, telic and atelic, each of which is divided into further subgroups: static state, dynamic state, process, incremental event, culmination and happening ('finer-grained' situation type). In the above table, derivationally related imperfective and perfective verbs differ in aspect and telicity, but they do not differ in their 'fine-grained' situation type: static state,

<sup>34</sup> Unlike in some other Slavic languages (Russian, for example, cf. Isačenko 1962:405-7; Comrie 1976:27; Kučera 1981:177), in Czech this derivation process is very productive and such derived VA-verbs can be found in all the styles of speech (cf. Kučera 1981:177). The suffix *va-* may be repeated for emphasis, which gives rise to a set of expanded verbs: *psát* 'to write' → *psávat* → *psávávat*. See Kučera (1981) and Filip (1993 and to appear), for an analysis of the habitual verbs in Czech.

episodic state, process, incremental event, culmination and happening.

There is an asymmetry between perfective and imperfective verbs with respect to telicity. All perfective verbs are telic. The imperfective counterparts fall into two groups. States and processes are atelic, while culminations and happenings are telic. For the same reasons as in English, the individual verbs that are associated with the incremental event type are indeterminate with respect to telicity. A complex verbal predicate that is headed by an imperfective verb that describes an incremental event is telic or atelic depending on the semantic properties of the Incremental Theme argument and of various optional adjuncts.

Morphologically nonderived verb stems tend to be imperfective.<sup>35</sup> In the group of states, we distinguish two types. Static states and episodic states. The main criterion is the possibility of having a derived perfective counterpart: Verbs denoting static states (*object-level* predicates in Carlson 1977), such as *mít<sup>I</sup> rád* 'love', 'like', have no perfective counterparts. This is not surprising given that cross-linguistically aspectual categories tend to be neutralized or develop special functions with such stative verbs. The lack of perfective counterparts for static stative predicates is motivated by the following general semantic property: static statives are associated with an interval of time that is (in most cases) large and vaguely defined. In sentences with static stative verbs, the property ascribed to the subject of a sentence is thought of as essential, permanent and unchangeable. This, however, is incompatible with the function of the perfective operator. Roughly, the perfective operator imposes a temporal frame over the denoted situation and limits its application to a contextually limited time interval.

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<sup>35</sup> However, there are exceptions, namely underived or primary perfective stems, as in *dát* 'give'.

By contrast, episodic stative verbs (*stage-level* predicates in Carlson 1977), such as *stát<sup>I</sup> na ulici* 'stand on the/a street', have perfective counterparts. This is motivated by the fact that they predicate temporary, accidental, or contingent properties of some entity and hence are potentially changeable. For example, the episodic state expressed in the following imperfective sentence is understood as lasting for some unspecified extent of time, starting and ending at unspecified times in the past.

- (54-a)
- |  |          |                |
|--|----------|----------------|
| <i>Stála<sup>I</sup></i>               | <i>u</i> | <i>výlohy.</i> |
| stood-3SG-FEM                          | at-PREP  | shop-window    |
| 'She was standing at the shop-window.' |          |                |
| ('She stood at the shop-window.')      |          |                |

In addition, Slavic languages like Czech can express episodic states by means of perfective verbs derived with the prefixes *pro-* and *po-*. This is shown in the following examples:

- (54-b)
- |   |               |          |                |
|---|---------------|----------|----------------|
| <i>Postála<sup>P</sup></i>                  | <i>chvíli</i> | <i>u</i> | <i>výlohy.</i> |
| PREF-stood-3SG-FEM                          | while-SG-SCC  | at-PREP  | shop-window    |
| 'She stood for a while at the shop-window.' |               |          |                |

- (54-c)
- |   |               |          |                |
|---|---------------|----------|----------------|
| <i>Prostála<sup>P</sup></i>                 | <i>hodinu</i> | <i>u</i> | <i>výlohy.</i> |
| PREF-stood-3SG-FEM                          | hour-SG-ACC   | at-PREP  | shop-window    |
| 'She stood for an hour at the shop-window.' |               |          |                |

The function of the perfectivizing prefixes *po-* and *pro-* is to indicate a temporally restricted situation. The lexical meaning of the prefixes *po-* and *pro-* can be characterized as indicating a *temporal measure*. The delimitative *po-* lexically incorporates the meaning 'a relatively short period of time'. The perdurative *pro-* contributes the meaning of 'a relatively long period of time' to the situation expressed by the verb root. The time period must be a syntactically realized by a durative adverbial.<sup>36</sup>

<sup>36</sup> Despite the fact that perfective verbs with the prefixes *po-* and *pro-* behave like imperfective verbs, as far as the compatibility with durative adverbials is concerned, there are independent reasons for regarding them as perfective verbs. As Comrie (1976:22, fn. 1) observes, among many others, the clear indication for their perfectivity is the fact that their

Imperfective verbs denoting processes also have perfective counterparts with the prefixes *po-* and *pro-*:

- (55-a) *Spal<sup>P</sup> hodinu.*  
'He slept for an hour.'
- (55-b) *Pospal<sup>P</sup> si hodinu.*  
'He slept for (only) an hour.'
- (55-c) *Prospal<sup>P</sup> hodinu.*  
'He slept for (the whole) hour'.

Another prefix that is also used to express a temporally restricted situation is *za-*, as is shown in:

- (56-a) *Plaval<sup>I</sup> v řece.*  
'He swam in the river.'  
'He was swimming in the river.'
- (56-b) *Zaplaval<sup>P</sup> si v řece.*  
'He swam (for a while) in the river'.  
'He took a swim in the river.'

Such prefixes as *po-*, *pro-* and *za-* can be thought of as measures of time. They stand to stative and process verbs (or more precisely verb roots) as measure, quantity and numeral expressions stand to mass and plural nominal expressions. Just as a bottle can be full of water, so can a sustained stretch of an episodic state, such as standing, or a process, such as sleeping, be thought of as 'filling' a certain bounded interval of time:

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non-past forms have a future time reference.

<b>measure operator</b>	<b>unbounded N/V-expression</b>
<i>a jar (of)</i> <i>a bottle (of)</i>	<i>cookies</i> <i>water</i>
<i>for an hour</i> <i>po-, pro-, za-</i>	<i>John ran</i> verb (root)

In general, just like measure, quantity and numeral expressions have an individuating function in the nominal domain, so the prefixes *po-*, *pro-* and *za-*, among others, have an individuating function in the verbal domain. They serve to demarcate one instance of a given situation type from another.

Perfective verbs with such prefixes as *po-*, *pro-* and *za-* incorporate a temporal measure and hence they are bounded or telic. They can be compared to English verbal predicates that are modified with durative adverbials like *John ran for an hour*.

In the following examples the imperfective is a suffixal derivative of the perfective verb.

(57-a)

<i>Vysvětlil<sup>P</sup></i>	<i>mi</i>	<i>svoji</i>	<i>posici.</i>
explained-3SG	me-DAT	his-SG-ACC	position-SG-ACC
'He explained his position to me.'			

(57-b)

<i>Vysvětloval<sup>I</sup></i>	<i>mi</i>	<i>svoji</i>	<i>posici.</i>
explained-SUFF-3SG	me-DAT	his-SG-ACC	position-SG-ACC
'He was explaining / tried to explain his position to me.'			

Both the perfective and imperfective sentence can be understood as denoting an incremental event, whereby the explanation consists of a number of ordered steps. Since 'explanation' is a bounded Incremental Theme argument, (a) and (b) are both telic.

The perfective sentence entails that all the steps of the explanation have been gone through and hence the event is completed. The imperfective sentence does not have this entailment. The imperfective sentence allows for the possibility that the explanation procedure was not completed at some relevant reference point in the past.



Verbs denoting happenings are perfective and have no imperfective counterparts with the same lexical meaning, this is shown in:

(58-a) *Spatřil<sup>P</sup> letadlo.*  
saw-3SG airplane-SG-ACC  
'He saw an airplane.'

(58-b) *\*Spatřoval<sup>I</sup> letadlo.*  
\*saw-SUFF-3SG airplane-SG-ACC

There is an imperfective verb *spatřovat<sup>I</sup>* that does not express visual perception, but rather is used as a verb of psychological state, as is shown in:

(59) *Spatřoval<sup>I</sup> v tom svou povinnost.*  
saw-SUFF-3SG in-PREP it-SG-DAT his-SG-ACC duty-SG-ACC  
'He regarded it as his duty.'

Perfective verbs denoting incremental events differ from perfective verbs denoting culminations and happenings in that they cannot be combined with point adverbials. This is shown in

(60-a)	<i>*Napsal<sup>P</sup> dopis ve tři hodiny.</i> *He wrote a/the letter at three o'clock.'	incremental event
(60-b)	<i>Vyhrál<sup>P</sup> závod ve tři hodiny.</i> 'He won the race at three o'clock.'	culmination
(60-c)	<i>Našla<sup>P</sup> klíč ve tři hodiny.</i> 'She found a/the key at three o'clock.'	happening

Another test for distinguishing between incremental events, on the one hand, and culminations and happenings, on the other, is the use of the prefix *do-* that focuses on the final stage of an incremental event. The prefix *do-* cannot be applied to verbs that are associated with culminations (*vrátit<sup>P</sup> se/vracet<sup>I</sup> se* 'return') and happenings, (*najít<sup>P</sup>* 'find'), because the semantic structure of such verbs does not include a process preceding the point at which they 'culminate' or 'happen'.

(61-a) *\*Donacházela<sup>P</sup> klíč.*  
\*PREF-find-SUFF-3SG-PAST-FEM key-SG-ACC

(61-b)	<i>*Donašla</i> <sup>P</sup> *PREF-find-3SG-PAST-FEM	<i>klíč.</i> key-SG-ACC
(62-a)	<i>*Dovracel</i> <sup>P</sup> *PREF-return-3SG-PAST	<i>se domů.</i> REFL home
(62-b)	<i>*Dovrátil</i> <sup>P</sup> *PREF-return-3SG-PAST	<i>se domů.</i> REFL home

In all the above examples cited so far, perfective and imperfective verbs that are derivationally related do not differ with respect to the 'fine-grained' situation type: 'episodic state', 'on-going situation', 'incremental event', 'culmination' and 'happening'. In what follows, I will give some examples of derivationally related perfective and imperfective verbs that differ with respect to telicity and the fine-grained situation types. Among the predictable and productive 'shifts' between situation types is the 'shift' between a process and a happening. It is illustrated by the following examples:

*vzdychat*<sup>I</sup>  
'He was sighing (once).'  
'He sighed (repeatedly).'  
'He kept sighing.'

situation type: process (atelic)  
aspect: imperfective

*vzdychnout*<sup>P</sup>  
'He sighed (once).'

situation type: happening (telic)  
aspect: perfective

A perfective verb form with the suffix *-nou-* is associated with a single happening, while the corresponding simple imperfective verb form describes a process. In an appropriate context, it may also have an iterative interpretation (a series of processes or punctual situations).

In many languages the semantic domain of states seems to involve the three types (cf. Chafe 1970 and Talmy 1985):

being in a state (stative)  
entering into a state (inchoative)

putting into a state (agentive)

Episodic states involve knowledge, beliefs, dispositions, body posture. These are states that can be acquired or entered into. Therefore, it is cognitively significant to mark their beginning, that is, their initial boundary (or ingressive phase). In English, this is expressed by an episodic stative verb and a locative verb particle, as in

(63) *She lay down there when the program began.*<sup>37</sup>

In Slavic languages, 'entering into a state' can be expressed morphologically by applying a prefix to an imperfective verb denoting a dynamic state, as in the following Czech sentence

(64)

<i>Zamiloval<sup>P</sup></i>	<i>se</i>	<i>do</i>	<i>ní.</i>
PREFIX-loved-3SG	REFL	in-PREP	her-SG-GEN
'He fell in love with her.'			

The prefix *za-* contributes an ingressive meaning element to the meaning of the whole derived verb *zamilovat<sup>P</sup> se* 'fall in love'. The derived perfective verb is telic. The simple imperfective verb is used in a sentence that denotes the state that results once the ingressive event is completed: *Miloval<sup>I</sup> ji* - 'He loved her.' Such an imperfective sentence denotes an episodic state and it is atelic.

As far as the finer-grained structure is concerned, the telic event of 'falling in love' can be understood as an incremental event (consisting of a series of ordered stages, each qualitatively different from the previous one), a culmination or a happening.

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<sup>37</sup> Example taken from Talmy (1985).

**milovat + NP/ACC**  
love  
'love'

aspect: imperfective

situation type:  
episodic state (atelic)  
(being in a state)

**zamilovat se + do NP/ACC**  
PREF-love REFL + into-PREP NP/ACC  
'fall in love'

aspect: perfective

situation type:  
incremental/culmination/happening (telic)  
(entering into a state)

If we derive a perfective verb from a simple imperfective verb, the meaning change is often not systematic and predictable, due to the largely derivational function of prefixes that derive perfective verbs. From this it follows that also the change in the situation type often is not predictable and systematic.

**Prefixes, perfectivity and telicity.** In Slavic languages the mere presence of a prefix in a derived verb is not sufficient as an indication of the perfective meaning of the derived verb. That is, prefixes are not inherently perfective. Neither is the presence of a prefix sufficient for conferring the telic meaning to a derived verb.

The role of prefixes in the system of Slavic verbs differs from the role of comparable prefixes in the system of verbs in such languages as German, Dutch and Hungarian, for example, where prefixes are analyzed as conveying telicity (cf. Zaenen 1990 and Ackerman 1992, for example). To illustrate this point, let us first consider the following example:

(65-a) **letět<sup>I</sup>** (přes něco)  
fly  
simplex verb  
  
aspect: imperfective  
situation type: process (atelic)

(65-b) **PŘE-letět<sup>P</sup>** (přes) něco

PREF-fly (over) something  
 prefixed verb

aspect: perfective  
 situation type: incremental event (telic)

With regard to verbs of motion, Talmy (1985) proposes that Germanic and Slavic languages conflate motion and manner and independently mark the Path. In this respect they differ from the Romance and Semitic type of conflation of motion and path with independent marking of manner.

In Czech we have a choice in expressing the Path. It can be expressed either morphologically with prefixes or syntactically with prepositions. With simple manner of motion verbs like *letět*<sup>I</sup> 'fly', 'be flying' the Path is expressed in an optional prepositional phrase.

The Path can also be expressed by means of directional prefixes that are typically applied to simple manner of motion verbs. This is exemplified by the perfective verb *přeletět*<sup>P</sup>: it contains the prefix *pře-* with a spatial directional meaning 'over', 'across'. The meaning of the derived verb *přeletět*<sup>P</sup> 'fly across', 'cross X (in) flying' is transparent, it is predictable from the meaning of the prefix and the imperfective verb root. *Pře-* contributes an indication of directionality of the motion and it functions as a frame-creating affix: it creates a directed motion frame, a subtype of the incremental event type. The part structure of the event is correlated with the part structure of the Incremental Path Theme.

The prefixation also has effects on the argument structure. It has an arity-augmenting, transitivity function, whereby the directional prefix introduces the Incremental Path Theme into the argument structure of the derived verb. The imperfective verb *letět* 'fly' is a one-place predicate. The perfective prefixed verb *přeletět*<sup>P</sup> 'fly across, over' is a two-place predicate that takes Agent and Incremental Path Theme. While the Path may be expressed by an optional prepositional phrase with

imperfective manner of motion verbs, with prefixed directed-motion verbs, the Path is 'promoted' to the function of an obligatory direct object.

This derivational type is extremely productive. There are numerous directional prefixes that induce such a predictable change in the lexical semantic properties of a derived verb along with the change in the argument structure: cf. *OB-letět<sup>P</sup>* (around-fly) 'fly around', *DO-letět<sup>P</sup>* (to-fly) 'move to X (in) flying', *POD-letět<sup>P</sup>* (under-fly) 'move under X (in) flying', for example.<sup>38</sup>

A superficially similar situation can be found in comparable German, Dutch (cf. Zaenen 1990) and Hungarian (cf. Ackerman 1992) prefixed verbs. Consider, for example, the following contrast in German:

- (66-a) *Der Vogel flog im Zimmer umher.*  
'The bird flew around the room.'  
(66-b) *Der Vogel flog hinüber.*  
'The bird flew to the other side.'

Sentences with prefixed verbs that contain directional prefixes, such as *hinüberfliegen* 'fly to the other side' (the prefix *hinüber* is separable from the stem) describe an incremental event. Moreover, they assert that the end-point of the path implied by the prefix is reached. That is, they are both telic and have a completive entailment. In German, this is also true for other prefixes that are not directional. For example, there is a difference between *schliessen* 'shoot (without necessarily aiming at and/or hitting anything)' and *erschliessen* 'kill by shooting'. And similarly, while *kämpfen* means 'fight' possibly without achieving anything, *erkämpfen* means 'achieve by means of fighting'. In short, German verbal prefixes behave like the majority of prefixes in perfective prefixed verbs in Slavic languages.

German examples like those given in the above paragraph led Jacob Grimm and other German philologists in the 19th century to extend the notion of 'aspect' from

<sup>38</sup> In other cases the meaning is non-compositional, as in *NA-letět<sup>P</sup> na* 'be fooled by'.

Slavic languages to Germanic languages. Streitberg, for example, observes, "[i]t is not impossible to find in the Germanic languages also the traces of a distinction which so permeates the Slavic languages. Composites with *ver-*, *be-*, *hin-*, *durch-*, etc. (as in Slavic with *po-*, *do-*, *na-*, etc.) perhaps represent perfectives, uncomposed verbs on the contrary imperfectives" (Streitberg 1891:77).

There is one crucial difference between Slavic prefixed verbs and German prefixed verbs that is often not taken into account. Only Slavic languages, but not German, have a means of deriving forms with imperfective meaning from prefixed perfective verbs. In Czech, for example, there is a systematic pairing of such verbs as *přeletět*<sup>P</sup> 'fly across' with secondary imperfective verbs as *přelétávat*<sup>I</sup>:

(67-a)

**PŘE-letět**<sup>P</sup> (přes) něco  
 PREF-fly (over) something  
 prefixed verb

aspect: perfective  
 situation type: incremental event (telic)

(67-b)

**PŘE-létávat**<sup>I</sup> (přes) něco  
 PREF-fly-SUFFIX (over) something  
 'fly over something'

secondary imperfective verb  
 situation type: incremental event  
 aspect: imperfective

Given that derived verbs like *PŘE-létávat*<sup>I</sup> (*přes*) *něco* are imperfective, the prefix cannot be viewed as having an inherently 'perfectivizing' function.

The existence of secondary imperfective verbs may look less exotic once we realize that there is a parallel in English. The function of Slavic prefixes overlaps with that of verbal particles in English. Similarly as with Czech prefixed verbs that can be either perfective or imperfective, so in English, we have the option of combining a phrasal telic verb with the progressive or simple (non-progressive) aspect. The

only difference is that in Slavic languages aspect is conveyed by individual verbs, while English has a more 'constructional', synthetic, way to express aspect in the periphrastic progressive construction. Consider the following examples:

- (68-a) *He thought the problem through.*  
 (68-b) *He was thinking the problem through.*

Under a single event interpretation, *He thought the problem through* is telic and it entails the completion of the denoted situation. A verbal prefix in Czech and a postverbal particle in English have the same effect: they derive a new verb that describes an incremental event.

Czech verbal prefixes and such verbal particles as *up* in English have in common that they do not carry the perfective meaning on their own. In Czech, the occurrence of prefixes in secondary imperfective verbs shows that prefixes are not inherently perfective, have no inherent holistic meaning. In English the verbal particle cannot be viewed as a marker of perfectivity, because the perfective, holistic, meaning is absent if the phrasal verb occurs in the progressive, as in *He was thinking the problem through*. This seems to be behind Comrie's observation that English is one of the languages that "have prefixes or verbal particles with, at least sometimes, aspectual (perfective) significance" (Comrie 1976:94).

There are important differences between English verb particles and verbal prefixes in Slavic languages. Most importantly, the use of such verb particles as *up* in English is not as widespread and systematic as the use of verbal prefixes in Slavic languages. Comrie describes the function of prefixes in aspectual systems as follows: "the addition of a prefix to a simple verb normally results in a restriction of the meaning of that verb, and one way in which such a restriction can be interpreted is as a restriction to a single unified complete action; *this is by no means a necessary restriction* [emphasis mine], as is shown by those languages where verbal prefixes do not normally have aspectual significance, though particularly in the presence of



semantically neutral aspectual prefixes and of processes of imperfectivisation, this can lead to the development of an aspectual system relying primarily on prefixation as a means of perfectivisation" (Comrie 1976:94).

Given that the existence of 'semantically neutral aspectual prefixes' in Czech is a marginal phenomenon, the existence of secondary imperfectivization is a more convincing argument for the development of the aspectual system with related perfective and imperfective counterparts and the role of prefixation in such a system. With this slight reservation, Comrie's viewpoint, and the above observations strongly suggest that the aspectual system in Czech should not be viewed merely in terms of derivationally related pairs of perfective and imperfective verbs, but rather in terms of derivationally related triples: 'imperfective simplex - prefixed perfective verb - secondary imperfective verb'. This is shown by the following example:

(69)

<b>imperfective simplex</b>	→	<b>prefixed perfective verb</b>	→	<b>secondary imperfective verb</b>
<i>psát</i>		<i>ZA-psát</i>		<i>ZA-pisovat</i>
'write', 'be writing'		'write down' 'record'		'write down', 'be writing down' 'record', 'be recording'

As has been shown above, in Slavic languages the presence of a prefix is not sufficient for indicating the perfectivity of a derived verb. Moreover, it is not sufficient for conveying the telic meaning of the individual verb or the phrase which it heads. In general, the telicity of sentences with imperfective verbs that denote incremental event depends on the semantic properties of their Incremental Theme argument and also on the semantic properties of various adjuncts, to just name these two main contextual factors. For example, the telicity of a sentence with a secondary imperfective verb like *přelétávat*<sup>I</sup> 'flying over', 'be flying over' is a composite function of the boundedness of the Path participant and the Holistic Theme participant (moving entity). If both the Path and the Holistic Theme are bounded, then the

whole sentence indicates a finite succession of positional changes. Consequently, it is telic. Otherwise, it is atelic. This is illustrated by the following examples:

(70-a)

telic

*Holub přelétával<sup>I</sup> (přes) střechu.*  
 pigeon-SG-NOM PREF-flew-SUFF-3SG (over-PREP) roof-SG-ACC  
 'The pigeon flew / was flying over the/a roof.'

(70-b)

atelic

*Holub přelétával<sup>I</sup> (přes) střechy.*  
 pigeon-SG-NOM PREF-flew-SUFF-3SG (over-PREP) roof-PL-ACC  
 'The pigeon flew / was flying over (the/some) roofs.'

The above sentences can be paraphrased with the corresponding sentences that contain a simple imperfective verb with a directional prepositional phrase:

(71-a)

telic

*Holub letěl<sup>I</sup> přes střechu.*  
 pigeon-SG-NOM flew-3SG over-PREP roof-SG-ACC  
 'The pigeon flew / was flying over the/a roof.'

(71-b)

atelic

*Holub letěl<sup>I</sup> přes střechy.*  
 pigeon-SG-NOM flew-3SG over-PREP roof-PL-ACC  
 'The pigeon flew / was flying over (the/some) roofs.'

The crucial point is that it is not telicity that is *necessarily* conveyed by the prefix or the prepositional phrase. The prefix and prepositional phrase contribute the concept of 'a goal oriented Path' to the meaning of a complex predicate that expresses a goal directed motion along a Path, a subtype of the incremental event type. The telicity of sentences depends on the boundedness of the Incremental Path Theme and Holistic Theme.

By contrast, in English the presence of a verbal particle and a resultative phrase determines the telic reading of the complex verbal predicate. This can be shown by the fact that the telic feature of the phrasal verb requires that the Incremental Theme

argument be bounded. This requirement is preserved even if the perfective (holistic or completive) meaning is absent. This is illustrated by the following distribution patterns:

- (72-a) *He ate blueberries (for ten minutes / ?in ten minutes).*  
 (72-b) *He ate the blueberries (?for ten minutes / in ten minutes).*
- (73-a) *(\* He ate up blueberries.*  
 (73-b) *He ate up the blueberries.*
- (74-a) *(\*Will you mop up water?*  
 (74-b) *Will you mop up the water, please?*

"(\*)" indicates that the sentence is unacceptable under a single event interpretation.

- (75-a) *He was eating blueberries (from his plate).*  
 (75-b) *(\* He was eating up blueberries (from his plate).*  
 (75-c) *He was eating up the blueberries (from his plate).*

#### 4.4.6 Argument Structure and Lexical Entries

Perfective and imperfective verbs are related by morpholexical operations. They may alter the lexical semantic properties of verbs. The change in lexical semantics of verbs has effects on the valence of derived verbs and/or (morphological) case government, which in turn may lead to changes in the grammatical function status of arguments. To illustrate this point, consider the following locative alternation:

(76) **argument structure change**

<b>imperfective</b>		<b>perfective</b>	
<i>sypat štěrk</i>	<i>do jámy</i>	<i>za-sypat jámu</i>	<i>štěrkem</i>
pour gravel-SG-ACC	into pit-SG-GEN	PREF-pour pit-SG-ACC	gravel-SG-INSTR
to pour gravel into a/the pit'		'to fill a/the pit by pouring gravel into it'.	

The simple imperfective verb *sypat*<sup>I</sup> 'pour/be pouring X into Y' realizes the object of pouring as a direct object in the accusative case and the location in a directional

prepositional phrase. The imperfective verb together with the directional PP is associated with the incremental event and it is atelic, as the Incremental Theme 'gravel' is unbounded.

The meaning of the prefixed verb *zasypat* is 'fill Y with X (by pouring X into Y)'. The application of the prefix *za-* to the simple imperfective verb, results in the following changes: the perfective verb syntactically realizes the location (Y) as the direct object in the accusative case and the original direct object (X) in the oblique instrumental case. The 'Y' participant is linked to the Incremental Theme argument. The perfective verb is both incremental and telic.

All these changes are encoded in the lexical entries of verbal predicators. To show how this works I will take a simpler example: *plavat*<sup>I</sup> 'swim', 'be swimming' and *přeplavat*<sup>P</sup> 'swim across'.

(77-a)

<i>Plaval</i> <sup>I</sup>	<i>(přes</i>	<i>řeku).</i>
swam-3SG	across-PREP	river-SG-ACC
'He swam (across the river).'		
'He was swimming (across the river).'		

(77-b)

<i>Přeplaval</i> <sup>P</sup>	<i>(přes)</i>	<i>řeku.</i>
PREF-swam-3SG	(across-PREP)	river-SG-ACC
'He swam across the river.'		

The simple imperfective verb *plaval*<sup>I</sup> 'he swam', 'he was swimming' denotes a manner of motion and is associated with a process situation type. The optional directional prepositional phrase 'across the/a river' indicates a Path. The prefixed verb is derived with the directional prefix *pře-*, which is related to the directional preposition *přes* 'across' used with the simple imperfective verb. The derived prefixed verb describes a directed motion and is associated with the incremental event. The meaning is 'cross X (by) swimming'. The prefix has an arity-augmenting function, it requires that the space through which the traversed Path leads be syntactically realized as its direct object argument in the accusative case. It is linked to the

Incremental (Path) Theme role. The lexical entries for these verbs are roughly as follows:

(77-a')

[Lexical Form	PLAVAL 'he swam', 'he was swimming']
[syn [cat V, lex + ]]	
[sem	[[frame SWIMMING]
	[sit-type process]
	[aspect [whole [ ]]]
	[telicity [bounded -]]
	[p-role [Part1 swimmer]]]
[val [θ-role	Agent]]

(77-b')

[Lexical Form	PŘEPLAVAL 'he swam across X']
[syn [cat V, lex + ]]	
[sem	[[frame SWIMMING]
	[sit-type incremental event]
	[aspect [whole +]]
	[telicity [bounded +]]
	[p-role [Part1 swimmer], [Part2 location]]]
[val [θ-role	[Agent, Incr.Theme]]]

Aspect is marked directly in the lexical entries of verbs, both in Slavic languages like Czech and also in English, for example. The feature specification that encodes the perfective meaning of perfective verbs is given as '[whole +]'. The feature specification that encodes the imperfective meaning of imperfective verbs in Slavic languages, is given as '[whole [ ]]'. The feature specification '[whole [ ]]' reflects the assumption that the Slavic imperfective aspect *lacks* the '[whole +]' property that characterizes the perfective aspect. That is, it does not oppose a negative meaning to that of the perfective aspect. The feature specification '[whole [ ]]' is to be understood as encoding the non-strict 'improper-part' relation. The adjective 'partitive' is used to refer to the imperfective meaning and the adjective 'holistic' to the

perfective meaning. (As has been observed above, the English progressive is the marked member in the aspectual opposition and characterized in terms of the 'proper-part' relation. This is encoded as the feature specification '[part +]' assigned to complex predicates that consist of the progressive auxiliary *be* and the present participle of the main lexical verb.)

The telic and atelic properties of verbs are marked with the cross-categorical feature specifications '[bounded +]' and '[bounded -]' in their lexical entries. All perfective verbs are marked as '[bounded +]'. Imperfective verbs that denote states and processes are atelic, hence marked as '[bounded -]'. Imperfective verbs that denote culminations are telic and marked as '[bounded +]'. Imperfective verbs that denote incremental events are indeterminate with respect to boundedness in their lexical entries.

The morpholexical rule by which the imperfective verb *plavat*<sup>I</sup> 'swim', 'be swimming' and the perfective verb *přeplovat*<sup>P</sup> 'swim across' are related is a valence augmentation process. Simple imperfective verbs that denote manner of motion are one-place predicates and they take an optional directional prepositional phrase:

(78-a)

<i>Plaval</i> <sup>P</sup>	( <i>přes</i>	<i>řeku</i> ).
swam-3SG	(across-PREP	river-SG-ACC)
'He was swimming (across the river).'/ ('He swam (across the river).')		

(78-b)

<i>Běžel</i> <sup>I</sup>	( <i>z</i>	<i>domu</i> ).
ran-3SG	(from-PREP	house-SG-GEN)
'He ran out of the house.'/ ('He was running out of the house.')		

The addition of a prefix to a one-place verb of motion yields a derived two-place perfective predicate. The perfective verb permits to realize the Incremental Path Theme participant either as a direct object or in a prepositional phrase:

- (79)
- |                               |                 |              |
|-------------------------------|-----------------|--------------|
| <i>Přeplaval</i> <sup>P</sup> | ( <i>přes</i> ) | <i>řeku.</i> |
| PREF-swam-3SG                 | (across-PREP)   | river-SG-ACC |
| 'He swam across the river.'   |                 |              |

The Incremental Path Theme is obligatory:

- (80)
- |                               |                  |
|-------------------------------|------------------|
| <i>Přeplaval</i> <sup>P</sup> | *0 <i>řeku.</i>  |
| PREF-swam-3SG                 | *0 /river-SG-ACC |
| 'He swam across the river.'   |                  |

However, neither the preposition alone nor the whole prepositional phrase is omissible with the following prefixed perfective verbs:

- (81-a)
- |                           |           |              |
|---------------------------|-----------|--------------|
| <i>Vběhl</i> <sup>P</sup> | <i>do</i> | <i>domu.</i> |
| PREF-ran-3SG              | into-PREP | house-SG-GEN |
| 'He ran into the house.'  |           |              |

- (81-b)
- |                            |           |              |
|----------------------------|-----------|--------------|
| <i>Vyběhl</i> <sup>P</sup> | <i>z</i>  | <i>domu.</i> |
| PREF-ran-3SG               | from-PREP | house-SG-GEN |
| 'He ran out of the house.' |           |              |

In the above examples both the prefix (*v-* 'in(to)', *vy-* 'out of', 'from') and the preposition (*do* 'in(to)', *z* 'out of', 'from') contribute to the expression of a Path. In such cases, the prefix in a perfective verb that expresses a directed motion and the preposition in a directional prepositional phrase generally match in their directional and topological properties. Although the prefix and preposition in the above examples semantically overlap, neither the preposition nor the prepositional phrase can be omitted. (Verbs like *vyběhnout*<sup>P</sup> 'run out' may license the omission of the subcategorized prepositional phrase when the speaker can take for granted that the hearer already knows that the speaker has a certain specific Path in mind.) Such Czech data constitute an exception to Talmy's (1985:104) claim that most branches of Indo-European have Path systems that "use a satellite [e.g., prefix, HF] and a preposition, with the prepositional phrase generally omissible" Talmy (1985:104). The question arises whether the Czech case is indeed exceptional or whether Talmy's claim needs to be modified.

There is also a close semantic connection between directional prefixes and the properties of the obligatory Incremental Path Theme argument. Directional prefixes incorporate motional and topological constraints that are reflected in the selectional constraints on the Incremental Theme argument. For example, the prefix *pře-* 'across', 'over' requires that the referent of the Incremental Theme argument (can) be (viewed as) a one-dimensional point or a two-dimensional surface. It indicates a directed motion along a path that leads across or over it. The prefix *po-*, as in *Pomaloval<sup>P</sup> stěny bílou barvou* - 'He covered the walls with white paint', contributes the meaning of 'covering or filling' and requires that the referent of the Incremental Theme argument be a two-dimensional surface. The prefix *za-* requires that the referent of the Incremental Theme be viewed as a two or a three-dimensional entity. For example, in *Zasypal<sup>P</sup> jámu štěrkem* - 'He filled the pit with gravel', the referent of the Incremental Theme is a three-dimensional container.

Hopper and Thompson (1980) argue that perfectivity is one of the factors that constitutes the cluster concept *transitivity*. Imperfectivity, on the other hand, is correlated with neutral aspectuality and reduced transitivity. To this it may be objected that the alleged correlations often does not have to do with the semantics of aspect, perfective and imperfective, but rather it is primarily conditioned by other factors.

Many perfective verbs are correlated with 'high transitivity', while their simple imperfective counterparts from which they are derived with 'low transitivity'. However, in many cases this correlation turns out to be due to the fact that the perfective verb is a derived prefixed verb and the transitivity is crucially related to the derivational and argument-changing function of prefixes that derive perfective verbs, rather than to the perfectivity of prefixed perfective verbs. Prefixation typically alters lexical semantic properties of verbs, which in turn has effects on the argument structure of derived verbs. In Slavic languages, like in other Indo-European languages, there are numerous examples in which prefixation functions as a lexical process of



transitivization.

If there were a tight correlation between perfectivity and transitivity, on the one hand, and imperfectivity and reduced transitivity, on the other hand, then one would expect that a derivation of a secondary imperfective verb from a prefixed perfective verb that is transitive would be accompanied by a reduction or loss of transitivity. However, this is never the case. Consider the following examples:

- (82-a)     **imperfective simplex**  
*Psal*            (*dopis*).  
 wrote-3SG    (letter-SG-ACC)  
 'He wrote (a/the letter)'  
 'He was writing (a/the letter)'
- (82-b)     **prefixed perfective verb**  
*PŘE-psal*        *dopis*.  
 PŘEF-wrote-3SG letter-SG-ACC  
 'He rewrote the/a letter.'
- (82-b')     \**PŘE-psal*            0.  
 \*PŘEF-wrote-3SG 0  
 '\*He rewrote.'
- (82-c)     **secondary imperfective verb**  
*PŘE-pisoval*        *dopis*.  
 PŘEF-wrote-SUFF-3SG letter-SG-ACC  
 'He rewrote a/the letter'  
 'He was rewriting the/a letter.'
- (82-c')     \**PŘE-pisoval*            0.  
 \*PŘEF-wrote-SUFF-3SG 0  
 '\*He rewrote.'  
 '\*He was rewriting.'

Both the prefixed perfective verb in (b) and the secondary imperfective verb in (c) are transitive. The only difference between (b) and (c) is in aspect, which in turn triggers different entailments with respect to which the referent of the direct object 'dopis' (Incremental Theme) was subjected to the event. In general, a perfective sentence with an Incremental Theme argument entails that the referent of the Incremental

Theme is completely subjected to the situation. An imperfective sentence does not have this entailment.

In the above examples and in many similar examples, the alleged correlation between perfectivity and 'high transitivity', identified as 'a completely affected direct object', is reducible to the fact that the direct object argument is linked to the Incremental Theme argument. When a prefix has an arity-augmenting function so that the perfective verb derived by it is transitive, the direct object of the derived perfective verb is almost invariably associated with the Incremental Theme argument. In such cases, high transitivity should be correlated with the presence of the Incremental Theme in the direct object function.

Of course, there are perfective verbs that take direct objects whose referents cannot be viewed as being affected by the denoted event, let alone completely affected (e.g., verbs of cognition and perception). Some prefixes that derive transitive perfective verbs introduce notions that mark 'lower transitivity'. For example, they contribute the specification of lower intensity, of lesser impact of the event on the referent of the direct object argument (*poplácal<sup>P</sup> ho po rameni* - 'he patted him on the shoulder'), or of reduced intentionality on the part of the Agent participant. There are also perfective verbs that are intransitive: cf. *omládnout<sup>P</sup>* - 'become young(er)', 'rejuvenate', *zlenivět<sup>P</sup>* - 'become lazy/lazier'.

#### 4.5 Conclusion

I began the discussion of aspect by proposing that the semantic core of many, possibly all, aspectual systems can be characterized in terms of the partitive-holistic distinction. It captures the general observation that perfective and imperfective verbs allow us to make an assertion about all and a part of a situation, respectively.

However, this does not mean that the aspectual semantics in any particular language and across different languages can be simply reduced to the partitive-holistic distinction. The semantic properties 'partitive' and 'holistic' are only two among several contributing properties that characterize the aspectual prototypes 'on-going situation' and 'result'. The prototype view of aspect presupposes that 'on-going situation' and 'result' are not discrete categories, but clusters of aspectual properties that are associated with the grammatical expression of imperfective and perfective aspect in natural languages.

In terms of the formal expression of aspect, we can classify languages into four main groups along the following parameters: (i) synthetic means (by means of some special morpheme) vs. analytic means (by means of a grammatical construction); (ii) verb-centered encoding vs. noun-centered encoding.

Building mainly on Bach's (1981 and 1986b) event semantic approach, the English progressive is here characterized in terms of a partitive operation in the domain of situations. Progressive predicates (e.g., *be crossing the street*) denote situations that are proper parts of situations denoted by the corresponding simple predicates (e.g., *cross the street*). This characterization has the advantage that it fits with the account of situation types, telic and atelic ones, which is based on the theories of mereology. This allows us to distinguish aspect from telicity and to characterize their systematic interaction (as in the case of 'imperfective paradox').

In the domain of individuals we draw a clear line between the bounded-unbounded distinction and the partitive-holistic distinction. That is, we categorize entities as bounded like *a letter* and unbounded like *sugar*. We also talk about parts of whole bounded entities (*a part of a letter*) and portions of some unbounded quantity of stuff (*There is sugar in my tea*). Analogically, I argue, we need to draw a clear line between the bounded-unbounded distinction and the partitive-holistic distinction in the domain of situations. This amounts to drawing a clear line between telicity and

aspect. Telicity and aspect are two semantic dimensions in the domain of verbal semantics that are clearly orthogonal to each other. However, they are not always clearly distinguished, which leads to problems in the characterization of aspect, telicity and the interaction between the two. The line between aspect and telicity is blurred in those accounts of aspectual semantics that characterize aspect in terms of situation types, both on the level of the telic-atelic distinction and on the level of finer-grained distinctions state, process and event (cf. Mourelatos 1981; Bennett 1981; Vlach 1981; Taylor 1977; Saurer 1984; Parsons 1990; and others).

I briefly describe the most basic morphological characteristics of Czech verbs. I show that perfective and imperfective verbs can be distinguished in terms of the co-occurrence restrictions with durative and time-span adverbials and their temporal reference in the present tense. In Czech and other Slavic languages temporal adverbials are blind to the telicity of verbal expressions, they only 'see' the aspect of the main lexical verb. Imperfective verbs can only be modified with durative adverbials of the '*for-PP*' type (under a single event interpretation). Perfective verbs are only compatible with time-span adverbial of the '*in-PP*' type. (By contrast, in English temporal adverbials are sensitive to telicity as well as to aspect of verbal expressions.)

I also take a close look at the widespread view that nearly all Slavic verbs come in 'aspectual pairs', in two complete sets of tense forms, and that there is a fairly large number of prefixes that are semantically empty, serving merely to mark perfective aspect (cf. Binnick 1991:137). I show that it is inadequate. I argue that the existence of 'empty' prefixes is a marginal phenomenon, because nearly all prefixes contribute some meaning to the meaning of a derived verb. Furthermore, rather than viewing an aspectual system in Czech, and in other Slavic languages like Polish and Russian, in terms of 'aspectual pairs', it should be best viewed in terms of derivationally related triples: 'imperfective simplex - prefixed perfective verb - secondary imperfective verb'.

Extending the mereologically based account of aspectual semantics to Slavic aspect, I propose that a perfective sentence presents a situation as a single whole, while an imperfective sentence allows for the denoted situation not to be viewed in its entirety. This amounts to viewing the Slavic imperfective aspect in terms of an improper-part relation in the domain of situations. This reflects the assumption that the Slavic imperfective aspect *lacks* the property that characterizes the perfective aspect. This view can be traced back to the structuralist markedness theory, according to which the Slavic imperfective aspect is the unmarked member and the perfective aspect the marked member in the aspectual opposition. By contrast, the English progressive can be seen as the marked member in the aspectual opposition and characterized in terms of the 'proper-part' relation.

Perfective and imperfective verbs are related by morpholexical operations that may alter aspectual and lexical semantic properties of verbs. The change in lexical semantics of verbs has effects on their situation type and valence of derived verbs and/or (morphological) case government, which in turn may lead to changes in the grammatical function status of arguments.

In Slavic languages the mere presence of a prefix in a derived verb is not sufficient as an indication of its perfective meaning. That is, prefixes are not inherently perfective. Slavic prefixes also differ from verbal prefixes in Hungarian and German, for example, in that the presence of a prefix is not sufficient for conferring the telic meaning to a derived verb.

## Chapter 5

### Verbal Morphology and Nominal Reference Czech

#### 5.1 Introduction

Chapter 4 focused on verbal morphology of Czech verbs and on the distinctions conveyed by verbs in the domain of situations. It has been shown that derivational verbal affixes function as aspect and situation type 'shifters'.

In this chapter I will show that verbal morphology often stands in a similar relation to noun phrases as determiners, such as *the*, *every*, *some* and various measure expressions, do to the nouns with which they are combined.

I propose that aspectual operators as well as derivational affixes function as operators over event predicates and their arguments. One of these arguments, the Incremental Theme (Dowty 1988 and 1991), is privileged in so far as it is crucially tied to the delimitation of the denoted event. This motivates the hypothesis advanced here that the Incremental Theme is the argument that aspectual operators and verbal affixes select for their semantic effects.

### Incremental Theme Hypothesis

In Slavic languages verbal morphology constrains the interpretation of the Incremental Theme argument. Perfective and imperfective aspectual operators as well as specific verbal affixes stand in a similar relation to the Incremental Theme argument as determiner quantifiers do to the nouns with which they are combined.

*Corollary 1:* The perfective operator functions as a universal quantifier over the denotation of the Incremental Theme argument. From this it follows that the perfective operator is correlated with a bounded Incremental Theme argument.

*Corollary 2:* The imperfective operator induces a partitive interpretation of the Incremental Theme argument (under a single event interpretation).

*Corollary 3:* Derivational verbal affixes often incorporate various quantificational notions, such as 'distributivity', '(small/sufficiently large) quantity', 'partitivity'. Derivational affixes function as quantifiers over the denotation of the Incremental Theme argument of the perfective and imperfective verbs they serve to derive.

The influence of aspectual operators and derivational verbal affixes on the interpretation of nominal arguments has been largely neglected. It is a phenomenon that deserves attention, especially in the light of recent studies on the expression of quantification and (in)definiteness by means of verbal morphology. This topic is at the heart of the current research in syntax-semantics interface and quantification.

First I will describe the relevant data. Then I will outline previous analyses (Partee, Bach and Kratzer 1987, Partee 1991, and Krifka (1986, 1989 and 1992) that serve as the point of departure for my analysis. In the subsequent section I will discuss my proposal. Finally, I will provide further evidence for the proposed analysis.

## 5.2 Data: Parallels between Determiner Quantifiers and Verbal Morphology

### 5.2.1 Measure, Proportion and Distributivity

#### 5.2.1.1 NP Quantification

Quantificational expressions in English are expressions like *every, all, each, no, some, most, many, much, a few, a little, two, several*. Syntactically they are determiners that combine with common nouns to make noun phrases. A determiner may be a member of a number of distinct syntactic categories, including Quantifier, Demonstrative, Article, and others. The syntactic category 'determiner' "corresponds to the logical category of quantifier, i.e., an element of logical structure that specifies for how much or for which part of a domain a propositional function is true" (McCawley 1988:193-4). Determiners incorporate such notions as quantity, number, measure or proportion.

(1)

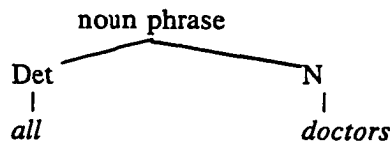
Quantifier → *every, all, each, no, some, most, many, two, ...*

Det ∈ {Quantifier, Demonstrative, Article, Interrogative, ...}

(2-a)        noun phrase → (Det) N



(2-b)



Quantified sentences allow us to make general statements. A sentence like *All doctors will tell you that aspirin helps.* expresses a generalization about doctors in a given domain of discourse. By contrast, *Dr. Kopfschmerz will tell you that aspirin helps* makes an assertion about a particular individual.

A quantified sentence like *All doctors will tell you that aspirin helps* can be thought of as having two components. (This view goes back to Frege, 1892 and 1918). One component is comparable to a simple subject-predicate sentence with a variable in the subject position:

(3)        x will tell you that aspirin helps

In order to properly interpret this formula we must substitute the variable *x* with an appropriate value. Such a formula can be evaluated as true or false only with respect to some individual contextually taken as a value for the variable.

The other component, the quantified expression, here the quantified noun phrase, indicates what *quantity* of the doctors, how many doctors will tell you that aspirin helps.

(4)        (all: x is a doctor) (x will tell you that aspirin helps)

In other words, it indicates how many different values of the variable *x* we have to consider. Take for example *all doctors* in *All doctors will tell you that aspirin helps.* This sentence can be felicitously uttered just in case all the doctors in a given domain of discourse that we substitute for the variable *x* will tell you that aspirin helps. The quantifying expression *all*, the universal quantifier, quantifies over doctors, and over individuals in general.

This is expressed in the formula of first-order predicate logic as follows:

$$(5) \quad \forall x (\text{doctor}(x) \rightarrow P(x))$$

P = "will tell you that aspirin helps"

Here, the universal quantifier binds the variable  $x$  and it takes scope over the propositional function (open sentence) in the parenthesis that comes immediately after the quantifier.

Most previous syntactic and semantic literature on quantification focused on noun phrase quantification by means of determiners like *all*, *every*, *most*, *no*. Standard approaches to noun phrase quantification are rooted in logic, mathematics and philosophy of language and a number of them focus on English data.

However, the expression of quantification is by no means restricted only to determiners within noun phrases. Languages dramatically differ in the way they express quantification, and closely related notions like (in)definiteness and boundedness. In many languages quantification and related notions are incorporated in verb morphology, in auxiliary verbs, preverbs and verbal affixes, for example.

In what follows I will focus on the role of certain verbal affixes in Czech. Following the strategy in Partee, Bach and Kratzer (1987) and Partee (1991a and 1991b), I will examine how various quantificational notions conveyed by overtly quantified noun phrases are expressed in Czech by means of verbal morphology. Although I examine only Czech, the phenomena described are not restricted to this language. They have been attested in other Slavic languages, and parallel cases seem to exist in such typologically distinct languages as Hindi, Japanese and Australian aboriginal languages, to name just a few.

### 5.2.1.2 Verbal Affixes as Modifiers and Quantifiers in the Domain of Situations

Various derivational affixes that operate on verbs, along with other morphological devices, typically restrict the meaning carried by the derivational base, the relevant restrictions concern direction (of motion), quality, degree, modality, distributivity, quantity, universality. The semantic contribution of affixes to the meaning of derived verbs was extensively discussed in traditional Slavic linguistics under the notion of 'Aktionsart' (German for 'manner of action'). Such a classification is complicated by the fact that there is typically no one-to-one relation between a given 'manner of action' ('Aktionsart') and a designated single morphological device for its expression, except from a few affixes like the semelfactive suffix *-nou-*.

Derivational affixes function as modifiers of denoted situations. For example, *spát<sup>I</sup>* 'sleep' is derivationally related to the diminutive *spinkat<sup>I</sup>* 'sleep' (high degree of expressive connotation, used in the speech of children, for example). To give another example, the prefix *po-* in *požertovat<sup>P</sup> si* 'joke a little; joke for quite a while; joke until one has had enough of joking'. It is derivationally related to the imperfective verb *žertovat<sup>I</sup>* 'joke', 'jest'. Here, the modification contributed by the prefix *po-* to the meaning of the base verb *žertovat<sup>I</sup>* 'joke', 'jest' concerns a lower or higher degree or intensity with which the action was performed and/or longer or shorter duration in time. In the following pair of sentences, (a) entails (b), as the set of individuals who joke for a while, a little, etc., is a subset of the set of joking individuals:

(6-a)

*Pavel si požertoval<sup>P</sup>.*  
 Paul REFL PREF-joked-3SG  
 'Paul joked a little / for a while.'

(6-b)

*Pavel žertoval<sup>I</sup>.*  
 Paul joked-3SG  
 'Paul joked.'

Such prefixes function as modifiers in that they map sets onto subsets. They stand to verb roots or bases to which they are applied in the same modificational function as many adjectives do to the common nouns with which they are combined. For example, the adjective *small* modifies the common noun *house* in

(7-a) *This is a small house.*

This sentence entails the following sentence

(7-b) *This is a house.*

(a) entails (b), as the set of small houses is a subset of the set of houses. Adjectives like *small* map sets of individuals onto subsets of individuals. All modifiers provide a further characterization to the expression they are combined with and they do not change its syntactic category.

Derivational affixes also function as quantifiers. They contribute some quantificational specification to the meaning of the derived verb, along with possibly further modificational specification to the identity of the described situation. That is, they may not (just) have the typical role of modifiers, but they also function as quantifiers over situations.

For example, a large group of perfective verbs with the suffix *-nou-* is related to simple imperfective verbs, as is shown by the following pair of verbs:

**vzdychat<sup>I</sup>**  
 'He was sighing (once).'  
 'He sighed (repeatedly).'  
 'He kept sighing.'

situation type: process (atelic)  
 aspect: imperfective

**vzdychnout<sup>P</sup>**  
 'He sighed (once).'

situation type: happening (telic)  
 aspect: perfective

The imperfective verb denotes a plurality of situations or one situation, the perfective verb only denotes a single, relatively short, situation (semelfactive 'Aktionsart').

Semantically, the suffix *-nou-* is comparable to the iterative adverb 'once'.

To take another example, the distributive verb *pobolívat*<sup>P</sup> denotes a series of situations of the same kind, it can be translated as 'ache a little from time to time/now and then' or 'ache a little occasionally'. Apart from the low degree or intensity modification, it contributes a quantificational element to the meaning of the derived verb. Semantically, *po-* is here comparable to adverbs of frequency, such as *occasionally, from time to time*. That is, it quantifies over situations or cases.

### 5.2.1.3 Verbal Affixes as Modifiers and Quantifiers in the Domain of Individuals

In certain cases the semantic restriction contributed by an affix to the meaning of a derived verb does not concern the derived verb alone but it also extends over one of the nominal arguments of the verb. In other words, derivational affixes do not just function as quantifiers over situations or cases, but they also seem to function as quantifiers over individuals. They stand in a similar relation to nominal arguments as determiner quantifiers do to the nouns with which they are combined.

Examples of prefixes that seem to function in this way are:

(8)	na-	measure ('some')
	po-, s-, vy-, z-	distributive ('each')
	o-, po-	all around, affecting the whole surface ('all')
	při-	additive
	u-	1. iterative (and causative), 2. partitive

It must be emphasized that it is only in combination with some verbs (or more precisely, verb roots) that the above prefixes have a function parallel to that of determiner quantifiers in noun phrases.

For example, the following verbs with the prefix *u-* combine a repetitive and causative meaning (cause to come into existence, cause to destroy or change): *udupat* (*pěšinu*)<sup>P</sup> 'by repeated stamping make a path', *ušlapat* (*pěšinu*)<sup>P</sup> 'by repeated walking over something make a path', *uklouzat*<sup>P</sup> 'by repeated sliding over something make it smooth(er)'. Here, the Agent causes some object to come into existence, be destroyed or changed gradually during the course of the denoted event.

The prefix *u-* can be also used in derived verbs that incorporate partitive meaning, as in:

- (9)
- |   |               |                    |
|---|---------------|--------------------|
| <i>Upil</i> <sup>P</sup>                  | <i>kávu</i>   | <i>(ze šálku).</i> |
| PREF-drank-3SG                            | coffee-SG-ACC | (from cup)         |
| 'He took a sip of coffee (from the cup).' |               |                    |

When the prefix *u-* modifies a verb *pít*<sup>I</sup> 'drink', the derived verb *upít*<sup>P</sup> means something like 'take a sip (out of some portion of liquid)'. The perfective verb is transitive and takes an obligatory direct object that denotes the entity measured by the prefix *u-*. It is understood as indicating some small portion that constitutes a proper part of some larger contextually determined portion.

The prefix *při-* has an additive meaning in *přisypat*<sup>P</sup> *cukr* 'pour an additional quantity of sugar or in addition pour some quantity of sugar'. This is not a quantificational meaning in the classical sense, nevertheless it may be mentioned in this context, given that it clearly concerns quantity or measure.

In the following example *na-* functions as a modifier of a verb root alone:

- (10)
- |   |                         |                           |
|---|-------------------------|---------------------------|
| <i>Na-lenošil</i> <sup>P</sup>                | <i>se</i>               | <i>(hodně / *trochu).</i> |
| PREF-loafed.around-3SG                        | REFL(a lot / *a little) |                           |
| 'He loafed around (for a long time, enough).' |                         |                           |

The prefix *na-* here contributes the scalar notion of evaluation to the meaning of the derived verb. It asserts a relatively high degree on the temporal scale (the situation lasted for a relatively long time) or on the 'satisfaction' scale associated with the referent of the subject argument (he spent some time loafing around and eventually

had enough of it). This is shown by the fact that the prefixed verb can be further modified with such degree words as *hodně* 'a lot', but not with *málo* 'a little'.

The prefix *na-* also functions as a modifier of a predicate and its direct object argument. It contributes the notion of gradual amassing or accumulation of the entity or entities denoted by the direct object.

- (11-a)
- |  |                           |                |
|--|---------------------------|----------------|
| <i>Pekař</i>   | <i>napekl<sup>P</sup></i> | <i>housky.</i> |
| baker-SG-NOM   | PREF-baked                | rolls-PL-ACC   |
| 'The baker baked a lot of / a large batch of / quite a few rolls.' |                           |                |

This sentence does not mean that the baker spent a long time baking rolls, that he had had his fill baking rolls or that he spent a lot of energy or effort to bake rolls. Rather, it entails that as a result of the denoted event, there was a sufficiently large quantity of rolls. That is, the sentence makes the following assertion: 'The baker baked a lot of / a large batch of / quite a few rolls.' Such a sentence cannot be felicitously uttered in a situation in which the baker made only two or three rolls. Although the prefix *na-* is directly attached to the verb, its semantic import is similar to that of determiner quantifiers like *a lot* or *many*. Semantically, the prefix *na-* behaves with respect to the undetermined plural noun phrase 'rolls' as a quantifier like *many*, for example, would with respect to the common noun 'rolls'.

By contrast, if we substitute *na-* with the prefix *u-*, which does not carry any quantificational meaning in *upéci<sup>P</sup>*, the whole sentence does not tell us anything about the amount of entities denoted by the direct object:

- (11-b)
- |                              |                          |                |
|------------------------------|--------------------------|----------------|
| <i>Pekař</i>                 | <i>upekl<sup>P</sup></i> | <i>housky.</i> |
| baker-SG-NOM                 | PREF-baked               | rolls-PL-ACC   |
| 'The baker baked the rolls.' |                          |                |

Since the prefix *u-* here does not contribute any distinct notion of quantity or measure, the undetermined plural noun phrase 'rolls' here simply has a bounded and a definite interpretation. (Since the perfective sentence makes an assertion about the

set of rolls baked by the baker, it is true only if it is also true of all the rolls making up the set that they were baked by the baker, in this sense, the above sentence also has a universal entailment.)

The fact that the above sentences (a) and (b) minimally differ in the prefixes of their main verbs, *na-* and *u-*, suggests that the difference in the interpretation of their direct object noun phrases derives from the idiosyncratic lexical semantic properties of the prefixes alone.

Another example in which a verbal prefix seems to behave like a quantifier with respect to a nominal argument of a verb is a construction with the distributive prefix *po-*, illustrated in the following sentence:

(12-a)

*Šálky se po-rozbíjely<sup>P</sup> v myčce.*  
 cups-PL-NOM REFL PREF-broke in dishwasher  
 '(All) the cups broke in the dishwasher.'  
 [gradually, one after the other, for example]

Here, the prefix *po-* is responsible for the distributive reading that concerns the subject argument 'cups'. (a) can be appropriately uttered in a situation in which the cups broke in a successive fashion, either individually or in individual groups. Crucially, this sentence disallows a collective interpretation. It would be inappropriate in a situation in which all the cups broke at the same time. Notice that the addition of an adverb like *najednou* 'at the same time', 'at once' would make the whole sentence odd:

(12-a')

*Šálky se ?najednou po-rozbíjely<sup>P</sup> v myčce.*  
 cups-PL-NOM REFL ?at once PREF-broke in dishwasher  
 '(All) the cups broke ?at once in the dishwasher.'  
 [gradually, one after the other, for example]

The corresponding perfective verb without the distributive prefix *po-* licenses a collective or a distributive interpretation, depending on the context in which it occurs:



(12-b)

Šálky                    se        rozbily<sup>P</sup>        v myčce.  
 cups-PL-NOM REFL broke        in dishwasher  
 '(All) the cups broke in the dishwasher.'

Other examples of verbs with distributive prefixes are: *vymřít* 'die out (one after the other, successively)', *skoupit* 'buy (all, one after the other, all successively).

The examples discussed in this section exemplify what may be considered to be a type of 'affixal quantification'. The verbal prefix indicates what sort of quantification is involved in the proposition expressed by a sentence and a nominal argument denotes the kind of individual the quantification is restricted to range over. Both the verbal prefix and nominal argument are used to signal that a free variable is introduced into the scope of the quantification.

In general, verbal affixes extend their effects over a verb alone, over a verb and the subject of an intransitive verb, over a verb and its direct object, and even over a verb and a prepositional object.

#### 5.2.1.4 Aspect: Parts and Wholes

In Chapter 4 I proposed that the perfective-imperfective distinction in many, if not all, languages concerns the part-whole structure of situations. In Slavic languages the perfective and imperfective aspect allow us to make assertions about all or a part of a given situation. At the same time, they can also be exploited in making assertions about all or a part of a given individual. This presupposes that the individual in question has a part-whole structure. In other words, the semantic contribution of aspectual operators to the meaning of nominal arguments is comparable to that of the universal quantifiers 'all' and 'whole' as well as to the partitive 'some'.

To illustrate this point let us compare the following pair of sentences:

(13-a)

*Pozamykal*<sup>P</sup>            *zásuvky.*  
 PREF-locked-3SG   drawers-PL-ACC  
 'He locked all the drawers' [gradually, in a distributive fashion]

(13-b)

*Zamykal*<sup>I</sup>            *zásuvky.*  
 locked-3SG   drawers-PL-ACC  
 'He was locking (the/some) drawers.' / ('He locked (some) drawers.')

The above sentences differ in aspect, indicated by their main verbs. The unprefix verb *zamykal* is imperfective and the prefixed verb *pozamykal* is perfective. Perfective verbs describe situations in their entirety, as completed. Imperfective verbs are unmarked in this respect: they may denote events that are in progress, completed events, or they may be used in sentences that "name" events and abstract away from the notions of progressivity and completion.

Although the above sentences minimally differ only in their verb forms, their direct object noun phrases have a distinctly different interpretation. The perfective sentence entails that the denoted event was completed when *all the drawers* in the relevant domain of discourse were locked. The noun phrase 'drawers' is here interpreted as a universally quantified noun phrase 'all the drawers', even though it is undetermined, it does not contain any overt determiners. The negation of the universal entailment results in a contradiction, as is shown in:

(14)

*\*Pozamykal*<sup>P</sup>            *zásuvky,*  
 \*PREF-locked-3SG   drawers-PL-ACC  
  
*ale nepozamykal*            *je*    *všechny*  
 but NEG-locked-3SG    them   all-PL-ACC  
 '\*He locked all the drawers, but he did not lock them all.'

Intuitively, the perfective operator (together with the verb root) does not just contribute the notion of completion ('entirely') to the meaning of the whole derived verb, but it also seems to function like a universal determiner with respect to the direct object noun phrase 'drawers' ('all the drawers'). The effect comparable to universal

quantification over individuals is triggered by the holistic meaning of the perfective verb:

'[lock COMPLETELY in a distributive way] DO-NPs'

which amounts to

'[lock in a distributive way] [ALL THE DO-NPs]'.

In the imperfective sentence, the universal entailment is lacking. If the imperfective sentence has a progressive interpretation, it approximately means

'[be in the process of locking] DO-NPs' or

'[lock PARTLY/INCOMPLETELY] DO-NPs'.

This gives rise to the partitive interpretation of the direct object:

'[lock] [ONLY SOME DO-NPs]'.

In other words, the referent of the direct object is understood as being partially subjected to the event. This gives an effect similar to partitive quantification.

### 5.2.2. Definiteness

Czech, like most Slavic languages, has a full and standard determiner system, with one notable exception: it lacks a set of articles. There is no choice between *a car*, *the car*; *cars*, *the cars*, *some cars*; *coffee*, *the coffee*. This is also true for other Slavic languages, except for Bulgarian and Macedonian. The differences in interpretation that are carried by articles in English, for example, are here inferred through, or expressed by, a variety of morphological, syntactic, prosodic and lexical devices: word order, stress, determiner quantifiers and various other lexemes that modify nouns. What has been less frequently noticed in the relevant literature, let alone systematically described, is the influence of aspect on the definite/indefinite interpretation of nominal arguments.

The best examples for the influence of aspect on the semantic properties of nominal arguments can be found in sentences that contain undetermined mass and plural noun phrases that function as DOs, as is shown in the following sentences:

(15-a) *Pil<sup>I</sup> víno.*  
 drank-3SG wine-SG-ACC  
 'He was drinking (the/some) wine.'  
 'He drank wine.'

(15-b) *Vypil<sup>P</sup> víno.*  
 PREF-drank-3SG wine-SG-ACC  
 'He drank up (all) the wine.'

(a) and (b) contain the same undetermined mass direct object noun phrase *víno* 'wine'. Formally, these two sentences only differ in aspect, marked on their main verbs. Nevertheless, there is a significant difference in the interpretation of their direct object noun phrases.

(b) contains the prefixed perfective verb *vypil<sup>P</sup>* and entails that the event ended when the Agent finished drinking all the wine. Moreover, the speaker presupposes that the hearer can identify the relevant portion of wine in the discourse. In this most natural, single event, interpretation, *víno* 'wine' is *bounded, referentially specific* (or *definite*) and *universally quantified*. This interpretation is often associated with the referential use of definite descriptions in languages like English.

By contrast, (a) with the imperfective verb *pil<sup>I</sup>* suggests that there was an *unbounded* amount of wine (existential quantification). The unbounded meaning is enhanced if imperfective sentence (a) is progressively used. In its progressive use, the above sentence entails that at some point in the past some 'wine-drinking' situation was "in progress". In this use of the mass direct object noun phrase *víno* 'wine' closely corresponds to English undetermined noun phrases. If the exact identity and quantity of wine is irrelevant for the purpose of communication, the function of the noun phrase 'wine' is primarily to supply a further specification to the identity of the

situation. However, the above imperfective sentence can also be felicitously uttered in a situation in which 'wine' designates some specific wine in the domain of discourse. The proposition then concerns a part out of the known quantity of wine.

A similar interaction also takes place between aspectual operators and undetermined plural direct object noun phrases, as is shown in (a) and (b):

(16-a)

*Jedl<sup>I</sup> ořechy.*  
 ate-3SG nuts-PL-ACC  
 'He was eating (some/the) nuts.' / ('He ate nuts.')

(16-b)

*Snědl<sup>P</sup> ořechy.*  
 PREF-ate-3SG nuts-PL-ACC  
 'He ate (all) the nuts.'

The fact that the above pairs of sentences minimally differ in aspect marked on the verbs suggests that the difference in the interpretation of their direct object noun phrases derives from the aspectual difference.

Notice that we often find the following three-way distinction:

(17)

*pít<sup>I</sup> kávu*  
 drink coffee-SG-ACC  
 'be drinking (some/the) coffee'  
 'drink coffee'

*NA-pít<sup>P</sup> se kávy*  
 PREF-drink REFL coffe-SG-GEN  
 'drink/have some coffee'

*VY-pít<sup>P</sup> kávu*  
 PREF-drink coffee-SG-ACC  
 'drink up all the coffee'

The vertical ordering here reflects the order in which the referential and quantificational specificity of the referent of the DO-noun phrase increases in dependence on the quantificational specification encoded by verb morphology. In *NA-pít<sup>P</sup> se kávy*, the prefix *na-* indicates 'some unspecified quantity of', a vague measure, and its impact on the nominal argument is roughly comparable to that of the unstressed

'some' in English. In *VY-pít<sup>P</sup> kávu*, the direct object noun phrase is both definite and universally quantified.

What must be accounted for is that verbs do not always behave like determiner quantifiers with respect to nominal arguments. For example, perfectivity is not always associated with a bounded and/or definite interpretation of nominal arguments. This is shown by the following pairs of sentences:

(18-a) *Slyšel<sup>I</sup> hlasy na chodbě.*  
 heard-3SG voices-PL-ACC on corridor  
 'He heard (some) voices in the corridor.'

(18-b) *Uslyšel<sup>P</sup> hlasy na chodbě.*  
 PREF-heard-3SG voices-PL-ACC on corridor  
 'He (suddenly) heard (some) voices in the corridor.'

(18-a) *Nesl<sup>I</sup> z obchodu mléko a vajíčka.*  
 carried-SG from store milk and eggs  
 'He carried milk and eggs from the store.'

(18-b) *Přinesl<sup>P</sup> z obchodu mléko a vajíčka.*  
 PREF-carried-SG from store milk and eggs  
 'He brought milk and eggs from the store.'

The direct object noun phrase in the perfective sentences does not have a referentially specific and universally quantified interpretation. Neither the perfective aspectual operator nor the imperfective one function as quantifiers over the denotation of the direct object noun phrase. With verbs of perception, the question whether a part or whole stimulus is perceived does not arise. If there are some voices that are the Stimulus of a hearing event, then all of those voices are the voices that the Experiencer participant hears, regardless whether the sentence presents the perception in its entirety or not.

If there is any difference in the interpretation of direct object noun phrases in the above imperfective and the corresponding perfective sentences at all, it will stem

from other contextual factors than the difference in aspect. Similarly, there is no difference in the definiteness of the direct object noun phrases in: *čekal<sup>I</sup> (na) hosty* - 'he waited/was waiting for the guests' vs. *počkal<sup>P</sup> na hosty* - 'he waited for the guests'. With both the perfective and imperfective verb, the object argument may have a definite interpretation.

Consider also the following pair of sentences with a singular count direct object noun phrase:

(19-a)  
*Četl<sup>I</sup> článek.*  
 read-3SG article-SG-ACC  
 'He read an/the article.'  
 'He was reading an/the article.'

(19-b)  
*Přečetl<sup>P</sup> článek.*  
 PREF-ate-3SG article-SG-ACC  
 'He read an/the article.' [i.e., he finished reading it]

The perfective sentence entails that the whole article was read, while the imperfective sentence lacks this entailment. However, there is no difference in definiteness enforced by aspect alone.

### 5.2.3 Summary: Parallels between Verbal Morphology and Determiners

The crucial point illustrated by the above examples is that the differences in the interpretation of nominal arguments arise from verbal morphology. The most compelling examples are those with undetermined mass and plural direct object noun phrases that occur in pairs of sentences that minimally differ in their verb forms. Such examples clearly show that aspect and idiosyncratic lexical semantic properties of derivational verbal affixes stand in a similar relation to nominal arguments as determiners do to the nouns with which they are combined. Simple verbs and derivational verbal affixes give rise to effects similar to (i) determiner quantifiers (universal

quantification, partitivity, distributivity, (large) quantity) and to (ii) articles (definite and indefinite interpretation).

Nominal arguments that are target of such 'affixal quantification' function as direct objects, subjects, indirect objects, and we may even include cases of oblique objects (in sentences that involve a directed motion).

How do we account for our observation that aspect and derivational affixes seem to behave with respect to noun phrases as determiner quantifiers do with respect to nouns? In particular, we need to pose the following questions:

- (i) What are the conditions under which verb morphology extends its semantic effects over a nominal argument? Which argument(s) does verb morphology target?
- (ii) What are the differences and similarities between the expression of quantificational notions and definiteness by means of verbal affixes and by means of determiners?
- (iii) What is the most appropriate theoretical framework for capturing various quantificational and related effects (such as boundedness and definiteness) of verbal morphology on nominal arguments?

The study of verb morphology in connection with quantification and definiteness is at the heart of the current research in syntax and semantics. It breaks into three main domains.

- The first domain focuses on the structure and interpretation of various expressions of quantification, and related notions such as definiteness and boundedness.
- The second domain concerns the syntax-semantics interface. The Czech data described in the previous section challenge the hypothesis that the meaning of



sentences can be derived in a systematic way by applying compositional semantic rules to independently motivated syntactic structures. Given the apparent non-compositionality of the data, what is the nature of the mapping between syntax and semantics?

- The third domain concerns the existence and nature of semantic universals.

### 5.3 Previous Approaches

The correlation of perfective aspect with definite direct objects, accusative case and holistic interpretation is well-documented in Slavic languages like Czech, Polish and Russian (cf. Wierzbicka 1967, Forsyth 1970, Comrie 1976, Rassudova 1977, Chvany 1983, among others). According to Wierzbicka 1967, the direct object of perfective verbs in Polish includes two elements in its semantic structure:

"the number (one thing, or one set of things) and the quantifier (all, whole). In the object of the imperfective verb neither of these elements are present" (Wierzbicka 1967:2240).

"In a sentence with an imperfective verb the object is treated as an endless 'continuum', as a 'substance without form'" (Wierzbicka 1967:2237).

For Russian, Forsyth (1970) and Chvany (1983) observe:

"[...] verb plus object in such a sentence as *on pil čaj* 'he drank tea' or 'he was drinking tea', may be looked upon as a coalesced unit in which the object has no specific reference, whereas in *on vypil čája* or *čaj* the object is specific - 'he drank the tea'" (Forsyth 1970:92).

"in sentences using the past tense there exists a general correlation between transitivity -- the expression of the *extension to a specific object of the action denoted by the verb -- and perfective aspectuality* [my emphasis]" (Forsyth 1970:91)

"Another well-known correlation in Russian is that of definite direct objects with perfective aspect, accusative case and holistic interpretation, while imperfective aspect, genitive case and partitive interpretations associate with indefiniteness" (Chvany 1983:71).

However, apart from such occasional cursory comments, there has been no attempt to

provide a systematic account of such data.

As far as the parallels between verbal morphology and determiner quantifiers and measure expressions are concerned, they are implicit in the studies on Aktionsart (German for 'manner of action'), or the classification of verbs into classes according to the affix(es) with which they are derived.<sup>1</sup> However, they have not been systematically explored. The study of 'Aktionsart' gained in prominence in the structuralist era in connection with the delimitation of the categories of 'aspect' and 'Aktionsart' and related issues (specification of aspectual pairs, existence of 'empty' prefixes, identification of the *invariant* aspectual meaning). The research on 'Aktionsart' in Slavic languages is a virtual trove of invaluable observations that concern the morphology and semantics of verbs. One of the reasons for the fact that quantificational and similar effects induced by verbal morphology on nominal arguments have not been systematically studied may be seen in the methodological assumptions of structuralism. Within structuralism, the description of derivationally related verbs is treated as a matter of isolated words and their formal relations to other isolated words. No attempt is made to account for argument structure changes induced by derivational devices, for the syntactic and semantic properties of the lexical items in the argument positions of base and derived verbs. This narrow focus of structuralism on isolated verbs is noticeable and still limits many contemporary Slavistic studies.

My approach mainly draws on two recent frameworks. The first one is Krifka's (1986, 1989 and 1992) lattice approach to the representation of the semantics of verbal and nominal predicates. Krifka provides a systematic account of the influence of nominal arguments on the telic and atelic interpretation of complex verbal predicates. He exploits the same theoretical apparatus to motivate the correlation between

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<sup>1</sup> The most comprehensive accounts can be found in the works of Isačenko (1962) and in the works of Czech linguists Dostál and Kopečný in the 1950s and 1960s. For Czech data, see also Petr (1986).

perfective aspect and definiteness in Czech.

Second, I build on the work of Partee, Bach and Kratzer (1987), Partee (1991), Bach, Jelinek, Kratzer and Partee (1995) that points at radically new ways of thinking about the relationship between syntactic categories and quantification.

These two recent frameworks differ both in their empirical scope and overall goals. Nonetheless, they both contribute in a crucial way to the solution of the puzzles posed by the data discussed in this chapter. Krifka's proposal is grounded within a semantics for noun phrases that is non-quantificational. For instance, a noun phrase like *five apples* denotes a "quantized" entity, a sum individual, and not a generalized quantifier.

The goal of Bach, Jelinek, Kratzer and Partee is to investigate how quantification and related notions are expressed by noun phrases and also by other means, outside of noun phrases. The shift of interest from noun phrase quantification to quantification by other means, in particular by verb morphology, has been accompanied by the shift of focus from English to a host of typologically distinct non-Indo-European languages that have received little attention in theoretical semantic studies. For example, Jelinek (1988 and 1995) has worked on American Indian languages (Coast Salish languages), Bittner (1994 and 1995) on Inuit (West Greenlandic dialect, Eskimo-Aleut family), and Baker (1995) on Mohawk.

The idea that verb morphology has quantificational force has also been investigated by Dalrymple, Mchombo and Peters (1994) and Mchombo and Ngunga (1994) in Bantu languages, Chicheŵa and Ciyao. In their paper "Semantic Similarities and Syntactic Contrasts between Chicheŵa and English Reciprocals", Dalrymple, Mchombo and Peters (1994), describe a similar interaction between a reciprocal quantifier marked on the verb and the noun phrase arguments in Chicheŵa. Consider the following example:

(20)

*Mbĩdzi ndĩ nkhandwe zi-ku-mény-an-a*  
 10-zebras and 10-foxes 10SM-pres-hit-RECIP-FV  
 'The zebras and the foxes are hitting each other.'

Dalrymple, Mchombo and Peters (1994) propose that the reciprocal verb affix *-an-* in Chicheŵa functions as a quantifier. The cross-linguistic investigation of reciprocals leads them to the conclusion that the semantic properties associated with reciprocals cannot be motivated by the idiosyncratic properties of the reciprocal construction in any particular language. From this they conclude that Heim, Lasnik and May's (1991) compositional interpretation of the English reciprocal sentences must be refuted.

### 5.3.1 Krifka (1986, 1989, 1992)

As has been discussed in Chapter 3, Krifka (1989:186-189; 1992:49-51) motivates the influence of nominal arguments on the telic and atelic interpretation of complex verbal predicates by assuming an event semantics with lattice structures. The contribution of nominal reference to the telicity of complex verbal predicates is characterized by establishing a mapping between algebraically structured denotations of nominal arguments and event denotata. "As the transfer of reference properties works in both directions, we should not be surprised to find the converse case as well, that is, a verbal predicate operator affecting the meaning of a nominal predicate" (Krifka 1992:49). This leads Krifka to the investigation of Czech data in which perfective aspect marked on the verb seems to be responsible for the definite interpretation of direct object noun phrases.

Krifka's account of the correlation of perfectivity with definiteness is based on two main assumptions. First, undetermined noun phrases in Czech are ambiguous between a definite and an indefinite interpretation. For example, the Czech *vino* can mean 'wine' or 'the wine'. In the definite reading, *vino* is bounded (that is, "quantized" in Krifka's terminology), while in the indefinite reading, it is unbounded

("cumulative"). Singular count nouns *hruška* can mean either 'a pear' or 'the pear' and they are bounded in both the definite and indefinite reading.

*víno*: a. 'wine' (indefinite, unbounded);  
b. 'the wine' (definite, bounded)

*hruška*: a. 'a pear' (indefinite, bounded);  
b. 'the pear' (definite, bounded)

It is also assumed that there is a syntactic rule 'noun phrase → N' allows for two different semantic interpretations, a definite and an indefinite one.

Second, the perfective operator can only be applied to a bounded verbal predicate, while the imperfective operator to an unbounded one (cf. Krifka 1989:187). In other words, perfective expressions are telic and imperfective expressions are atelic.

PERFECTIVE operator =  $\lambda P \lambda e [P(e) \ \& \ \text{BOUNDED}(P)]$

IMPERFECTIVE operator =  $\lambda P \lambda e [P(e) \ \& \ \text{UNBOUNDED}(P)]$

Given these two assumptions, let us consider the correlation between perfectivity and definiteness in such sentences as the following one:

(21)  $Vypil^P$   $víno.$   
 PREF-drank-3SG-MASC wine-SG-ACC  
 'He drank up (all) the wine.'

Krifka suggests that such Czech data can be described in a compositional way, "although the phenomenon itself seems not to be compositional at first sight" (Krifka 1992:50). Perfective aspect forces a bounded interpretation of the complex verbal predicate, and consequently the complex verbal predicate forces a bounded interpretation of the object noun phrase linked to the Gradual Patient (cf. Krifka 1992:50). From this it follows that undetermined noun phrases with mass and plural nouns will have a definite interpretation, "as this is the only quantized [i.e., bounded, HF]

interpretation" (Krifka 1992:50) for such noun phrases, "the perfective aspect is only compatible with the definite interpretation of the object" (Krifka 1992:50). In perfective sentences, "the unwelcome reading [of *víno* 'wine'] is excluded by general principles, just as in *rob the bank* the unwelcome readings of *bank* are excluded by the lexical meaning of *rob*" (Krifka 1992:50). At the same time, "If we assume the normal transfer of properties for the object role of verbs like *eat* and *drink*, then we see that only with a bounded object the complex verbal predicate will be bounded as well" (Krifka 1992:50).

Krifka provides the first systematic account of the correlation of perfective aspect with the definite direct object. His main contribution is to relate this phenomenon to a particular thematic role, his Gradual Patient (in Dowty's terminology used here, 'Gradual Patient' corresponds to 'Incremental Theme'). However, his account is flawed in two main respects. First, the assumption that undetermined noun phrases in Czech are ambiguous between a definite and an indefinite interpretation is empirically unmotivated. For the same reason that it is empirically and theoretically inadequate to limit the definite and indefinite interpretation of noun phrases to its formal expression by means of articles within noun phrases, it is also inadequate to associate the definite and indefinite interpretation directly with the senses of undetermined noun phrases in those languages that have no overt article system.

"The article is only one of several morphosyntactic contexts from which the cluster of meanings grouped together as D/I may be derivable in whole or in part. It is therefore essential to separate the manifestations of D/I from the semiotic value of the article" (Chvany 1983:72).

The categories 'definite' and 'indefinite' are reflected in linguistic structure "via lexical and grammatical properties that tend to cluster together" (Chvany 1983:75). They are reflected "not only in the determiners and cases of nouns, but also in other categories (aspect, tense, mood) where D/I meanings appear as contextual, non-primary functions" (Chvany 1983:86). The category definite/indefinite cannot "be uniquely associated with any particular form, including the article, for D/I pervades

all areas of language" (Chvany 1983:75).

The second objection concerns the semantic distinction bounded-unbounded, Krifka's "quantization" and "cumulativity", and its application in the description of verbal expressions. There is a general agreement that perfective aspect forces a bounded (telic) interpretation of the complex verbal predicate. However, it cannot be assumed that imperfective aspect forces an unbounded (atelic) interpretation of the complex verbal predicate. The reason is that it seems to lead to a wrong account of telic imperfective sentences like the following one:

- (22) *Psát<sup>I</sup> dopis.*  
 wrote-SG letter-SG-ACC  
 'He was writing a/the letter.'  
 'He wrote a/the letter.'

Krifka's (and Dowty's) homomorphism hypothesis (cf. Chapter 3) predicts that the predicate *psát<sup>I</sup> dopis* is telic, because 'write' entails a homomorphism and the noun phrase associated with its Incremental Theme, 'a/the letter', is bounded.

However, contrary to this result, if the imperfective operator were only applicable to atelic (or cumulative) verbal predicates, as Krifka assumes, then *psát<sup>I</sup> dopis* 'write/be writing a/the letter' would have to be atelic. Along the same lines as suggested for perfective sentences, the analysis for the above sentence would come out as follows: Given that the imperfective aspect forces an unbounded ("cumulative") interpretation of the complex verbal predicate, the complex verbal predicate will again force an unbounded ("cumulative") interpretation of the object noun phrase. Does it mean that the singular count noun phrase *kniha* 'book' is cumulative in the above example? It would be counterintuitive to assume that singular count noun phrases like *dopis* 'letter' that are linked to the Incremental Theme undergo a 'count-to-mass' shift in the scope of the imperfective operator. This suggests that we need to abandon the claim that the imperfective operator is only applicable to atelic verb

predicates.

What we have in the above sentence is, of course, an example of the well-known 'imperfective paradox' (cf. Dowty 1972, 1977, 1979) or 'imperfective puzzle' (cf. Bach 1986). Any adequate description of such telic imperfective sentences must account for the fact that a verb phrase like *psát<sup>I</sup> dopis* 'write/be writing a/the letter' is telic. At the same time, it must account for the contribution of (the progressive use of) the imperfective aspect: *psát<sup>I</sup> dopis* 'write/be writing a/the letter' carries no entailment that the result state inherent in the semantic description of the telic predicate was (or ever will be) reached.

The two-way distinction between bounded ("quantized") and unbounded ("cumulative") predicates that Krifka's analysis presupposes does not seem to be sufficient to account for all the relevant data. It is essential to draw a clear line between telic verbal expressions, on the one hand, and the *partitivity* associated with the semantics of imperfective aspect, on the other hand.

### 5.3.2 D-quantification and A-quantification: Partee, Bach and Kratzer (1987), Partee (1991a, 1991b).

Partee, Bach and Kratzer (1987) take a fresh look at the study of quantification and initiate a research that is remarkable both in its empirical scope and in the fundamental theoretical questions they pose. Partee, Bach and Kratzer (1987) propose to investigate the similarities and differences, within one language and across languages, in the structure and interpretation of quantification expressed within noun phrases and by various means that are not located within noun phrases. They suggest that in syntax we may distinguish two distinct strategies for the expression of quantification: D-quantification and A-quantification. 'D' is mnemonic for Determiner and 'A' for the cluster of adverbs, auxiliaries, verb affixes, etc., all of which serve to express



quantification by non-noun phrase means.

(23) **D-quantification** is typically expressed in the noun phrase with determiner quantifiers like *every, most* ('D' stands for Determiner).

**A-quantification** is typically expressed at the level of the sentence or VP with sentence adverbs ("adverbs of quantification", such as *usually, always, in most cases*; cf. Lewis (1975)), "floated" quantifiers (*each*), verbal affixes, auxiliaries, and various argument-structure adjusters. ('A' stands for Auxiliary, Adverb, Argument-structure Adjuster, etc.)

According to Partee, A-quantification is a heterogeneous class and it subsumes a variety of phenomena that can be divided into

(i) "true A-quantification, with unselective quantifiers and a syntactic basis for determining, insofar as it is determinate, what is being quantified over, and

(ii) lexical quantification, where an operator with some quantificational force (and perhaps further content as well) is applied directly to a verb or other predicate at a lexical level, with (potentially) morphological, syntactic, and semantic effects on the argument structure of the predicate" (Partee 1991a:19).

D-quantification and A-quantification are associated with different quantificational ontologies. Partee (1991b) suggests that D-quantifiers primarily quantify over individuals and A-quantifiers over cases, events, or situations.

category of expression of the language	domain of quantification
<b>D-quantifiers</b> determiners: <i>every, most</i>	<b>individuals</b>
<b>A-quantifiers</b> adverbs - frequency: <i>always, usually</i> - iterative: <i>twice, several times</i> - generic: <i>generally, habitually, normally</i> auxiliaries verbal affixes	<b>cases, events or situations</b>

D-quantification and A-quantification are often interchangeable from a truth-

functional point of view, as in English examples with *every* and *always*, for example (cf. Partee 1991b:10 and 12).

Within the class of A-quantification, Partee and her colleagues take adverbs of quantification as the paradigm case (cf. Partee 1991a:3). Consider the following examples with the temporal adverbs of frequency *usually* and *always*:

(24-a) *A philosopher usually has many objections.*

(24-b) *Most philosophers have many objections.*

(25-a) *A philosopher always has many objections.*

(25-b) *All philosophers have many objections.*

Traditional grammars treat adverbs of frequency like *usually* as temporal adverbials that indicate the quantity of the relevant times at which some event takes place. In other words, on this traditional view, adverbs like *usually* quantify over times. However, David Lewis (1975) proposed that adverbs of frequency like *usually* do not just quantify over times (or occasions, events or situations), but they also function like quantifiers over individuals. That is, they function with respect to nouns as determiners like *most* do with respect to common nouns in a noun phrase construction. Notice that *A philosopher usually has many objections* means that most philosophers have many objections. This sentence does not mean that there are philosophers that usually have many objections or that usually there are philosophers that have many objections. In other words, *A philosopher usually has many objections* and *Most philosophers have many objections* have the same propositional content. Heim (1982) and de Swart (1993) build on Lewis's (1975) suggestions and treat adverbs frequency and determiner quantifiers essentially in the same way.<sup>2</sup>

<sup>2</sup> Frequency adjectives and frequency adverbs (or "adverbs of quantification") behave syntactically as X/X adjectives and adverbials, but they do not have the typical semantic properties of a modifier. Both the adjectives and adverbs intuitively describe pluralities of events or situations. Although *Philosophers argue about quantifiers* will be true if *Philosophers always argue about quantifiers* is, the relation is not an implicational one, such as found, for

## Chapter 5. Verbal Morphology and Nominal Reference in Czech: 352

Heim (1982) also notices semantic parallels between modal verbs and quantification. Consider the following pair of sentences:

- (26-a) *Necessarily, John will be fired.*  
 (26-b) *John must leave.*

Partee (1991a) draws attention to 'lexical quantification' induced by verb morphology and points out that it differs from the quantification induced by sentential adverbs, such as *always*, in that semantic effects of verb morphology are "directed to a specific argument or arguments of the verbs" (p. 10). She illustrates it with examples from such typologically distinct languages as Czech and Warlpiri. In Czech, "an operator with some quantificational force (and perhaps further content as well) is applied directly to a verb or other predicate at a lexical level" (Partee 1991a:19) seem "best analyzed as an operation on the argument structure of the verb with a corresponding semantic operation on the interpretation" (Partee 1991a:19). She illustrates this point with the Czech prefix *po-*. Consider the following examples:

- (27-a)
- |  |                |            |                |
|--|----------------|------------|----------------|
| <i>Maloval<sup>I</sup></i>                     | <i>hesla</i>   | <i>(na</i> | <i>stěnu).</i> |
| painted-3SG                                    | slogans-PL-ACC | (on-PREP   | wall-SG-ACC)   |
| 'He painted (the/some) slogans (on the wall).' |                |            |                |
- (27-b)
- |                                       |              |                    |
|---------------------------------------|--------------|--------------------|
| <i>Pomaloval<sup>P</sup></i>          | <i>stěnu</i> | <i>(hesly).</i>    |
| PREF-painted-3SG                      | wall-SG-ACC  | (slogans-PL-INSTR) |
| 'He covered the wall (with slogans).' |              |                    |

The prefix *po-* can be applied to verbs that belong to the family of writing, drawing, etc. The resulting perfective verb takes as its direct object the optional locative

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example, in *Philosophers argue passionately* and *Philosophers argue*. The adverb of frequency like *always* describes a quantity of events, rather than adding a further specification to the identity of the event itself. The same can be said with respect to the frequency adjectives. Adverbs of quantification differ from other adverbials in semantic type, but not in syntactic category. Consequently, the functional relation between syntactic category and semantic type as in classical Montague Grammar cannot be maintained in the analysis of adverbs of quantification. Syntactically, they behave as expressions of category S/S and are interpreted as quantifiers that establish a relation between two sets of events or situations. They behave like quantifiers over occasions, events or situations (cf. also de Swart 1993:7).

complement of the original imperfective verb (what one writes on, etc.) and it does not allow any overt expression of the original direct object (what is written, etc.):

- (27-c)
- |                               |                       |                 |                     |
|-------------------------------|-----------------------|-----------------|---------------------|
| <i>*Pomaloval<sup>P</sup></i> | <i>hesla</i>          | <i>(na</i>      | <i>stěnu).</i>      |
| <i>*PREF-painted-3SG</i>      | <i>slogans-PL-ACC</i> | <i>(on-PREP</i> | <i>wall-SG-ACC)</i> |

The meaning is 'write all over X' or 'cover X with writing', etc., "a meaning which is in a certain sense quantificational but is certainly to be captured at a lexical rather than a syntactic level" (Partee 1991a:19).

A similar interaction between verbal morphology and nominal arguments that can be observed in Slavic languages like Czech seems to take place in two Australian languages, Warlpiri and Gun-djeyhmi. Consider, for instance, the following Warlpiri example with the partitive preverb *puta-*, *yarda-* 'again', 'another' (repetitive) and the Gun-djeyhmi prefix *-GJANGGED-* 'be in a bunch', 'be in a mob of':

- (28)
- |              |             |                      |
|--------------|-------------|----------------------|
| <i>Ngapa</i> | <i>o-ju</i> | <i>puta-nga-nja.</i> |
| water        | AUX-1SG     | PART-drink-IMP       |
- 'Just drink some (not all) of my water!'

- (29)
- |                        |                     |                               |
|------------------------|---------------------|-------------------------------|
| <i>Warna-ku-yijala</i> | <i>kaji-rna-rla</i> | <i>yarda-rdipi,</i>           |
| snake-DAT-TOO          | COMP-1sg-DAT        | REP-encounter(-noun phraseST) |
- 
- |                  |               |                   |                   |
|------------------|---------------|-------------------|-------------------|
| <i>angula-ji</i> | <i>ka-rna</i> | <i>pi-nja-rla</i> | <i>nga-rni.</i>   |
| that-TOP         | PRES-1SG-3SG  | kill-INF-CONTEMP  | eat-noun phraseST |
- 'When I come upon another snake, I kill it and eat it.'

- (30)
- |                |                        |
|----------------|------------------------|
| <i>Guluban</i> | <i>ga-djangged-di.</i> |
| flying.fox     | 3SG-mob-stand          |
- 'There's a big mob of flying foxes.'

(The above data was collected by Nicholas Evans and reported in Partee 1991a:17-18).

Evans (cited in Partee 1991a) argues that many of the A-quantifiers expressed by preverbs or verbal prefixes in Warlpiri and Gun-djeyhmi do not function as unselective quantifiers. They do not quantify over an event argument only, but rather they show varying particular patterns of thematic affinity. He observes that there is

considerable variation in the particular thematic affinities or "scope" preferences that different A-quantifiers manifest. Evans identified four patterns of thematic affinity: actor/subject scope ("acting together, all doing the same thing"), absolutive scope ("completely", "fully"), VP or verb plus object scope ("again/ another/ repetitive").

The investigation of the structure and interpretation of D-quantification and A-quantification provides evidence about the semantics domains of a particular language and also for the existence and nature of semantic universals. The research of Partee, Bach and Kratzer (1987), Partee (1991a and 1991b), and others (cf. Davidson 1967a, Langacker 1987, for example), sheds a new light on the relation between the syntactic N-V distinction and the ontology of individuals and events or situations.

Another important result of this research is the finding that languages differ in their preferences for D-quantification or A-quantification. Some languages seem to lack D-quantification (cf. Jelinek (1988) on Coast Salish; Baker (1991) on Mohawk; Bach, Jelinek, Kratzer and Partee 1995)). By contrast, A-quantification seems to be universal. This finding contradicts Barwise and Cooper's (1981) noun phrase categorical universal within the generalized quantifier approach.

Given that D-quantification is not universal, the question arise what are the possible noun phrase-types in natural languages. It is not clear whether there is some kind of quantification that every language employs (In Partee, Bach and Kratzer (1987), it is assumed there is probably no truly universal type of quantification, while in Partee (1991a:1) this question remains open.) As Partee observes, "[t]he study of non-noun phrase quantification is important as a counterbalance to the nearly exclusive concentration on noun phrase quantification in most of the previous syntactic and semantic literature. In fact many more such examples will be needed to provide a broad basis for typological generalizations and implicational universals" (Partee 1991a:8).

## 5.4 Suggested Analysis

### 5.4.1 Incremental Theme Hypothesis

All the examples in which aspectual operators and derivational verbal affixes seem to behave like quantifiers with respect to nominal arguments share one striking commonality: the relevant nominal arguments denote an object with a part-whole structure that is subjected to the event part by part or degree by degree. In other words, the relevant object corresponds to the Gradual Patient (cf. Krifka 1986, 1989, 1992) or Incremental Theme (cf. Dowty 1988 and 1991). I propose the following hypothesis:

In Slavic languages verbal morphology constrains the interpretation of the Incremental Theme argument. Perfective and imperfective aspectual operators as well as specific verbal affixes stand in a similar relation to the Incremental Theme argument as determiner quantifiers do to the nouns with which they are combined.

*Corollary 1:* The perfective operator functions as a universal quantifier over the denotation of the Incremental Theme argument. From this it follows that the perfective operator is correlated with a bounded Incremental Theme argument.

*Corollary 2:* The imperfective operator induces a partitive interpretation of the Incremental Theme argument (under a single event interpretation).

*Corollary 3:* Derivational verbal affixes often incorporate various quantificational notions, such as 'distributivity', '(small/sufficiently large) quantity', 'partitivity'. Derivational affixes function as quantifiers over the

denotation of the Incremental Theme argument of the perfective and imperfective verbs they serve to derive.

It must be emphasized that the Incremental Theme Hypothesis concerns simple past tense clauses that denote single events.

Derivational affixes that serve to derive perfective and imperfective verbs are operators over episodic predicates. This is motivated by the observation that verbs denoting episodic situations, states and non-states have derived perfective counterparts, and often also secondary imperfective counterparts (cf. also Chapter 4). By contrast, verbs denoting static states such as *mít<sup>I</sup> rád* 'love', 'like', are simple imperfective verbs that have no perfective and (consequently) no secondary imperfective counterparts. (Such verbs have derived habitual counterparts. As I have shown elsewhere (Filip 1994a), the habitual suffix *-va-* can be only applied to episodic predicates or predicates that are construed as episodic.)

The aspectual operators, perfective and imperfective, are sentential operators with one main function each. There is independent evidence for regarding aspect as a sentential operator from other languages with the grammatical category of aspect. In English, for example, the applicability of the progressive aspect depends on the telicity type of the whole sentence to which it applies, and because this may be a function of the subject of the sentence, the progressive is an operation on sentences, not on verbs or verb phrases. In Chapter 4, I propose that in Slavic languages the perfective aspect has a holistic meaning ('situation viewed in its entirety') and the imperfective aspect has a partitive meaning, whereby 'partitivity' is understood in the sense of an 'improper-part' relation. Due to the presence of the perfective operator the proposition concerns all the parts of the referent denoted by the Incremental Theme argument. This explains that the perfective operator has an effect similar to universal quantification over the Incremental Theme argument. Similarly, due to the presence

of the imperfective operator and certain contextual factors the proposition may concern only a part (but not all) of the referent denoted by the Incremental Theme argument. This gives rise to a partitive interpretation of the Incremental Theme argument.

In addition, verbal affixes that derive perfective and imperfective verbs, seem to behave like determiner quantifiers with respect to the Incremental Theme argument, despite their primary function as operators over entities in the domain of situations.

The Incremental Theme argument is associated with a participant that plays a very specific role in the denoted situation: it takes part in the situation part by part, or it incrementally changes degree by degree, and it is intrinsically tied to the delimitation of the denoted event. The Incremental Theme Hypothesis amounts to the claim that the quantificational and related effects over individuals derive from the role they play in the denoted situations. A similar suggestion seems to have been made by Hale with respect to preverbs in Warlpiri and their function as event and nominal quantifiers.<sup>3</sup>

This hypothesis has the advantage that it provides a uniform account of the apparent variability in the "scope preferences" of verb affixes. It builds on the parallels between the domains of situations and individuals and parallels between verbal and nominal expressions that were independently observed and explicitly described in terms of lattice structures.

#### 5.4.2 Perfective Aspect and the Semantics of Nominal Arguments

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<sup>3</sup> "Although the translations of Warlpiri examples may often make it appear as though a particular argument is being quantified over, Hale believes it is more appropriate to consider these preverbs to be quantifying over whole events, and that the appearance of quantification over arguments follows from the role played by various participants in the events" (Partee 1991a:16-7).



### 5.4.2.1 Perfective Aspect and Undetermined Mass and Plural Noun Phrases

Consider the following example:

- (31)  $Vypil^P$   $víno.$   
 PREF-drank-3SG wine-SG-ACC  
 'He drank up (all) the wine.'

The above sentence entails that the denoted situation was completed when all the (contextually determined) portion of wine was consumed. The prefixed verb  $vypil^P$  contributes the holistic meaning to the interpretation of the sentence, it means 'drink completely', 'finish drinking' or 'drink up'. At the same time, the perfective operator carried by the perfective verb can be viewed as modifying the argument 'wine' in a way that is comparable to the combined effects of the determiners *all* and *the*: 'all the wine'. Notice that we cannot assert without contradiction:

- (32) \* $Vypil^P$   $víno$  z této sklenky, ale trochu vína v ní, ještě je. \*'He drank up the wine from this glass, and yet there still is some wine in it left.'

In a simplified fashion we can represent this situation as follows: [*HOL-verb* 'wine'] amounts to  $HOL(\text{verb}) + HOL(\text{'wine'}) = HOL(\text{verb} + \text{'wine'})$ . "HOL" stands for the holistic meaning associated with perfective verbs.

The function of the perfective operator as a quantifier of the nominal argument 'wine' can be represented as follows:

- (33)  $[HOL_y: \text{wine}'(y)] \text{drink}'(x_1, y)$

y: Incremental Theme

$x_1$ : Agent

Generally, this may be expressed as follows:

(34) [HOL<sub>y</sub>: P(y)] R(x<sub>1</sub>,y)

In the case of quantification triggered by verbal aspect the scope-bearing element is incorporated in a verb. Both the aspectual operator and noun phrase are used to signify that a free variable is introduced into the scope of quantification. The quantification is restricted, ranging only over members of a group of individuals that satisfy the property P.  $P(y)$  indicates what kind of object is allowed to be substituted for  $y$ .  $R(x_1, y)$  is the propositional function into which the substitution is made. The open proposition  $R(x_1, y)$  constitutes the scope of the aspectual operator. It constitutes the local domain over which the aspectual operator extends its semantic effects. This is to be expected given that the verb and its arguments are in the relation of predication and given that the predication is necessarily a local relationship. The range of the aspectual operator is restricted to those individuals that satisfy the formula immediately following the restricting formula [*ASPECTUAL OPERATOR*<sub>y</sub>:  $P(y)$ ]. The aspectual operator requires that the assignments of values to  $y$  that satisfy the restricting formula must also satisfy what follows:  $R(x_1, y)$ .

The subscript on an aspectual operator indicates what variable it is associated with. I propose that the variable subscript is predictable from the properties of the rest of the structure. The aspectual operator is associated with that variable that corresponds to the Incremental Theme argument of the predicate in the formula  $R(x_1, y)$ .

Every occurrence of the variable is part of the structure that the aspectual operator which is associated with the variable (and which binds the variable) governs. In other words every occurrence of the variable is in the scope of the aspectual operator which binds the variable. Coherence conditions on closed sentences can be characterized as follows (modified version of McCawley's (1981:96) coherence conditions):

- (35) The variables in a closed sentence are combined coherently if
- a. every occurrence of a variable is commanded by exactly one ASPECTUAL OPERATOR that has that variable as a subscript; and
  - b. in every [ASPECTUAL OPERATOR] S combination, both the ASPECTUAL OPERATOR and the S contain occurrences of the variable with which the ASPECTUAL OPERATOR is subscripted.

Let us go back to our initial examples. In Chapter 4, it has been suggested that [PERFECTIVE  $\phi$ ] presents a situation as a single whole, in its entirety. In general, if an entity, a situation or an object, is viewed in its entirety, there must be some limits imposed on its (temporal or spatial) extent, it must be bounded. We can capture this observation by the following entailment:  $HOL(P) \rightarrow BOUNDED(P)$ .

The observation that a perfective operator functions as a modifier of the noun phrase *víno* 'wine' can be explained, if we assume that *vypít*<sup>P</sup> 'drink up' is a homomorphic predicate mapping the described situation and its parts into some quantity of wine and its parts (cf. Krifka's lattice approach in Chapter 3). Consequently, if the perfective verb has a holistic, and hence bounded interpretation, the Incremental Theme 'wine' will have a holistic and bounded interpretation. In other words given that a perfective sentence expresses a proposition that concerns all the parts of the portion referred to by the Incremental Theme argument, the perfective operator has an effect similar to universal quantification over the Incremental Theme argument. In order to assign a holistic interpretation to a mass noun like 'wine', we interpret it as referring to a bounded portion of wine. In other words, the understanding of the Incremental Theme 'wine' as a universally quantified noun phrase in the scope of the perfective operator also presupposes that 'wine' undergoes a mass to count 'shift' in the scope of the perfective operator. It would be impossible to make an assertion about a whole entity if we did not assume that there are some limits to it.

## Chapter 5. Verbal Morphology and Nominal Reference in Czech: 361

The lexical semantics of the prefix *vy-* contains no specific information concerning quantity, number or measure. In such a case the only semantic element of the perfective verb that will be 'transferred' onto the Incremental Theme argument will be the holistic meaning.

The interpretive rules for the integration of a perfective verb with an undetermined mass noun phrase linked to the Incremental Theme are clearly *asymmetric*. It is the perfective verb alone that carries all the relevant information about both aspect and telicity. The perfective verb identifies the type of situation and it also entails that it is viewed in its entirety, and hence that it is bounded. By contrast, the undetermined mass noun phrase only identifies some stuff without giving any indication about its boundaries. Hence, the verb alone determines the bounded interpretation of the sentence and of the Incremental Theme argument.

The same asymmetric rules operate in the interpretation of perfective sentences with undetermined plural noun phrases, such as the following one:

- (36)
- |                           |                |
|---------------------------|----------------|
| <i>Snědl</i> <sup>P</sup> | <i>ořechy.</i> |
| PREF-ate-3SG              | nuts-PL-ACC    |
| 'He ate (all) the nuts.'  |                |

This sentence entails that the situation came to an end when all the nuts were consumed. Here, the direct object noun phrase 'nuts' refers to a certain (contextually determined) set of nuts taken as a sum object which was entirely subjected to the event. Again, this amounts to the effect similar to universal quantification.

The Incremental Theme hypothesis proposed here correctly predicts that the perfective aspect does not induce a holistic, universal-quantifier like, interpretation of the direct object argument in the following sentence:

- (37)
- |                             |                    |               |
|-----------------------------|--------------------|---------------|
| <i>Uslyšel</i> <sup>P</sup> | <i>(na chodbě)</i> | <i>hlasy.</i> |
| PREF-heard-3SG              | (on corridor)      | voices-PL-ACC |

'He (suddenly/unexpectedly) heard (some) voices (in the corridor).'

Here, the perfective operator contributes the holistic meaning to the interpretation of the whole sentence. However, it does not function as a modifier of the direct object noun phrase 'voices', because 'voices' is not associated with the Incremental Theme role, but rather with the Stimulus role. With verbs of perception, the question whether a part or whole stimulus is perceived does not arise. If there are some voices that are the Stimulus of a hearing event, then all of those voices are the voices that the Experiencer participant hears.

To take another example, let us consider the following sentence in which the direct object noun phrase 'coal' is associated with the traditional Theme or Patient role.

(38) *Přinesl<sup>P</sup> (ze sklepa) uhlí.*  
 PREF-carried-3SG (from basement) coal  
 'He brought (the/some) coal (from the basement).'

The noun phrase 'coal' is not the Incremental Theme, since it is not the amount (or any other property) of coal that is intrinsically tied to the delimitation of the denoted motion event. Although 'coal' denotes an entity with a part-whole structure, the part structure of coal is not mapped into the part structure of the situation. If somebody carries a certain amount of coal, then the whole amount of coal is carried, regardless whether the event is in progress or completed. The incremental object that stands in a one-to-one relation to the event is the Path. The prepositional phrase 'from the basement' indicates its starting point. The above sentence entails that the Agent traversed the whole Path. In other words, the holistic effect of the perfective operator *při-* concerns the Incremental Path Theme. Due to the fact that the direct object 'coal' is not the Incremental Theme and also due to the coherence conditions, the perfective aspect does not induce a holistic interpretation of the direct object 'coal'.

The Incremental Theme hypothesis according to which the perfective operator imposes a holistic interpretation only on the denotation of the Incremental Theme

argument, but not over the denotation of other arguments can also be illustrated by the following examples:

- (39-a)
- |                                  |                |                     |
|----------------------------------|----------------|---------------------|
| <i>Napsal<sup>P</sup></i>        | <i>dopisy</i>  | <i>(inkoustem).</i> |
| PREF-wrote-3SG                   | letters-PL-ACC | (ink-SG-INSTR)      |
| 'He wrote the letters (in ink).' |                |                     |

This sentence entails

- (39-b)
- |                                      |                |                |                     |
|--------------------------------------|----------------|----------------|---------------------|
| <i>Napsal<sup>P</sup></i>            | <i>VŠECHNY</i> | <i>dopisy</i>  | <i>(inkoustem).</i> |
| PREF-wrote-3SG                       | all-PL-ACC     | letters-PL-ACC | (ink-SG-INSTR)      |
| 'He wrote all the letters (in ink).' |                |                |                     |

However, (a) does not entail that the Agent used all the ink to write the letters. In fact, the optional instrumental complement cannot be modified with the determiner quantifier 'all', as (c) shows:

- (39-c)
- |   |                |                 |                    |
|---|----------------|-----------------|--------------------|
| <i>Napsal<sup>P</sup></i>                         | <i>dopisy</i>  | <i>(?*VŠÍM</i>  | <i>inkoustem).</i> |
| PREF-wrote-3SG                                    | letters-PL-ACC | (?*all-SG-INSTR | ink-SG-INSTR)      |
| 'He wrote the/some letters (?*with all the ink).' |                |                 |                    |

In order to express that all the ink was used to write the letters, we would have to use a different prefixed verb, namely *vypsát* with the meaning 'to use completely up by writing' that takes as its direct object/Incremental Theme the optional instrumental complement of the simplex verb *psát* 'to write', as (d) shows:

- (39-d)
- |  |                      |                |                 |
|--|----------------------|----------------|-----------------|
| <i>Vypsál<sup>P</sup></i>                        | <i>(na dopisech)</i> | <i>VŠECHEN</i> | <i>inkoust.</i> |
| PREF-wrote-3SG                                   | (on letters)         | all-SG-ACC     | ink-SG-ACC      |
| 'He used up all the ink (to write the letters).' |                      |                |                 |

#### 5.4.2.2 Perfective Aspect and Singular Count Noun Phrases

The following example contains a perfective verb with a singular count noun phrase linked to the Incremental Theme argument:

- (40)
- |                           |               |
|---------------------------|---------------|
| <i>Napsal<sup>P</sup></i> | <i>dopis.</i> |
| PREF-wrote-3SG            | letter-SG-ACC |

'He wrote (up) a/the (whole) letter'.  
'He finished writing a/the (whole) letter'.

The situation necessarily ends when the writing of the whole letter is completed. Hence, since *dopis* 'a/the letter' is a bounded noun phrase, the whole sentence is telic, as is predicted by Krifka's and Dowty's account. In addition, due to the perfective verb, the sentence has a holistic entailment: it entails that the entire letter came into existence. Since *dopis* 'letter' is an inherently bounded noun, the perfective operator does not induce any shift in its sortal properties. The perfective operator only has a holistic effect over the Incremental Theme argument.

The Incremental Theme hypothesis predicts that the perfective aspect does not have an effect similar to universal quantification over direct objects in such sentences as: *Poplácal<sup>P</sup> ho po rameni* - 'He patted him on the shoulder.' This is explained if we assume that the direct object pronoun *ho* 'him' refers to an individual with a part-whole structure, but the verb is not homomorphic and hence there is no correlation between the parts of the individual denoted by 'him' and the parts of the event.

### 5.4.3 Imperfective Aspect and the Semantics of Nominal Arguments

#### 5.4.3.1 Imperfective Aspect and Undetermined Mass and Plural Noun Phrases

The imperfective aspect in Slavic languages has a wide range of uses. It can be used to express on-going processes (progressive use), to name the type of situation ('general factual' or 'simple denotative' use) and even to denote single completed situations. Therefore, as has been proposed in Chapter 4, the partitivity involved in imperfectivity in Slavic languages is to be understood in terms of an *improper part* relation, rather than in terms of a *proper part* relation involved in the English progressive.

For the sake of simplicity, let us consider the progressive use of the imperfective. Consider the following sentence:

- (41)
- |                                    |              |
|------------------------------------|--------------|
| <i>Pil<sup>I</sup></i>             | <i>víno.</i> |
| drank-3SG                          | wine-SG-ACC  |
| 'He was drinking (some/the) wine.' |              |

In its progressive use, the above sentence entails that at some point in the past some 'wine-drinking' situation was "in progress". If the exact identity and quantity of wine is irrelevant for the purpose of communication, the function of the noun phrase 'wine' is primarily to supply a further specification to the identity of the situation. The assertion concerns some wine or other out of some unspecified larger quantity of wine that was involved in the denoted situation. However, the above imperfective sentence can also be felicitously uttered in a situation in which 'wine' designates some specific wine in the domain of discourse. The proposition then concerns a sub-portion out of the known quantity of wine.

In any case, the imperfective operator functions as a partitive quantifier over the episodic predicate and, at the same, as a partitive quantifier over the direct object noun phrase 'wine'. Roughly, an expression like [*PART-verb* + 'wine'] amounts to *PART(verb) + PART('wine') = PART(verb + 'wine')*.

The motivation for this behavior is seen in the in the lexical semantic properties of the homomorphic predicate *pil<sup>I</sup>*. The homomorphic predicates establishes a mapping between the part structure of 'wine' and the part structure of the drinking event. Since *pil<sup>I</sup>* has a partitive meaning, the Incremental Theme 'wine' has a partitive interpretation as well.

It has been argued that homomorphic imperfective verbs, or verbs that describe incremental situations, are indeterminate with respect to telicity. In the most simple case, telicity of the whole complex predicate is a composite function of the



boundedness properties of the verb and the Incremental Theme argument (cf. Krifka 1986, 1989, 1992; Dowty 1988 and 1991). *Pil*<sup>I</sup> and 'wine' each have a partitive interpretation. The existence of a part of an entity does not generally presuppose the existence of a whole bounded entity, rather it merely allows for the possible existence of a (contextually) relevant additional continuation or quantity. Hence, if *pil*<sup>I</sup> and 'wine' have a partitive interpretation, they need not be bounded. Since 'wine' is inherently unbounded, it retains its inherent unbounded property. Following Krifka's and Dowty's account of telicity, this motivates the observation that the verb phrase *pil*<sup>I</sup> *víno* is unbounded (or atelic).

It is easy to see that the same line of reasoning can be applied to interpret undetermined plural noun phrases in imperfective sentences (in a progressive use) like the following one:

- (42)
- |   |                |
|---|----------------|
| <i>Jedl</i> <sup>I</sup>                                      | <i>ořechy.</i> |
| ate-3SG   | nuts-PL-ACC    |
| 'He was eating (some/the) nuts. / ('He ate (some/the) nuts.') |                |

#### 5.4.3.2 Imperfective Aspect and Singular Count Noun Phrases

The following imperfective sentence contains a bounded Incremental Theme argument:

- (43)
- |                                |               |
|--------------------------------|---------------|
| <i>Psal</i> <sup>I</sup>       | <i>dopis.</i> |
| wrote-3SG                      | letter-SG-ACC |
| 'He was writing a/the letter'. |               |

Since 'dopis', the Incremental Theme is bounded, the whole imperfective sentence is bounded or telic.

In its progressive use, the imperfective sentence asserts that a part of the situation took place. Under the most natural interpretation, this means that a part of the letter came into existence. The speaker is not committed to the existence of a

complete letter, and in general, to any particular outcome of the denoted situation. Due to the presence of the imperfective operator, the proposition does not concern all the parts of the entity denoted by the Incremental Theme argument. This amounts to the partitive interpretation of the Incremental Theme argument.

The imperfective operator functions as a partitive quantifier only with respect to the Incremental Theme argument, but not with respect to other arguments. For example, take a situation in which somebody is holding a book in his hand.

- (44)
- |  |          |             |               |
|--|----------|-------------|---------------|
| <i>Držel<sup>I</sup></i>                 | <i>v</i> | <i>ruce</i> | <i>knihu.</i> |
| held-SG                                  | in-PREP  | hand-LOC    | book-SG-ACC   |
| 'He was holding a/the book in his hand.' |          |             |               |

The question to which extent the book was subjected to the holding event, whether a part of a book or a whole book, does not arise. Therefore, the above imperfective sentence, even in its progressive reading, does not entail that only a part of the book was subjected to the event of holding, while other parts were not.

#### 5.4.4 Aspect and (In)definiteness

##### 5.4.4.1 Perfectivity and Definiteness

One of the advantages of the present account is that it provides a systematic explanation for the well-known correlation of perfective aspect with definite direct objects. It motivates not only those cases in which the perfective aspect *must* be correlated with definite objects, but also those cases in which the perfective aspect *must not* or *need not* be correlated with definite direct objects.

Just as in Krifka (1986, 1989, 1992), so in my account the influence of aspectual operators on the referential properties of nominal arguments is lexically determined. The aspectual operators extend their semantic effects over the Incremental Theme argument. The correlation of the perfective aspect with definite direct objects is

restricted to only a narrow class of direct objects, to *undetermined mass and plural direct objects* that are linked to the *Incremental Theme* argument. My account differs from Krifka's in the following respects:

First, I draw a clear line between the 'bounded vs. unbounded' distinction (Krifka's "quantized/cumulative" distinction) and aspect.

Second, I assume that undetermined noun phrases in Czech are not ambiguous between a definite and an indefinite interpretation. Rather, undetermined noun phrases in languages that lack overt article systems are unspecified with respect to (in)definiteness.

Third, the 'definite vs. indefinite' distinction is orthogonal to the 'bounded vs. unbounded' distinction. In particular, undetermined mass noun phrases in Czech do not have the 'indefinite and unbounded' meaning as one of their meanings. There is no necessary correlation between an indefinite and unbounded interpretation of undetermined mass and plural noun phrases.

Fourth, I propose that the perfective and imperfective aspectual operator requires a partitive and a holistic interpretation of the *Incremental Theme* argument, respectively.

Fifth, the correlation of the perfective aspect with definite direct objects is epiphenomenal. It is mediated through the holistic interpretation assigned to the *Incremental Theme* argument by the perfective operator. In other words, the perfective operator itself does not require that such direct objects be definite. Rather it only requires that they have a holistic (and therefore also bounded) interpretation.

Sixth, the correlation of perfective aspect with a definite direct object noun phrase is weakened or blocked if it is not the perfective aspect alone (by virtue of its universal effect) that enforces the bounded interpretation of the direct object noun phrase (*Incremental Theme*). This is the case, for example, if a perfective verb incorporates quantificational notions that constrain the semantic interpretation of the

Incremental Theme argument and preempt its definite interpretation. For example, undetermined mass or plural noun phrases (Incremental Themes) in the scope of the accumulative prefix *na-* are interpreted as denoting indefinite and often relatively large quantities of some stuff or individuals. This meaning clearly preempts their definite interpretation.

I propose that the assignment of definite interpretation works *in tandem* with the assignment of a universal interpretation to undetermined noun phrases with inherently unbounded nouns that function as Incremental Theme arguments of perfective verbs. In order to assert that an event concerns the whole entity we must assume that the entity is well-demarcated. The universally-quantified interpretation of the Incremental Theme argument in perfective sentences that denote single events is licensed if it is syntactically realized by a noun phrase that has an individuated, bounded referent. If the universal interpretation concerns an undeterminate noun phrase with an inherently unbounded noun, the only way in which the boundaries of the referent of such a noun phrase can be fixed, is to anchor it to a bounded entity in the discourse. In order to "individuate" an entity in this way, given that it is named by an inherently unbounded noun, we need to "identify" it contextually. This, however, implies that the relevant bounded referent will also be definite.

Let us again consider the following sentence:

- (45)
- |                               |              |
|-------------------------------|--------------|
| <i>Vypil</i> <sup>P</sup>     | <i>víno.</i> |
| PREF-drank-3SG                | wine-SG-ACC  |
| 'He drank up (all) the wine.' |              |

The speaker of this sentence may have a portion of wine in mind that is *uniquely identifiable* in the context. In this case, the speaker presupposes that the hearer can uniquely identify the entity that is spoken of: a *specific* portion of wine. However, the definiteness in this highest degree is not always required.<sup>4</sup> It is sufficient that the

<sup>4</sup> Comrie makes the following observation: "In describing definiteness cross-linguistically, we can make use of (...) a continuum of definiteness (or specificity). Definiteness in the

referent of the Incremental Theme argument is understood as being individuated, rather than as being necessarily uniquely identifiable in the discourse context.<sup>5</sup>

The claim that the perfective operator requires a bounded interpretation of the inherently unbounded Incremental Theme argument, which in turn triggers its definite interpretation, can be supported with the data from Bulgarian. In Bulgarian, the use of the enclitic definite article *-to* is in such cases obligatory, as is shown by the following example:

(46) *Toj izpi<sup>P</sup> \*kafe / kafeto.*  
 he-NOM PREF-drank-3SG \*coffee-SG-ACC / coffee-DF-SG-ACC  
 'He drank up (all) the coffee.'

Similarly, in a comparable English construction with the phrasal verb *drink up* the definite article is required. Compare *\*He drank up wine* with *He drank up the wine*. It is safe to assume that if the phrasal verb occurs in the non-progressive, it has aspectual (perfective) import.

The Incremental Theme hypothesis proposed here predicts that the perfective aspect does not induce a holistic (and bounded) interpretation of noun phrases that are not linked to Incremental Themes. If this is correct, then we would expect that if such noun phrases are undetermined and headed by mass or plural nouns, they will not be necessarily correlated with a definite interpretation in perfective sentences. This prediction is borne out, as the following examples show:

---

highest degree means, as in English, that the speaker presupposes that the hearer can uniquely identify the entity being spoken of. In Persian (...) we are clearly not dealing with definiteness in this extreme degree, rather what is at issue is that the referent of the noun phrase has been delimited by specifying a certain set, which can be identified (...), and then indicating that the entity which is to be given, while not uniquely identifiable, must still be a member of this identifiable set" (Comrie 1981:128).

<sup>5</sup> We know that beverages are usually packaged, served and consumed in containers--glasses, cups, mugs, pots, bottles--which have a certain standard or conventional size. This knowledge in turn is evoked by the verb *drink*. The speaker may presuppose that the hearer knows that the referent is some individuated entity or other in this set.

(47-a)

*Uslyšel<sup>P</sup>* (na chodbě) hlasy.  
 PREF-heard-3SG (on corridor) voices-PL-ACC  
 'He (suddenly/unexpectedly) heard (some) voices (in the corridor).'

(47-b)

*Přinesl<sup>P</sup>* (ze sklepa) uhlí.  
 PREF-carried-3SG (from basement) coal-SG-ACC  
 'He brought (the/some) coal (from the basement).'

The above sentences show that undetermined mass and plural noun phrases that are not linked to the Incremental Theme argument do not have a holistic and definite interpretation in perfective sentences. The direct object 'voices' is associated with the Stimulus role. The direct object 'coal' is associated with the traditional Theme or Patient role. The optional translation with the determiners "the" and "some" indicates that 'coal' can have a bounded and definite interpretation, but it will stem from other contextual factors than the perfective aspect.

#### 5.4.4.2 Perfectivity and Indefiniteness

The correlation 'perfective aspect - definite DO-NP' is weakened or blocked if it is not the perfective aspect, that enforces the bounded interpretation of the Incremental Theme argument. It does not necessarily hold that the perfective aspect is correlated with a definite direct object noun phrase if the noun phrase in question (Incremental Theme) is bounded and highly individuated due to other factors. For example, we may distinguish the following four:

- (i) the presence of verbal affixes that serve to derive perfective verbs and that incorporate various quantificational notions;
- (ii) the Incremental Theme noun phrase functions as subject;
- (iii) the noun that heads the noun phrase associated with the Incremental Theme is inherently bounded;

- (iv) the Incremental Theme is realized as a measure noun phrase;
- (v) the Incremental Theme is realized as a quantified or numerically-specified noun phrase.

The quantificational contribution of verbal affixes and the Incremental Theme noun phrases that function as subjects will be discussed in separate sections. In what follows I will briefly address the other three factors.

Consider the following example in which the Incremental Theme is realized with an inherently bounded common noun 'dopis'.

- (48)
- |                              |             |               |
|------------------------------|-------------|---------------|
| <i>Napsal</i> <sup>P</sup>   | <i>nový</i> | <i>dopis.</i> |
| PREF-wrote-SG                | new-SG-ACC  | letter-SG-ACC |
| 'He wrote a/the new letter.' |             |               |

Since *dopis* 'letter' is an inherently bounded noun, we need not anchor its referent to some bounded entity in the discourse in order to understand that the whole letter came into existence. This opens up the possibility for the noun phrase *dopis* 'letter' to have an indefinite interpretation.

In general, noun phrases that contain determiner quantifiers or measure expressions have a different discourse function than referring noun phrases. While a proposition with a referring noun phrase identifies a specific object in the domain of discourse, a proposition that contains a quantified or a measure noun phrase does not. Quantified noun phrases are non-referential and measure noun phrases are low in referential specificity. When we use measure NPs like 'a yard of fabric', 'a cup of coffee' or 'a bottle of beer', 'one [portion of] beer', we do not usually assert something about a specific yard, a pint of beer, a cup of coffee (cf.: "the yard", "the pint of beer", "the cup of coffee"). We are interested in counting such entities, but we do not take an interest in them individually as discrete particular participants in an event. This explains the observation that Incremental Themes realized as measure noun

phrases have an indefinite interpretation in perfective sentences. This is illustrated by the following example:

(49)

*Vypil<sup>P</sup> šálek kávy / láhev piva / jedno pivo.*  
'He drank (up)/had a cup of coffee / a bottle of beer / one beer.'

#### 5.4.4.3 Imperfectivity and Definiteness

It is important to emphasize that the unbounded interpretation of undetermined mass NPs does not preempt their definite interpretation. For example, the following imperfective sentence suggests that there was an unbounded amount of wine that is clearly identifiable in the discourse:

(50)

*Pil víno, co mu jeho neúnavný hostitel stále doléval.*  
'He was drinking the wine that his tireless host kept pouring [into his glass].'

Such examples show that the unbounded interpretation is compatible with the definite interpretation of undetermined mass NPs. This clearly invalidates Krifka's suggestion that undetermined mass NPs in Czech are ambiguous and that they have the 'indefinite and unbounded' meaning as one of their meanings.

#### 5.4.4.4 Aspect and Subject

Given that the perfective aspect co-occurs with indefinite direct object noun phrases (Incremental Themes) and the imperfective aspect is compatible with definite and unbounded direct object noun phrases (Incremental Themes), the definite/indefinite distinction is orthogonal to the bounded/unbounded distinction. The behavior of subject noun phrases provides further support for this observation. Consider the following example:



- (51-a)
- |   |                               |                 |
|---|-------------------------------|-----------------|
| <i>Vlaky</i>                                      | <i>projížděly<sup>I</sup></i> | <i>hranicí.</i> |
| trains-PL-NOM                                     | PREF-passed-SUFF-3PL          | border-SG-INSTR |
| 'The trains were crossing the border.'            |                               |                 |
| ('There were (some) trains crossing the border.') |                               |                 |
- (51-b)
- |  |                            |                 |
|--|----------------------------|-----------------|
| <i>Vlaky</i>                           | <i>projely<sup>P</sup></i> | <i>hranicí.</i> |
| trains-PL-NOM                          | PREF-passed-3PL            | border-SG-INSTR |
| '(All) the trains crossed the border.' |                            |                 |

Given that *vlaky* 'trains' is linked to the Incremental Theme, the hypothesis predicts that it will have a partitive interpretation in the imperfective sentence and a holistic interpretation in the perfective sentence. The imperfective sentence with the verb *projížděly<sup>I</sup>* entails that there was an unbounded stream of trains passing through the station. The perfective sentence with the verb *projely<sup>P</sup>*, on the other hand, entails that all the trains passed through the station.

Regardless of the partitive/holistic reading induced by verb aspect, *vlaky* 'trains' (Incremental Theme) has the same definiteness potential in both the perfective and imperfective sentence. It is most likely to have a definite interpretation. This has to do with the topic-focus informatinal structure of Czech sentences. Subjects often function as topics. Topicalized constituents that occur in a sentence-initial position are often highly individuated and definite.

Speakers of Czech can resort to various permutations of word order to convey differences in definiteness. If the subject-NP *vlaky* 'trains' occurs in the sentence final position, it is likely to express new information, in which case the indefinite interpretation '(some) trains' will become available. The imperfective sentence *Hranicí projížděly<sup>I</sup> vlaky* will then mean 'There were (some) trains crossing the border'. The corresponding perfective sentence *Hranicí projely<sup>P</sup> vlaky* can be translated as 'Some trains crossed the border' or 'The trains crossed the border'. In order to assign the definite or indefinite interpretation to noun phrases in Czech, we need to take into account the word order and the information structure of sentences, among other factors.

#### 5.4.4.5 Independence of Definiteness and Boundedness

To summarize, in describing the affinities between aspectual operators and the (in)definiteness of the Incremental Theme argument, I referred to three separate distinctions:

**bounded vs. unbounded**

**holistic vs. partitive**

**definite vs. indefinite**

The first two are cross-categorical distinctions that are applicable to the domains of nominal expressions and verbal expressions. In the domain of verbal expressions, the 'bounded vs. unbounded' distinction concerns telicity and the 'holistic vs. partitive' distinction aspect.

From the above observations it is clear that unbounded and bounded noun phrases can be either definite or indefinite. It has also been shown that the features 'imperfective - definite - unbounded' and 'perfective - indefinite - bounded' can occur. This leads to the conclusion that the bounded/unbounded distinction is orthogonal to the definite/indefinite distinction. These two distinctions must be kept apart. The boundedness parameter concerns individuation. To "individuate" means to mark off one instance of a count entity from another. By contrast, (in)definiteness parameter concerns identification in the domain of discourse. To "identify" means to point to a certain entity or entities in the domain of discourse.

Another argument in support of the independence of the 'definite vs. indefinite' from the 'bounded vs. unbounded' distinction comes from languages like English that have an overt article system. English subject noun phrases that function as topics and that occur in a sentence-initial position are typically marked with the definite article.

Nonetheless, the definite subject noun phrase does not need to be interpreted as bounded. Whether it will be interpreted as bounded or unbounded depends on its thematic role and aspect. In English the progressive aspect imposes a partitive interpretation over the Incremental Theme argument and the non-progressive aspect a universal (holistic) interpretation. If the Incremental Theme argument is realized as a mass or plural noun phrase, the partitive interpretation in the progressive sentence enhances its unbounded property, while the holistic interpretation in the non-progressive sentence gives rise to its bounded interpretation.

The above observations are confirmed by the data from Jackendoff (1990:101). He claims that the following sentences suggest that there was an unbounded stream of water or of people:

- (52-a) *The water was rushing out of the faucet.*
- (52-b) *The people were streaming into the room.*

The definite article "performs only a deictic function; in these cases it designates a previously known medium instead of a previously known object" (Jackendoff 1990:101). The sense of unboundedness is here heightened by the use of progressive aspect, "which in a sense takes a snapshot of an event in progress" (Jackendoff 1990:101).

If progressive is replaced by simple past, the event is viewed as temporally bounded and consequently, "the amount of water and the number of people is also bounded" (Jackendoff 1990:101):

- (53-a) *The water rushed out of the faucet.*
- (53-b) *The people streamed into the room.*

#### **5.4.5 Supporting Evidence: Interaction between Aspect and Determiners**

### 5.4.5.1 Imperfective Aspect

According to the Incremental Theme Hypothesis, Slavic aspectual operators function as modifiers over episodic predicates and their arguments. They extend their semantic effects over the Incremental Theme argument. The imperfective aspectual operator imposes a partitive interpretation and the perfective operator a holistic or universal interpretation on the Incremental Theme argument. If this is true, then it may be expected that aspectual operators should interact with various determiner quantifiers that modify the Incremental Theme argument. What happens when an aspectual operator and a determiner quantifier simultaneously lay claim to the same variable introduced by the Incremental Theme? Is there a possibility for both of them to have their way, and if not, how is the conflict resolved?

(54) **imperfective aspect and strong quantification ('all')**

(54-a)

<i>Pil<sup>I</sup></i>	<i>(*)všechnu</i>	<i>kávu.</i>
drank-3SG	(*)all-SG-ACC	coffee-SG-ACC
'He was drinking (?)all the coffee.'		
'He drank (?)all the coffee.'		

"(\*)" indicates that this sentence is not acceptable under a single event interpretation, regardless whether it has a progressive or what has been labeled 'general factual' use. The above sentence also does not mean that he drank a part of a whole portion of coffee. Notice that the above imperfective sentence would be also odd in the following context: 'Last night, he drank all the coffee.' Such a context favors the environment of perfective aspect: *Včera večer vypil<sup>P</sup> všechnu kávu* - 'Last night, he drank (up) all the coffee'.

In imperfective sentences that denote single events, the Incremental Theme argument cannot be quantified with the universal quantifiers 'all' and 'whole'. One way to motivate this behavior would be to assume that the quantifier *všechen* 'all' binds the variable introduced by the Incremental Theme argument. This variable cannot be, at the same time, bound by the imperfective operator which functions as a partitive

quantifier over the denotations of the Incremental Theme argument. If we assume that there is a general prohibition against vacuous quantification in natural language (cf. Milsark (1974), Chomsky (1982), Kratzer (1989), for example), the oddity of the above sentence is accounted for.

**Prohibition against vacuous quantification**

For every quantifier Q, there must be a variable  $x$  such that Q binds an occurrence of  $x$  in both its restrictive clause and its nuclear scope (Kratzer 1989:9).

The conflict between the aspectual operator and the universal quantifier is resolved if the above sentence is used in the context that enforces a habitual interpretation: the imperfective sentence then denotes an unspecified (and sufficiently large) number of bounded situations. It would be felicitous in the following context, for example: *Když měl hodně práce, PİL<sup>I</sup> všechnu kávu, kterou si přinesl do nemocnice v termosce* - 'When he was busy, he drank all the coffee that he had brought to the hospital in a thermos bottle.' Or consider a different example: *Meruňkové knedlíky, ty JEDL<sup>I</sup> zpravidla všechny* - 'Apricot dumplings, he tend to eat them all.' In the first sentence, the predicate *piI<sup>I</sup>* 'he drank' introduces a situation variable that is bound by the habitual (or generic) operator. It does not discharge a partitive quantification over the variable introduced by the Incremental Theme argument. This variable is bound by the universal quantifier. The domain of the universal quantification is specified by the denotation of the Incremental Theme: portions of coffee or sums of dumplings, for example. Hence, the problem of vacuous quantification does not arise.

A similar situation seems to obtain in examples with weak quantifiers like *hodně* 'a lot of':

(55) **imperfective aspect and weak quantifiers**

(55-a) *PiI<sup>I</sup> (?)hodně kávy.*

drank-3SG (?)a-lot-of coffee-SG-GEN  
 'He was drinking (?)a large portion of coffee.'  
 'He drank (?)a large portion of coffee.'

Unless the above sentence is understood habitually, it is odd, both under a progressive and 'general factual' interpretation. In order to express a single non-progressive event, the use of the perfective verb is clearly preferred. As in the case of the imperfective operator and the strong determiner quantifier, we could exclude examples with the imperfective operator and weak determiner quantifiers by evoking the prohibition against vacuous quantification: if the imperfective operator functions as an ordinary quantifier, then there is only one variable introduced by the Incremental Theme argument for two quantifiers to bind.

The same holds if we substitute the quantifier *hodně* 'a lot of' with *málo* or *trochu* 'a little':

(55-b)

<i>Pil</i> <sup>I</sup>	(?) <i>málo</i> /(?) <i>trochu</i>	<i>kávy.</i>
drank-3SG	(?)a-little	coffee-SG-GEN
'He was drinking a little bit of / a small portion of coffee.'		
'He had a little coffee.'		

Consider the following sentence in which the universal quantifier modifies a plural Incremental Theme argument.

(56)

<i>Prala</i> <sup>I</sup>	(*) <i>všechny</i>	<i>svetry.</i>
washed-3SG-FEM	(*)all-PL-ACC	sweaters-PL-ACC
'She was washing (?)all the sweaters.'		
'She washed (?)all the sweaters.'		

"(\*)" indicates that such examples are not unconditionally unacceptable, but we have to do a certain amount of work to find a suitable interpretation and context of use for them. The above sentence is acceptable under a habitual interpretation.

With plural noun phrases, there is yet another accommodation strategy for integrating both the aspectual operator and the universal quantifier into the meaning

of a sentence. The above sentence is felicitous in the situation in which 'she' is washing the sweaters *consecutively* or *simultaneously*. If the Incremental Theme is realized by a plural noun phrase, it is understood as a sum individual whose individual members are consecutively or simultaneously subjected to the denoted event.

Under the simultaneous interpretation, all the sweaters are subjected to the event of washing at the same time. There may be a point at which all the ten sweaters are half-way washed, for example. This interpretation presupposes that washing is viewed in an incremental way, as consisting of a series of ordered stages that a sweater undergoes on its way to becoming clean. In the simultaneous interpretation, 'all' takes wide scope relative to the aspectual operator 'PART' and the event predicate it modifies:

simultaneous interpretation: ALL > PART

The problem of vacuous quantification does not arise, because 'all' and the aspectual operator (in its function as a partitive quantifier over the denotation of the Incremental Theme) have different domains of quantification. 'All' quantifies over some contextually determined set of sweaters (and the plurality of corresponding sweater-washing events). 'PART' functions as an aspectual operator over a predicate that describes each individual event of washing. At the same time it functions as a partitive quantifier over each individual sweater subjected to the event of washing.

The consecutive interpretation seem to be less frequent. It would be felicitous in a situation in which 'she' makes her way through the sweaters, washing one sweater after another, until all of them are washed. It is not the case that at any time when one sweater gradually becomes clean, 'she' is also washing any other sweater or all the other sweaters. In the consecutive reading, the imperfective sentence entails that only some sweaters (from the whole quantity of sweaters) were washed, while others were not. Under the consecutive interpretation, the aspectual operator 'PART' takes wider scope relative to the universal quantifier 'all':

consecutive interpretation: PART > ALL

The aspectual operator 'PART' and the universal quantifier 'all' have different domains of quantification, hence the problem of vacuous quantification does not arise. 'All' quantifies over the set of sweaters (and the corresponding sweater-washing events). 'PART' functions as an aspectual operator over a predicate that describes the event of washing. At the same time it functions as a partitive quantifier over the whole set of sweaters (and the plurality of corresponding sweater-washing events).

The observation that the simultaneous interpretation is preferred over the consecutive interpretation may be seen in connection with Ioup's (1975) hierarchy of the relative scope of different quantifier types in multiply-quantified sentences and the classification of quantifiers into strong and weak (cf. Milsark 1974). For example, in a sentence with a weakly quantified subject on its cardinal reading and a strongly quantified object (presuppositional reading), the object receives wider scope than the subject (The examples are taken from Diesing 1992:63):

- (57-a) *Sm cellists played every suite today.*  
(57-b) *Mny cellists played SOME suite today.*  
(57-c) *Tw cellists played SOME suite today.*

In the above sentences, the strongly quantified object noun phrases *every suite* and *some suite* take scope over the weakly quantified subject noun phrases. (The unstressed readings of the determiners are indicated by deleting the vowels.)

Ioup (1975) proposes the following hierarchy of relative scope preferences among quantifiers:

- (58) *Ioup's Hierarchy*  
each > every > all > most > many > several > some > a few



As Diesing (1992:64) points out, the quantifiers in the left-hand half that tend to have wider scope belong to the class of strong determiners in the sense of Milsark (1974). Those in the right-hand half that tend to have narrower scope belong to the class of weak determiners.

The imperfective operator functions as a partitive quantifier over situations and individuals, its quantificational force is roughly comparable to the English unstressed *some* ('sm'). This predicts that it should take narrower scope relative to the universal quantifier 'all'. This is the case in the preferred simultaneous interpretation. In the consecutive interpretation, the aspectual 'PART' quantifier takes wider scope relative to the universal quantifier. This, however, contradicts Ioup's (1975) hierarchy and it may be viewed as motivating the observation that the associated consecutive reading is clearly not the preferred one.<sup>6</sup>

The same ambiguity between simultaneous and consecutive interpretation arises in imperfective sentences with numerically-specified Incremental Theme argument. This is shown by the following examples:

(59) **imperfective aspect and numerical-specifiers**

(59-a)

Včera psal<sup>I</sup> pět žádostí.  
yesterday wrote-3SG five applications  
'He was writing five applications yesterday.'  
'He wrote five applications yesterday.'

---

<sup>6</sup> Independently of the issues in this section, Carlson (1981) proposes that English has a general ordering principle concerning the order of interpretation of nonpartitive and partitive quantifiers:

"a nonpartitive (singular count) quantifier takes right of way over a partitive (noncount or plural) quantifier" (Carlson 1981:59).

In other words, partitive quantifiers have a narrower scope than nonpartitive quantifiers. A further evidence for this generalization is provided by the fact that it is more natural to say in English *Unicycles have wheels* rather than *Unicycles have a wheel*.

In the progressive use, the most likely interpretation is the *simultaneous* interpretation in which the Agent started writing each of the five applications. In this interpretation the numeral 'five' takes wide scope relative to the aspectual operator 'PART'.

The consecutive interpretation is less likely: the above sentence would not most likely be appropriate in the context in which the Agent wrote (and finished writing) just three out of five applications, for example, and did not actually start writing the other two. In this interpretation the aspectual operator 'PART' takes wide scope relative to the numeral 'five'.

The above sentence is felicitous in a contrastive context, such as: 'Yesterday he wrote five applications and today he will write at least two.' In such a context, the above imperfective sentence strongly suggests that he finished writing all the five applications.

English progressive sentences with universally quantified and numerically-specified Incremental Theme arguments also give rise to a simultaneous or consecutive interpretation:

(60) *Mary was polishing five spoons / all (the) spoons.*

This sentence is appropriate in a context in which Mary systematically works her way through the spoons (*consecutive* interpretation) or if she polishes all of them at the same time (*simultaneous interpretation*).<sup>7</sup>

Whether a given imperfective sentence has a simultaneous or consecutive interpretation depends on the nature of the denoted event, on what we know about how events typically take place. The most likely interpretation of the following sentence is a consecutive one in which the Agent participant drinks one portion of coffee

<sup>7</sup> See Taylor (1977) for a discussion of a similar English example.

and then the other:

- (61)
- |  |                       |
|--|-----------------------|
| <i>Pil<sup>I</sup></i>                       | (?) <i>dvě kávy.</i>  |
| drank-3SG                                    | (?)two coffees-PL-GEN |
| 'He was drinking (?)two portions of coffee.' |                       |
| 'He drank (?)two portions of coffee.'        |                       |

The above sentence is perfectly acceptable if it is used in a context that enforces a habitual interpretation (e.g., 'Every day, he drank two (portions of) coffees'). We know that drinking coffee simultaneously from two containers is impossible for most humans. However, one way in which the above sentence may be understood as having a simultaneous interpretation is a situation in which the Agent participant is taking sips alternately from one cup and then from the other.

In the following sentence the consecutive reading is the only plausible reading, given what we know about the nature of singing.

- (62-a)
- |   |                 |                           |
|---|-----------------|---------------------------|
| <i>Zpíval<sup>I</sup></i>                         | <i>tři árie</i> | <i>z Prodané Nevěsty.</i> |
| sang-SG   | three arias     | from Bartered Bride       |
| 'He was singing three arias from Bartered Bride.' |                 |                           |
| 'He sang three arias from Bartered Bride.'        |                 |                           |

Imperfective sentences with a quantified or numerically-specified Incremental Theme argument raise a number of difficult questions. One of them concerns the conditions under which a consecutive or simultaneous interpretation can be assigned to them. Related to this question is another that concerns the scope of the aspectual operator and the quantified or numerically-specified Incremental Theme argument. The above preliminary observations just scratch the surface of this phenomenon and they clearly need to be refined.

To summarize, if both the imperfective operator and a determiner quantifier lay claim on the variable introduced by the Incremental Theme argument, the whole

sentence is not acceptable, due to the vacuous quantification. The conflict between two quantifiers can be resolved if the whole sentence has a habitual interpretation, because then the imperfective operator and the determiner quantifier quantify over different entities. If the Incremental Theme is realized by a plural noun phrase, a non-habitual interpretation is possible, because the Incremental Theme noun phrase is understood as a sum individual whose individual members are consecutively or simultaneously subjected to the denoted event. In this case also the imperfective operator and the determiner quantifier quantify over different entities. Whether a given imperfective sentence is more likely to have a simultaneous or a consecutive interpretation depends on the nature of the denoted event, on what we know about how events typically take place.

The hypothesis that the imperfective operator functions as a quantifier over the denotations of the Incremental Theme argument correctly predicts that the quantification over other arguments with determiner quantifiers is not constrained in any way by the presence of the imperfective operator. In the following sentence the imperfective operator does not clash with the universal quantifier *všechn* 'all' in the direct object noun phrase. The reason is that the noun phrase is linked to the Patient (or Theme) role:

- (63)
- |  |                         |                |                 |                  |
|--|-------------------------|----------------|-----------------|------------------|
| <i>Václav</i>  | <i>nesl<sup>I</sup></i> | <i>všechny</i> | <i>balíky</i>   | <i>na poštu.</i> |
| Václav   | carried-SG              | all-PL-ACC     | packages-PL-ACC | to post-office   |
| 'Václav was carrying all the packages to the post office.' |                         |                |                 |                  |
| 'Václav carried all the packages to the post office.'      |                         |                |                 |                  |

In the following sentence, the weak determiner *několik* 'several' and the numeral *tři* 'three', which occur in a direct object noun phrase, do not clash with the imperfective operator. Here, the direct object is linked to the Stimulus role.

- (64) *Slyšel<sup>I</sup> několik hlasů / tři hlasy na chodbě.*  
 heard-SG several voices-PL-GEN / three voices-PL-ACC on corridor  
 'He heard several voices / three voices in the corridor.'

### 5.4.5.2 Perfective Aspect

In perfective sentences, there is no conflict between the perfective aspectual operator and a determiner quantifier that both modify the Incremental Theme argument. This is shown by the following examples:

- (65) **perfective aspect and strong quantification ('all')**

- (65-a) *Vypil<sup>P</sup> všechnu kávu.*  
 PREF-drunk-3SG all-SG-ACC coffee-SG-ACC  
 'He drank (up) all the coffee.'

- (65-b) *Upletla<sup>P</sup> všechny svetry.*  
 PREF-knitted-3SG-FEM all-PL-ACC sweaters-PL-ACC  
 'She knitted all the sweaters.'

- (66) **perfective aspect and weak quantifiers**

- (66-a) *Vypil<sup>P</sup> hodně kávy.*  
 PREF-drunk-3SG a-lot-of coffee-SG-GEN  
 'He drank (up) a large portion of coffee.'

- (66-b) *Vypil<sup>P</sup> málo/trochu kávy.*  
 PREF-drunk-3SG a-little coffee-SG-GEN  
 'He drank (up) a small portion of coffee.'

- (67) **perfective aspect and numerical-specifiers**

- Vypil<sup>P</sup> dvě kávy.*  
 PREF-drunk-3SG two coffees-PL-GEN  
 'He drank (up) two portions of coffee.'

The above examples show that quantified or numerically-specified Incremental Theme arguments are unconditionally acceptable in perfective sentences. It has been

proposed that the perfective aspectual operator functions as a universal quantifier with respect to the denotation of the Incremental Theme argument. Its force is comparable to the English quantifier *all* or *whole*. The combination of the quantificational force of the perfective operator and the determiner quantifier amounts to 'the whole quantity of the size of the set indicated by the determiner quantifier'. The quantity indicated by the perfective operator and the quantity indicated by the determiner quantifier are always compatible.

The Incremental Theme noun phrase which is not overtly quantified is understood as being universally quantified in a perfective sentence. The overt universal quantification by means of the universal determiner quantifier over the denotation of the Incremental Theme reiterates the quantificational force of the perfective operator. Since the quantification induced by the perfective aspect and the strong quantifier overlap, they may co-occur and modify the same Incremental Theme argument. This may be viewed as the reason why they do not give rise to vacuous quantification.

*Vypil tři kávy* 'He drank (up) two portions of coffee' has the reading in which *tři kávy* denotes a single complex entity, a sum individual, and the whole sentence has a single event interpretation. Roughly, this reading can be represented as: 'HOL (drank (3 coffees))'.

Notice that this sentence would not be felicitous in a situation in which there were three separate occasions on each of which he had one portion of coffee: '3-times (HOL (drank one coffee))'. Under the latter interpretation, the numeral would take wider scope relative to the universal quantification imposed by the perfective operator.

Ioup's hierarchy predicts that the perfective operator should take scope over weakly quantified noun phrases like *hodně kávy* 'a lot of coffee', *dvě kávy* 'two coffees'. The observation that the second reading is typically excluded could be explained if we assume that a numeral like 'three' should not take wider scope

relative to a universal quantifier.

Not only does the perfective operator sanction any determiner quantifier to modify the Incremental Theme argument, but there is a preference for the Incremental Theme argument that denotes a plurality of individuals to be modified by a determiner quantifier if it occurs in the scope of a perfective operator. Perfective sentences with an undetermined plural noun phrase linked to the Incremental Theme sound odd (unless they have a habitual interpretation or they are used in a context in which a number of different events are enumerated, for example). This is illustrated by the following examples ("#" indicates 'acceptable, but not preferred or frequent').

- (68-a) *Postavil<sup>P</sup> #domy / dva domy.*  
'He built houses / two houses.'
- (68-b) *Napsal<sup>P</sup> #knížky / několik knížek pro děti.*  
'He wrote books / several books for children.'
- (68-c) *Napsal<sup>P</sup> #žádosti / hodně žádostí.*  
'He wrote applications / a lot of applications.'

By contrast, the following perfective sentences are acceptable, even though the direct objects 'voices' and 'coal' do not contain any overt determiners. The reason is that they are not associated with the Incremental Theme and hence are not assigned a holistic interpretation by the perfective aspect:

- (69-a) *Uslyšel<sup>P</sup> (na chodbě) hlasy.*  
 PREF-heard-3SG (on corridor) voices-PL-ACC  
 'He (suddenly/unexpectedly) heard (some) voices (in the corridor).'
- (69-b) *Přinesl<sup>P</sup> (ze sklepa) uhlí.*  
 PREF-carried-3SG (from basement) coal-SG-ACC  
 'He brought (the/some) coal (from the basement).'

A similar interaction between aspectual operators and determiner quantifiers that modify Incremental Theme arguments can be observed in English. The following

examples<sup>8</sup> show that the partitivity imposed by the progressive on the Incremental Theme clashes with the quantifier *some* that modifies the Incremental Theme.

(70-a) ??*Some water was rushing out of the faucet.*

(70-b) ??*Some people were streaming into the room.*

However, *some* is acceptable in the corresponding sentences with simple verb forms:

(71-a) *Some water rushed out of the faucet.*

(71-b) *Some people / Fifty people streamed into the room.*

We do not find such an interaction with nominal arguments that are not linked to the Incremental Theme:

(72-a) *Some water was glistening glistened in the distance.*

(72-b) *Some people were waiting / waited in line. Fifty people were waiting / waited in line.*

To summarize, the examples in this section show that there are systematic restrictions on the occurrence of determiner quantifiers that modify Incremental Theme arguments in perfective and imperfective sentences. Such restrictions lend support to the hypothesis advanced here that aspectual operators extend their semantic effects over the Incremental Theme argument.

The hypothesis sheds light on the seemingly complicated way in which noun phrases with determiner quantifiers, numerical-specifiers and other expressions of quantity interact with aspect has puzzled linguists working on Slavic languages (cf. Wierzbicka 1967; Rassudova 1977; Merrill 1985; among others). Slavic linguistics has so far failed to provide an adequate description for this interaction. In this section, I will show that we can easily describe it, if we recognize that the Incremental Theme argument provides the missing semantic link in this puzzle. The restrictions on the occurrence of determiner quantifiers, numerals and various quantifying and measure expressions in perfective and imperfective sentences can be explained if we assume that aspectual operators function like quantifiers over the denotation of

<sup>8</sup> The examples are taken from Jackendoff (1990:101).



Incremental Theme noun phrases.

#### **5.4.6 Verbal Affixes as Expressions of Quantity and Measure**

As a corollary to the Incremental Theme hypothesis proposed here, it is proposed that verbal affixes incorporate various quantificational notions that constrain the interpretation of the Incremental Theme argument of the verb they serve to derive. As a case in point, I will discuss two prefixes *na-* and *po-*. I will show that they behave like quantifiers with respect to the Incremental Theme argument of the verb they serve to derive.

##### **5.4.6.1 The Prefix NA-**

Consider the following one- and two-place perfective predicates with the prefix *na-*:

One-place predicates:

*naspat se*<sup>P</sup> 'sleep a lot', 'have one's fill of sleeping';

*nasmát se*<sup>P</sup> 'have a good laugh';

*nastát se*<sup>P</sup> 'spend a lot of time standing'.

Two-place predicates:

*nabrat*<sup>P</sup> *vodu* 'draw (in) some water',

*nachytat*<sup>P</sup> *ryby* 'catch some fish',

*nasbírat*<sup>P</sup> *jahody* 'pick some strawberries',

*naspořit*<sup>P</sup> *peníze* 'save some money',

*napéct*<sup>P</sup> *chleba* 'bake (a lot of) bread',

*nasmažit*<sup>P</sup> *lívance* 'make (a lot of) pancakes',

*navyrábět*<sup>P</sup> *spotřební zboží* 'produce (a lot of) consumer goods'.

The verbs in these lists are perfective, derived from simple imperfective verbs with the prefix *na-*. The meaning of one-place *na-*verbs can be characterized as 'be engaged in a certain activity for a (sufficiently) long time and/or with a high degree of intensity'. Hence, the prefixed verb can be further modified with such degree words as *hodně* 'a lot', but not with *málo* 'a little'. The prefix *na-* here contributes some scalar notion of evaluation to the meaning of the derived verb. The relevant scale here measures time, energy or effort spent.

Related to this use of the prefix *na-* in one-place predicates is the use of the prefix *na-* in two-place predicates. The meaning of such predicates can be characterized as 'amass or accumulate a quantity of *x* gradually, part by part, by creating or acquiring *x*. The quantity of stuff or individuals denoted by *x* is typically large or sufficient, which is associated with a positive evaluation'.<sup>9</sup> The relevant evaluation

<sup>9</sup> Cf. Petr (1986, Vol. 1: 396, 3.1.8.2).

scale concerns the quantity of the object *x* that functions as the Incremental Theme participant in the denoted situation. Consider the following example:

- (73)
- |   |                 |
|---|-----------------|
| <i>Martin na-smažil<sup>P</sup></i>                               | <i>lívance.</i> |
| Martin PREF-fried   | pancakes-PL-ACC |
| 'Martin made a lot of / a large batch of / quite a few pancakes.' |                 |

This sentence does not mean that Martin spend a long time making pancakes, or that he had had his fill making pancakes, or that he was engaged in the making of pancakes with a great intensity. The sentence entails that as a result of the denoted event, there was a sufficiently large quantity of pancakes. Such a sentence cannot be felicitously uttered in a situation in which Martin made only two or three pancakes. In other words, the prefix *na-* has the semantic import of a weak quantifier 'a lot', 'many'.

Such arguments as the direct object 'pancakes' in the above example are prime examples of the Incremental Theme argument. They denote an entity that is gradually accumulated during the course of the event. The Incremental Theme argument is an obligatory direct object of the perfective 'accumulative' *na*-verb. This can be shown by the fact that the Incremental Theme argument cannot be omitted:

- (74)
- \*nasmažit<sup>P</sup>* 'fry',
  - \*nabrat<sup>P</sup>* 'draw (in)',
  - \*nachytat<sup>P</sup>* 'catch',
  - \*nasbírat<sup>P</sup>* 'pick',
  - \*naspořit<sup>P</sup>* 'save',
  - \*napéct<sup>P</sup>* 'bake',
  - \*navyrábět<sup>P</sup>* 'produce'.

The prefix *na-* functions as a vague quantifier with respect to the Incremental Theme argument. It contributes a meaning comparable to 'a lot (of)', 'many' in English. It indicates that the Incremental Theme argument denotes some sufficiently large quantity of stuff or individuals. In standard dictionaries, the lexical entries of *na-*verbs that belong to this class typically include examples in which the lexical item that is associated with the Incremental Theme argument is modified with vague quantifying words *hodně* or *mnoho* 'a lot of', 'many': cf. *nabájit<sup>P</sup>/nablábolit<sup>P</sup> hodně/mnoho báchorek* 'tell a lot of white lies'; *naspořit<sup>P</sup> hodně/mnoho peněz* 'save a lot of money'; *mnoho nám toho navyprávěl* 'he told us a lot of stories'.

What counts as a large or a sufficient quantity depends on the context. For example, what is a sufficient quantity of wood depends on how much wood is normally needed to last for one winter.

- (75)
- |                                       |              |                 |
|---------------------------------------|--------------|-----------------|
| <i>Nakácel<sup>P</sup></i>            | <i>dřevo</i> | <i>na zimu.</i> |
| PREF-fell-3SG                         | wood-SG-ACC  | on winter       |
| 'He cut down enough wood for winter.' |              |                 |

In the following example, the intended amount of soup depends on what counts as having enough soup to last for one week in a given situation:

- (76)
- |  |                |                      |
|--|----------------|----------------------|
| <i>Navařila<sup>P</sup></i>                          | <i>polévku</i> | <i>na celý týden</i> |
| PREF-cooked-3SG-FEM                                  | soup-SG-ACC    | on whole week        |
| 'She cooked enough soup to last for the whole week.' |                |                      |

The Incremental Theme argument of the 'accumulative' *na-*verb can be realized in the accusative case, as in the above examples, or in the genitive case:

- (77)
- |                                       |              |                 |
|---------------------------------------|--------------|-----------------|
| <i>Nakácel<sup>P</sup></i>            | <i>dřeva</i> | <i>na zimu.</i> |
| PREF-fell-3SG                         | wood-SG-GEN  | on winter       |
| 'He cut down enough wood for winter.' |              |                 |

(78)

*Navařila*<sup>P</sup>                      *polévky*                      *na celý týden*  
 PREF-cooked-3SG-FEM      soup-SG-GEN      on whole week  
 'She cooked enough soup to last for the whole week.'

The possibility of realizing the Incremental Theme argument of the 'accumulative' *na*-verb in the genitive case can be perhaps motivated by the assumption that the prefix *na*- has the semantic import similar to that of the vague quantifiers *hodně* and *mnoho* 'a lot of', 'many'. The vague quantifiers *hodně* and *mnoho* 'a lot of', 'many' require that the noun they modify be put into the genitive case.

The proposal advanced here is that the prefix *na*- functions as a modifier of the episodic verb. At the same time it functions as a vague weak quantifier of the Incremental Theme argument. Abstracting away from the function of the prefix *na*- as an operator over an event predicate and its arguments, the function of the prefix *na*- as a weak quantifier over the denotation of the Incremental Theme argument can be represented as follows:

(79)      [NA<sub>y</sub>: Incremental-Theme(y)] P(x<sub>1</sub>,y)

y: Incremental Theme

x<sub>1</sub>: Agent

The subscript on the prefix *NA*- indicates what variable it is associated with. The quantification is restricted, ranging only over members of a group of individuals denoted by the Incremental Theme argument. This is indicated in the restricting formula: *Incremental-Theme(y)*. It also indicates what kind of objects are allowed to be substituted for *y*. *P(x<sub>1</sub>,y)* is the propositional function into which the substitution is made.

If the claim that the prefix *na*- functions as a vague quantifier over the Incremental Theme argument is correct, then it is to be expected that the prefix *na*- should

interact with other overt determiner quantifiers that modify the Incremental Theme argument. The question to ask is what happens when a determiner that indicates a certain size of a set and the prefix *na-* that also indicates a certain size of a set both modify the same nominal argument?

The meaning of accumulation, of some vague sufficient or large quantity incorporated in the prefix *na-* motivates the requirement that the Incremental Theme argument be a mass or plural noun phrase but not a singular count noun phrase. This is shown by the following examples:

(80)	<b>imperfective</b>	<b>perfective</b>
	<i>trhat jablko</i> pick apple-SG-ACC	<i>NA-trhat *jablko</i> PREF-pick *apple-SG-ACC
	<i>trhat jablka</i> pick apples-PL-ACC	<i>NA-trhat jablka</i> PREF-pick apples-PL-ACC
	<i>trhat šeřík</i> pick lilac-SG-ACC	<i>NA-trhat šeřík</i> PREF-pick lilac-SG-ACC

The following examples with the *na-*verb shares the same superficial structure [NA-V NP] with the above examples. However, they differ from them in so far as it takes a singular noun phrase:

(81-a)	<i>NA-hmatat<sup>P</sup> tepnu</i> PREF-touch vein-SG-ACC 'find a vein by touching'
--------	---

In (a), the direct object of the verb *nahmatat* 'find by touching' is not linked to the Incremental Theme argument.

(81-b)	<i>NA-psat<sup>P</sup> dopis</i> PREF-write letter-SG-ACC
--------	--

'write a/the letter' [and finish writing it]

In (b), the direct object of the verb *napsat* 'write (and finish writing)' is linked to the Incremental Theme. Other perfective *na*-verbs that licence a singular count noun phrase are: *načechrat polštář* 'plump up the/a pillow', *nakázat<sup>P</sup> někomu něco* 'order something (to do something) to somebody', *nalomit něco* 'break something halfway', *nahnout něco* 'slant something',

Although it is true that the prefix *na*- has a quantificational effect on the Incremental Theme argument, the presence of the Incremental Theme argument in the argument structure of a perfective *na*-verb is not a sufficient condition for the quantificational effect to arise. In the above example (b) *napsat dopis*, the prefix *na*- does not function as a vague quantifier with the meaning 'some sufficient (or sufficiently large) quantity' over the individual denoted by 'letter'. However, as is predicted by the Incremental Theme hypothesis the perfective operator associated with the perfective verb functions as a universal quantifier with respect to the denotation of 'letter'.

One may argue that *napsat dopis* 'write a/the letter' is just a special case of the quantificational use of the prefix *na*-, namely it could be paraphrased as 'accumulate some written signs so that as a result a letter comes into existence'. In other words, 'letter' would function as a measure of writing, just like the noun 'basket' functions as a measure expression with respect to apples.

Against this proposal it may be objected that the prefix *na*- as a vague quantifier clashes with the numeral 'one' as well as with definite and indefinite numeral specifiers in the Incremental Theme NP, as the following examples show:

(82-a)

*Nakoupil<sup>P</sup> \*jedno jablko / ??pět jablek.*  
 PREF-bought-3SG ?\*one-SG-ACC apple-SG-ACC / ??five apples-PL-GEN  
 'He bought one apple/five apples.'

(82-b)

*Martin na-smažil<sup>P</sup> \*dva lívanec / \*jeden lívanec.*  
 Martin PREF-fried \*two pancakes-PL-GEN ! \*one-SG-ACC pancake-SG-ACC

- (82-c) 'Martin made two pancakes/one pancake.'  
*Nadělal<sup>P</sup>* \**několik* *dluhů.*  
 PREF-make-3SG \*several debts-PL-ACC  
 ?'He made several debts.'

Such examples show that if the prefix *na-* quantifies over denotata of plural noun phrases, as they are treated as constituting an unspecified and relatively large quantity of individuals. Moreover, they are treated as a sum individual whose parts are not treated as discrete and countable entities. In this sense the denotation of the argument in the scope of the vague quantifier *na-* is relatively low on an individuation scale.

By contrast we can say

- (83) *Napsal<sup>P</sup>* *dva* *dopisy.*  
 PREF-wrote-SG two letters-PL-ACC  
 'He wrote two letters.'

If the prefix *na-* functions as a vague quantifier, then it is also to be expected that the denotation of the Incremental Theme argument in its scope is not some contextually specific set of individuals or portion of stuff that is completely subjected to the denoted event. In other words, the Incremental Theme argument in the scope of the vague quantifier *na-* is not universally quantified. For example, the following sentence does not entail that he accumulated all the debts in some contextually specified set of debts:

- (84-a) *Nadělal<sup>P</sup>* *dluhy.*  
 PREF-make-3SG debts-PL-ACC  
 'He fell into debt.'

Also, the negation of the universal reading does not result in a contradiction, but rather in a sentence that is awkward. The awkwardness has to do with the fact that it does not make sense to negate a meaning element that in fact is not entailed by anything in the sentence.



(84-b)

?*Nadělal*<sup>P</sup> *dluhy,* *ale ne* *všechny.*  
 ?PREF-make-3SG debts-PL-ACC but not all-PL-ACC  
 'He fell into debt, but not into all the debt.'

By contrast, in the following sentence the prefix *na-* does not function as a vague quantifier, but rather as a universal quantifier over the denotation of the Incremental Theme argument. The sentence entails that all the letters in some contextually specified set were written. Hence (a) entails (b):

(85-a)

*Napsal*<sup>P</sup> *dopisy.*  
 PREF-wrote-3SG letters-PL-ACC  
 'He wrote (all) the letters.'

(85-b)

*Napsal*<sup>P</sup> *všechny* *dopisy.*  
 PREF-wrote-3SG all-PL-ACC letters-PL-ACC  
 'He wrote all the letters.'

The negation of the universal entailment results in a contradiction:

(85-c)

\**Napsal*<sup>P</sup> *dopisy, ale ne všechny.*  
 'He wrote (all) the letters, but not all of them.'

In light of the above observations it may be expected that the Incremental Theme argument of 'accumulative' *na-*verbs cannot be modified with strong quantifiers like 'every', 'each', 'all' (cf. Milsark 1974). This is confirmed by the following examples:

(86-a)

*Natrhala*<sup>P</sup> *\*každou* *jahodu.*  
 PREF-picked-3SG-FEM \*each-SG-ACC strawberry-SG-ACC

(86-b)

*Nadělal*<sup>P</sup> *\*všechny* *dluhy.*  
 PREF-make-3SG \*all-PL-ACC debts-PL-ACC  
 ?'He made all the debts.'

(86-c)

\**Všechno* *nám* *navyprávěl*<sup>P</sup>.  
 \*all us-DAT PREF-told-3SG

The clash with the universal quantification is even more blatant if the Incremental Theme NP is in the genitive case:

(87-a)  
*Naber<sup>P</sup> vody do džbánu!*  
 PREF-pour water-SG-GEN into jug  
 'Pour some water into the jug!' [the jug does not necessarily have to be full with water]

(87-b)  
*Naber<sup>P</sup> \*všechny vody do džbánu!*  
 PREF-pour \*all-SG-GEN water-SG-GEN into jug  
 'Pour all the water into the jug!'

Notice that we can say

(88-a)  
*Naber<sup>P</sup> všechnu vodu do džbánu!*  
 PREF-pour all-SG-ACC water-SG-ACC into jug  
 'Pour all this water into the jug!'

However, here the prefix *na-* does not have the quantificational meaning of some sufficiently large quantity. The sentence implies that there is some portion of water in the domain of discourse and all of it should be poured into the jug. The emphasis is on the completion of the event.

Sometimes it may be difficult to distinguish which use of *na-* a given sentence instantiates. For example, in the following example the universal quantifier is acceptable. The sentence may be felicitous in a situation in which the speaker and hearer share the knowledge about what constitutes a sufficiently large quantity of wood needed to last for one winter. The sentence makes an assertion about the whole quantity of wood.

(89)  
*Nakácel<sup>P</sup> všechno dřevo na zimu už v říjnu.*  
 'He cut all the wood needed for winter already in October.'

As can be expected, the Incremental Theme argument of 'accumulative' *na-*verbs can be modified with weak determiner quantifiers like 'many/much', 'few/little' and

'some' (cf. Milsark 1974) and measure expressions. This is illustrated with the following examples:

- (90)
- |  |              |   |               |  |                |
|--|--------------|---|---------------|--|----------------|
| <i>Nakoupil<sup>P</sup></i>                | <i>hodně</i> | / | <i>koš</i>    |  | <i>jablek.</i> |
| PREF-bought-3SG                            | a-lot-of     | / | basket-SG-ACC |  | apples-PL-GEN  |
| 'He bought a lot of / a basket of apples.' |              |   |               |  |                |

It has been shown that if the prefix *na-* and the strong determiner quantifier lay claim to the same variable introduced by the Incremental Theme argument, they cannot both have their way. Similarly, a numeral cannot modify the Incremental Theme argument of the 'accumulative' *na-*verbs. By contrast, weak determiner quantifiers that indicate some relatively large and unspecified quantity and the prefix *na-* can simultaneously modify the Incremental Theme argument. The same holds for measure expressions and the prefix *na-*.

The ungrammaticality of sentences with the 'accumulative' prefix *na-* and a universally quantified Incremental Theme noun phrase can be motivated by the prohibition against vacuous quantification. The quantifier *všechen* 'all' or *každý* 'each' binds the variable introduced by the Incremental Theme argument. This variable cannot be at the same time bound by the quantifier *na-*.

It has been suggested that the prefix *na-* functions as a vague quantifier with a meaning comparable to 'a lot (of)', 'many' in English. In those cases in which a *na-*verb and a weak determiner quantifier like *hodně* and *mnoho* 'a lot (of)', 'many' simultaneously modify the same Incremental Theme argument, the prefix *na-* simply reiterates the inherent quantificational meaning expressed by the weak quantifier. Since the meanings of the prefix and the weak quantifier overlap, they may co-occur and modify the same Incremental Theme argument. Contrary to expectations, they together do not give rise to vacuous quantification. One possible way to treat such data would be to view the prefix *na-* and the weak quantifier like *hodně* and *mnoho* 'a

lot (of)', 'many' as constituting one complex (and discontinuous) quantifier over the Incremental Theme argument, precisely because their semantic overlap.

#### 5.4.6.2 The Prefix PO-

The distributive prefix *po-* provides another example of the parallels between determiner quantifiers and prefixes. Other examples of verbs with distributive prefixes are: *vymřít* 'die out (successively, one after the other)', *skoupit* 'buy (all one after the other, all successively).

The distributive verb *pobolívat*<sup>P</sup> denotes a sum situation that consists of individual situations of the same kind. It can be roughly translated as 'ache a little from time to time/now and then' or 'ache a little occasionally':

- (91)
- |   |           |             |              |
|---|-----------|-------------|--------------|
| <i>Pobolívala</i> <sup>I</sup>                    | <i>ho</i> | <i>levá</i> | <i>ruka.</i> |
| PREF-hurt-3SG-FEM                                 | him       | left-SG-NOM | hand-SG-NOM  |
| 'His left hand ached a little from time to time.' |           |             |              |

The prefix *po-* here functions as a quantifier over situations meaning approximately 'occasionally', 'from time to time'. It concerns a plurality of situations and their distribution in time. In this respect it is comparable to adverbs of frequency, such as *often*, *always*, *seldom*.

In addition, the prefix *po-* in *pobolívat*<sup>P</sup> has a modifier function. It adds a specification of a relatively low intensity to the meaning conveyed by the verb root 'ache'. The denotation of *ache a little* picks out a set that counts as a subset of *ache*.

Apart from its function as a quantifier and modifier over situations, the prefix *po-* can function as a quantifier over individuals. This may not be surprising given that distributivity is a "relational notion that is relevant wherever there is predication over pluralities (or anything with part-whole structure)" (cf. Partee 1991:22). I

propose that the distributive prefix *po-* functions as a quantifier over the denotation of the Incremental Theme argument. It is the defining characteristics of the Incremental Theme argument that its denotation has a part-whole structure.

I assume that distributive predicates represent sum situations, that is, they represent situations that consist of other situations. A distributive predicate is homomorphic and it establishes a mapping between the part structure of the sum situation denoted by the distributive predicate and the part structure of the Incremental Theme (which may denote some stuff or a sum individual). Exactly what subpart of the sum situation corresponds to what subpart of the (sum) individual denoted by the Incremental Theme is contextually determined. Consider the following sentence:

(92-a)

*Šálky se po-rozbíjely<sup>P</sup> v myčce.*  
 cups-PL-NOM REFL PREF-broke in dishwasher  
 '(All) the cups broke in the dishwasher.'  
 [gradually, one after the other, for example]

The prefix *po-* is responsible for the distributive reading that concerns the subject argument 'cups'. It can be appropriately uttered in a situation in which the cups broke in a successive fashion, either individually or in individual groups. The presence of the distributive prefix *po-* blocks a collective interpretation. The above sentence would be inappropriate in a situation in which all the cups broke at once. This is confirmed by the fact that the addition of an adverb like *najednou* 'at the same time', 'at once' would make the whole sentence odd:

(92-a')

*Šálky se ?najednou po-rozbíjely<sup>P</sup> v myčce.*  
 cups-PL-NOM REFL ?at once PREF-broke in dishwasher  
 '(All) the cups broke ?at once in the dishwasher.'  
 [gradually, one after the other, for example]

The absence of the distributive prefix *po-* licenses a collective or a distributive interpretation of the whole sentence:

- (92-b)
- |   |           |                            |                 |
|---|-----------|----------------------------|-----------------|
| <i>Šálky</i>                              | <i>se</i> | <i>rozbily<sup>P</sup></i> | <i>v myčce.</i> |
| cups-PL-NOM                               | REFL      | broke                      | in dishwasher   |
| '(All) the cups broke in the dishwasher.' |           |                            |                 |

A distributive *po*-verb requires that every successive situation (which constitutes a part of the whole sum situation) corresponds to a part of the denotation of the Incremental Theme argument. Consider the following example:

- (93-a)
- |  |           |                             |           |                 |
|--|-----------|-----------------------------|-----------|-----------------|
| <i>Jablka</i>                                      | <i>se</i> | <i>kutálela<sup>I</sup></i> | <i>po</i> | <i>podlaze.</i> |
| apples-PL-NOM                                      | REFL      | rolled-3PL-NEU              | on-PREP   | floor           |
| 'The apples were rolling / rolled over the floor.' |           |                             |           |                 |
- (93-b)
- |   |           |                                |           |                 |
|---|-----------|--------------------------------|-----------|-----------------|
| <i>Jablka</i>                                   | <i>se</i> | <i>rozkutálela<sup>P</sup></i> | <i>po</i> | <i>podlaze.</i> |
| apples-PL-NOM                                   | REFL      | PREF-rolled-3PL-NEU            | on-PREP   | floor           |
| '(All) the apples rolled apart over the floor.' |           |                                |           |                 |
- (93-c)
- |   |           |                                  |           |                 |
|---|-----------|----------------------------------|-----------|-----------------|
| <i>Jablka</i>   | <i>se</i> | <i>porozkutálela<sup>P</sup></i> | <i>po</i> | <i>podlaze.</i> |
| apples-PL-NOM   | REFL      | PREF-PREF-rolled-3PL-NEU         | on-PREP   | floor           |
| '(All) the apples rolled apart over the floor.' [i.e., gradually, successively] |           |                                  |           |                 |
- (94)
- |                                    |  |
|------------------------------------|--|
| <i>kutálet<sup>I</sup></i>         | 'roll', 'be rolling'   |
| <i>rozkutálet<sup>P</sup> se</i>   | 'roll apart, roll in different directions'   |
| <i>porozkutálet<sup>P</sup> se</i> | 'roll apart, roll in different directions, successively/gradually/one after the other' |

The simple imperfective verb *kutálet<sup>I</sup>* 'roll' serves as the input into the prefixation with *roz-*. If the prefix *roz-* adds the spatial meaning of 'apart', 'into different directions' (centripetal motion) to the simple imperfective predicate *kutálet<sup>I</sup> se* 'roll', the result is a perfective group predicate *rozkutálet<sup>P</sup> se* 'roll apart, roll in different directions'. A group predicate is predicated of a group and it is true only if it is also true of all individuals making up the group (cf. Brodie and Dowty 1984:84).

When the distributive prefix *po-* is applied to the group predicate *rozkutálet<sup>P</sup> se* 'roll apart, roll in different directions', the result is a perfective distributive group predicate *porozkutálet<sup>P</sup> se* 'roll apart, roll in different directions successively/gradually/one after the other'. Due to the fact that *rozkutálet se<sup>P</sup>* 'roll

apart, roll in different directions' and *porozkutálet se<sup>P</sup>* 'roll apart, roll in different directions successively/gradually/one after the other' are group predicates, they cannot be predicated of a single individual. This is shown by the following example:

(95-a)

\**Jablko se porozkutálelo<sup>I</sup> po podlaze.*  
 \*apple-SG-NOM REFL PREF-PREF-rolled-3SG-NEU on-PREP floor  
 '\*\*The apple was rolling / rolled apart over the floor.'

Since rolling cannot be predicated of individual parts of an apple, the group meaning of the verb *rozkutálet<sup>I</sup> se* is also blocked in the following sentence. However, the perfective verb *rozkutálet<sup>I</sup> se* can be combined with a singular subject noun phrase if it means 'start rolling' (ingressive meaning).

(95-b)

*Jablko se rozkutálelo<sup>I</sup> po podlaze.*  
 apple-SG-NOM REFL PREF-rolled-3SG-NEU on-PREP floor  
 'The apple started to roll across the floor.'

When the distributive prefix *po-* is attached to the predicate like *rozkutálet<sup>P</sup>* as in (a), it enforces its group reading and preempts its ingressive reading.

The distributive *po*-verb requires that each part of the sum situation corresponds to a part of the Incremental Theme argument (or to a partial change of the referent of the Incremental Theme argument), regardless whether it is a sum individual or a single individual. This also allows for a singular count individual to be referred to by the Incremental Theme argument, provided that the appropriate mapping can be established. For example, in the following sentence, every successive situation corresponds to a different subpart of the shoe-lace that was chewed up or to a different degree to which the shoe-lace was damaged.

(96)

*Dášenka mi porozžvýkala<sup>P</sup> tkaničku od boty.*  
 Dášenka me-DAT PREF-PREF-chewed-3SG-FEM lace from shoe  
 'Dášenka gradually chewed up my whole shoe-lace.'

What happens when the distributive prefix *po-* and some determiner quantifier both quantify over the denotation of the Incremental Theme argument? The following sentence, which contains the distributive *po-* and the distributive determiner *každý* in the Incremental Theme NP, is unacceptable.

(97-a)

<i>Pozamykal</i> <sup>P</sup>	<i>*každou</i>	<i>zásuvku.</i>
PREF-locked-3SG	*each-SG-ACC	drawer-SG-ACC
'He locked each drawer.' [successively, one after the other, for example]		

Even without the distributive determiner *každý* 'each', 'every', the corresponding sentence is unacceptable (under the most typical interpretation):

(97-b)

<i>Pozamykal</i> <sup>P</sup>	<i>*zásuvku.</i>
PREF-locked-3SG	*drawer-SG-ACC
'He locked a/the drawer.' [gradually, successively]	

This follows from the distributive meaning of the prefix *po-* and our knowledge of how the denoted event typically takes place. In the above examples, the denoted event cannot be predicated of a single drawer. However, the determiner quantifier *každý* quantifies only over single individuals.

By contrast, the corresponding perfective verb without the distributive prefix *po-* allows for its direct object argument to be quantified with the distributive determiner *každý* 'each', 'every'.

(97-c)

<i>Zamkl</i> <sup>P</sup>	<i>každou</i>	<i>zásuvku.</i>
locked-3SG	each-SG-ACC	drawer-SG-ACC
'He locked each drawer.'		

One significant difference between the distributive prefix *po-* and the determiner *každý* 'each', 'every' is that only the determiner quantifier combines distributivity and universal quantification. By contrast, distributivity only, but not universality, is a constant semantic feature of verbs with the distributive prefix *po-*. In the perfective verb like *pozamykat* 'lock (successively, one after the other)', the distributive reading



is due to the semantics of the prefix *po-*. The universal interpretation stems from the perfective meaning of the whole derived verb.

- (98-a)
- |  |               |
|--|---------------|
| <i>Pozamykal</i> <sup>P</sup>                                    | <i>dveře.</i> |
| PREF-locked-3SG  | doors-PL-ACC  |
| 'He locked (all) the doors.' [one after the other, successively] |               |

The perfective sentence (a) entails (b) with the universally quantified direct object noun phrase:

- (98-b)
- |   |                |               |
|---|----------------|---------------|
| <i>Pozamykal</i> <sup>P</sup>   | <i>všechny</i> | <i>dveře.</i> |
| PREF-locked-3SG   | all-PL-ACC     | doors-PL-ACC  |
| 'He locked all the doors.' [successively, one after the other, for example] |                |               |

Notice that in the above example, the presence of the distributive prefix *po-* and the universal quantifier 'all' do not give rise to a vacuous quantification. The reason is that they quantify over different variables. Distributive *po-* quantifies over sum situations, situations that consist of other situations or cases. While the universal quantifier here quantifies over individuals denoted by the noun 'door'. The mapping is established between all the doors in some contextually determined set of doors and the sum situation denoted by the distributive perfective predicate.

The negation of the universal entailment in a perfective sentence results in a contradiction, as is shown in:

- (98-c)
- |   |               |                        |           |                 |
|---|---------------|------------------------|-----------|-----------------|
| <i>*Pozamykal</i> <sup>P</sup>                              | <i>dveře,</i> | <i>ale nepozamykal</i> | <i>je</i> | <i>všechny.</i> |
| *PREF-locked-3SG  | doors-PL-ACC  | but NEG-locked-3SG     | them      | all-PL-ACC      |
| *'He locked (all) the doors, but he did not lock them all.' |               |                        |           |                 |

The above examples provide evidence in support of the claim that Incremental Theme arguments in perfective sentences are in general understood as being universally quantified. The universal entailment does not stem from the prefix *po-*. The fact that the prefix on its own does not convey universality can be clearly shown by the fact that universality is absent in the secondary imperfective distributive verb

*pozamykávat*<sup>I</sup> 'lock gradually/be gradually closing' which is derived from the perfective distributive verb *pozamykat*<sup>P</sup>. The imperfectivizing suffix *-va-* cancels the universal entailment.

(99-a)

<i>Pozamykával</i> <sup>P</sup>	<i>dveře.</i>
PREF-locked-3SG	doors-PL-ACC
'He was locking (the/some) doors.' [one after the other, successively]	

In the progressive reading, the above sentence entails that only some locking events took place and hence only some doors (but not all of them) were locked. The imperfective operator has the widest scope with respect to both the distributive *po-* and the determiner quantifier *all*: PART > DISTR > ALL.

(99-b)

imperfective	perfective	secondary imperfective
<i>zamykat</i> 'lock', 'be locking'	<i>po-zamykat</i> distributive: 'lock (entirely)' 'finish locking'	<i>po-zamyká-va-t</i> distributive: 'lock', 'be locking'

Given that the distributive prefix *po-* is not inherently a universal quantifier, its quantificational force is weaker than that of the determiner *každý* 'each', which is both distributive and universal.

### 5.4.7 Quantificational Force

In the previous sections, it has been proposed that the prefixes *na-* and *po-* function as weak quantifiers over the denotation of the Incremental Theme argument. One way to test the quantificational force of verbal prefixes is to see whether undetermined Incremental Theme arguments in their scope license discourse anaphora.

Only noun phrases with existential or weak monotone increasing determiners can serve as antecedents of unbound anaphora which escape c-command domains (cf.

Heim 1982, Reuland and ter Meulen (eds.) 1987, Partee et al. 1990:389). To illustrate this point, first consider the difference between the following examples:

(100-a) *Max built a house. It stood on a hill.*

(100-b) *Every dentist in this town built a house. #It was spacious / #They were spacious.*

If the denotation of the Incremental Theme argument is bound by a strong quantifier, it will not sanction discourse anaphora. This is shown in the following examples in which the distributivity is expressed with the strong quantifier *každý* 'each', 'every':

(101-a) *Otevřel<sup>P</sup> každou zásuvku.*  
 opened-3SG each-SG-ACC drawer-SG-ACC  
 'He opened each drawer.'

(101-b) *#Byla<sup>I</sup> prázdná.*  
 #was-3SG empty-SG  
 '#It was empty.'

(101-b') *#Byly<sup>I</sup> prázdné.*  
 #were-3PL empty-PL  
 '#They were empty.'

If the denotation of the Incremental Theme argument is bound by existential or weak determiners, it can serve as an antecedent of unbound anaphora which escape c-command domains. To illustrate this point, consider the difference between the following examples:

(102) *Pootvíral<sup>P</sup> zásuvky.*  
 PREF-opened-3SG drawers-PL-ACC  
 'He opened all the drawers. [one after the other, successively]

*Byly<sup>I</sup> prázdné.*  
 were-3PL empty-PL

They were empty.'

The same holds for the prefix *na-* that functions as a vague measure expression with respect to the Incremental Theme noun phrase 'apples', meaning approximately 'some unspecified quantity of apples'.

(103)

*Na-trhal*<sup>P</sup>      *jablka*<sub>i</sub>  
 PREF-picked    apples-PL-ACC  
 'He picked some apples<sub>i</sub>

*a dal*      *je*<sub>i</sub>      *do mísy.*  
 and put      them<sub>i</sub>    into bowl  
 and put them<sub>i</sub> in a bowl.'

Since the Incremental Theme arguments in the above sentences license discourse anaphora, we may conclude that they are bound by weak quantifiers, and not by strong quantifiers.

The contrast between nominal arguments bound with the distributive prefix *po-* and those bound with the distributive determiner *každý* 'each', 'every' shows that prefixes and determiner quantifiers differ in their quantificational force. The prefixes behave like weak quantifiers and the determiner *každý* is a strong quantifier.

It has been observed that the Incremental Theme noun phrase in a perfective sentence is understood as being universally quantified. The discourse anaphora test seems to indicate that it does not, however, behave like a strongly quantified noun phrase. Consider the following sentences:

(104)

*Otevřel*<sup>P</sup>                      *zásuvky.*  
 opened-3SG                  drawers-PL-ACC  
 'He opened all the drawers.'

*Byly*<sup>I</sup>                      *prázdné.*  
 were-3PL                  empty-PL  
 'They were empty.'

(105-a)

*Vypila*<sup>P</sup>                      *jsem*                      *čaj.*  
 PREF-drank-FEM              am-AUX-SG              tea-SG-ACC  
 'I drank up the tea.'

*Ten*                      *byl*                      *ale*                      *hořký!*  
 that-NOM-MASC              was-3SG              but                      bitter  
 'Boy, was it bitter!'

(105-b)

*Pomaloval*<sup>P</sup>                  *stěny*                      *bílou*                      *barvou.*  
 PREF-painted-3SG              wall-PL-ACC              white-SG-INSTR              color-SG-INSTR  
 'He covered (all) the walls with white paint.'

*Byly*                      *vlhké.*  
 were-3PL                  wet-PL  
 'They were wet.'

Notice that also quantified noun phrases with *všechn* 'all' are acceptable antecedents of unbound anaphora.

(106)

*Otevřel*<sup>P</sup>                      *všechny*                      *zásuvky.*  
 opened-3SG                  all-PL-ACC                  drawers-PL-ACC  
 'He opened all the drawers.'

*Byly*<sup>I</sup>                      *prázdné.*  
 were-3PL                  empty-PL  
 'They were empty.'

This seems to indicate that quantified noun phrases with *všechn* 'all' are weakly quantified. Such examples can be seen as providing support for the claim that *every* is a strong quantifier, but *all* is not (cf. also Vendler 1967; Reinhart 1983 and 1987; Baker 1991).

## 5.5 Conclusion

The proposed analysis is a contribution to the general study of quantification expressed by other means than by determiner quantifiers within noun phrases. As in Partee, Bach and Kratzer (1987) and Partee (1991a, 1991b), among others, it is assumed that the notion of quantification subsumes such notions as 'universality', 'partitivity', 'distributivity', 'measure' that may be conveyed by determiner quantifiers and verbal morphology. I focus on the way in which quantification and related notions, boundedness and (in)definiteness, are conveyed by means of aspectual operators and derivational verbal affixes in Czech.

The approach advocated here has the advantage that all the parameters on which it is based are independently motivated and needed elsewhere in the grammar. I propose that the influence of aspectual operators and derivational affixes on the interpretation of certain nominal arguments can be naturally accounted for in terms of the thematic structure of verbs. I suggest that verbal affixes that serve to derive perfective and imperfective verbs function as operators over episodic predicates and their arguments. At the same time, they constrain the interpretation of the Incremental Theme argument. The ideas that led to the introduction of the notion of 'Incremental Theme' (cf. Dowty 1988 and 1991) go back to Krifka (1986, 1989, 1992). The Incremental Theme hypothesis presupposes an event semantics with lattice-structures (cf. Link 1983; Krifka 1986, 1989, 1992). It also relies on the independently motivated assumption that thematic roles are relations between individuals and events.

The relevant semantic effects on the Incremental Theme argument derive from the aspectual semantics of verbs. They concern the partitive-holistic distinction in the domain of objects and hence amount to effects similar to universal and partitive quantifiers. In proposing that (part of) aspectual semantics can be characterized in terms of part-whole relations in the domain of events I follow some suggestions in

Bach (1981 and 1986b).

The universal (or holistic) interpretation assigned to the Incremental Theme argument by the perfective operator provides a systematic motivation for the well-known correlation of perfective aspect with definite direct objects in Slavic languages. I argue that this correlation is restricted to only a narrow class of direct objects, to *undetermined mass and plural direct objects* that are linked to the *Incremental Theme* argument. Second, the correlation itself is epiphenomal, since it is mediated through the holistic, and bounded, interpretation assigned to the Incremental Theme argument by the perfective operator. In other words, the perfective operator itself does not require that such objects be definite, rather it only requires that they have a holistic (universal) interpretation.

The semantic effects on the Incremental Theme argument are also attributable to the idiosyncratic lexical semantic properties of derivational verbal affixes and concern distributivity, quantity, measure, and other similar notions.

The Incremental Theme hypothesis can be supported by the following empirical evidence: (i) the universal and definiteness effect on the undetermined mass and plural NPs associated with the Incremental Theme argument in perfective sentences. (ii) constraints on the occurrence and interpretation of strong and weak quantifiers (Milsark 1974) with the Incremental Theme argument.

Although I examine in detail Czech data only, the phenomena described here are not restricted to Czech, but they can be also observed in other Slavic languages, and even in such typologically distinct languages as Hindi, Japanese and Warlpiri, to give just a few examples. In general, the phenomena described here may be best observed in languages with rich verbal systems and incomplete determiner systems (e.g., lacking a set of articles like Czech, for example).

The Incremental Theme hypothesis will not be invalidated if we find that there are languages that employ other principles governing the association between verbal

## **Chapter 5. Verbal Morphology and Nominal Reference in Czech: 413**

morphology and nominal arguments. That there may be other principles is to be expected given the wide variety of ways in which languages encode quantification and related notions such as part-whole relations, measure and boundedness.



## Chapter 6

### Aspect and Nominal Reference in German and Finnish

#### 6.1 Introduction

The empirical material in this chapter comes from German and Finnish. These two languages provide particularly interesting evidence for the claim that the incremental situation type represents one of the cross-linguistic (and perhaps universal) schemata that underlies the expression of aspect in typologically different languages.

The German partitive *an*-construction is an illustration of a similarity between the formal expression of imperfective aspect and various locative adverbial phrases. The Finnish partitive case is used both as a partitive quantifier and as an imperfective aspect marker. In addition, Finnish also uses the accusative case as a holistic (or a universal) quantifier and as a perfective aspect marker. I will argue that the transposition of the partitive (Finnish) and locative (German) operations from the spatial domain to the domain of time-occupying entities, or situations, is semantically determined. It takes place in sentences that activate the incremental event type.

The parallel between partitive constructions in the nominal domain and the imperfective aspect in the verbal domain can be seen in connection with the independently motivated fact that languages tend to transfer partitive and locative (cf. Comrie 1976:98ff.) operations from the nominal domain to the expression of imperfective aspect.

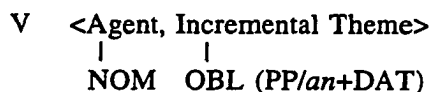
## 6.2 Aspect in German

### 6.2.1 The Partitive *an*-Construction

The partitive *an*-construction is exemplified by the following sentence:

- (1)
- |                              |              |           |              |              |
|------------------------------|--------------|-----------|--------------|--------------|
| <i>Alex</i>                  | <i>baute</i> | <i>an</i> | <i>einem</i> | <i>Haus.</i> |
| Alex                         | built        | on-PREP   | a-SG-DAT     | house-SG-DAT |
| 'Alex was building a house.' |              |           |              |              |

The minimal representation of the partitive *an*-construction will include the following pattern of thematic roles and morpho-syntactic structure:



The partitive *an*-construction has an Agent and an Incremental Theme argument. The Incremental Theme argument is realized as a PP with the preposition *an* (lit.: 'on') and a noun phrase in the dative case.

A sentence like *Alex baute an einem Haus* 'Alex was building a house' denotes an event which is a *proper part* of an event of building a whole house. The speaker who utters such a sentence asserts that the construction of a house was not completed at a relevant contextually specified reference point and he does not commit himself to any particular outcome of the event at a later point. In this respect, the German *an*-construction is comparable to the progressive construction in English. The German partitive *an*-construction can be characterized as denoting situations that are proper parts of situations denoted by the corresponding simple sentences. The German partitive *an*-construction differs from the English progressive construction in that it can be combined with a durative adverb:

- (2-a) *Alex baute zwei Jahre lang an einem Haus.*  
 Alex built two years long on a house
- (2-b) ??'Alex was building a house for two years.'

The partitive *an*-construction stands in a systematic opposition to a construction with an accusative direct object, as is illustrated in:

- (3)
- |                              |              |            |              |
|------------------------------|--------------|------------|--------------|
| <i>Alex</i>                  | <i>baute</i> | <i>ein</i> | <i>Haus.</i> |
| Alex                         | built        | a-SG-ACC   | house-SG-ACC |
| 'Alex built a house.'        |              |            |              |
| 'Alex was building a house.' |              |            |              |

The direct object construction differs from the partitive *an*-construction in that the referent of the Incremental Theme argument tends to be interpreted as being completely subjected to the event. Telic sentences in the past tense that activate an incremental situation type, such as *Alex baute ein Haus* 'Alex built a house', usually imply that the inherent terminus of the denoted event was reached. In other words, the denoted event is viewed in its entirety, the sentence that expresses it has a holistic, or perfective, reading. However, this is not always necessarily the case. The holistic implicature can be cancelled without contradiction:

- (4)
- |  |              |            |              |             |              |                      |
|--|--------------|------------|--------------|-------------|--------------|----------------------|
| <i>Alex</i>                                | <i>baute</i> | <i>ein</i> | <i>Haus,</i> |             |              |                      |
| Alex                                       | built        | a-SG-ACC   | house-SG-ACC |             |              |                      |
| 'Alex built a house,                       |              |            |              |             |              |                      |
| <i>aber</i>                                | <i>er</i>    | <i>hat</i> | <i>es</i>    | <i>noch</i> | <i>nicht</i> | <i>fertiggebaut.</i> |
| but  | he-NOM       | has-3SG    | it-SG-ACC    | still       | NEG          | finish-built         |
| 'but he has not yet finished building it.' |              |            |              |             |              |                      |

The question whether a sentence like *Alex baute ein Haus* 'Alex built a house' has a holistic entailment or not can only be answered on the propositional and discourse level and taking into account the tense marking on the verb.

While sentences that activate an incremental or a culminative situation tend to have a holistic (perfective) implicature in the past tense, they do not have this implicature in the present tense (under a single event interpretation). Consider the following sentence in the present tense:

- (5)
- |  |             |            |              |
|--|-------------|------------|--------------|
| <i>Alex</i>                              | <i>baut</i> | <i>ein</i> | <i>Haus.</i> |
| Alex                                     | builds      | a-SG-ACC   | house-SG-ACC |
| 'Alex is building a house.' <sup>1</sup> |             |            |              |

Such a sentence is usually interpreted as having a partitive reading, since it cannot be assumed that the inherent limit is attained at the relevant reference point (the time of the speech event). Therefore, in the present tense, the construction with an accusative direct object and the construction with an oblique *an*-phrase, e.g., *Er baut ein Haus* and *Er baut an einem Haus*, can often be used interchangeably.

Regardless of the tense marking on the verb, the *an*-construction is a highly marked form: it is used only if it is necessary to indicate explicitly the partitive meaning in German. The partitive *an*-construction is the marked member in the opposition 'accusative direct object construction : oblique *an*-phrase construction'. It is more restricted in meaning than the corresponding accusative construction. Since the latter construction has a less specific interpretation (it allows for both the partitive and non-partitive interpretation), it has a wider range of uses than the partitive *an*-construction. And it can often substitute for the marked partitive *an*-construction. As has been observed above, in so far as the German *an*- construction conveys the partitive meaning and in so far as it is the marked member in the aspectual opposition, it resembles the English progressive construction. Both the German *an*-construction and the English progressive construction overlap with the progressive use of the Slavic imperfective aspect. However, both the German *an*-construction and the English progressive construction differ from the Slavic imperfective aspect in two respects: the Slavic imperfective aspect expresses an improper part relation in the domain of situations and it is the unmarked member in the aspectual opposition 'perfective/imperfective'.

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<sup>1</sup> Of course, a sentence like *Alex baut ein Haus* can have a habitual interpretation 'Alex builds a house', for example, in a context in which Alex is a contractor and builds a new house every month. However, I leave such habitual interpretations aside. As has been pointed out at several places above, iterativity and habituality concern the "plurality" of events, they add another dimension to the basic distinctions that I focus on in this work, and hence they should be treated separately.

Since the only formal difference between the partitive *an*-construction and the non-partitive direct object construction is the alternation 'oblique object (*an* + NP/dative case) vs. direct object (accusative case)', it is obvious that the different interpretations associated with these two types of constructions is attributable to this formal difference marked on nominal arguments.

While there is a corresponding accusative construction for each well-formed partitive *an*-construction, there is not a corresponding *an*-construction for each accusative construction, as the following pair of German sentences shows:

(6-a)

<i>Alex</i>	<i>sah</i>	<i>ein</i>		<i>Haus.</i>
Alex	saw	a-SG-ACC		house-ACC
'Alex saw a house.'				

(6-b)

<i>Alex</i>	<i>sah</i>	<i>*an</i>	<i>einem</i>	<i>Haus.</i>
Alex	saw	*on-PREP	a-SG-DAT	house-SG-DAT

Such examples suggest that the partitive *an*-construction only sanctions a certain type of predicate-argument relations. This asymmetry serves as an opening wedge to the understanding of the underlying event-based restriction on the use of the partitive *an*-construction. Since the partitive *an*-construction licenses only a very restricted class of predicates, its range is narrower than the range of the progressive construction in English or the imperfective aspect in Slavic languages. Hence, it cannot fully compensate for the lack of the grammatical expression of aspect in German.

## 6.2 2 Constraints

An adequate description of the partitive *an*-construction must account for the connection between the *PP/an* and the partitive interpretation of the whole sentential construction. Building on Krifka's (1989:182-183) proposal, I suggest that only such *PPs/an* that are linked to the Incremental Theme role trigger the partitive interpretation. In other words, the class of predicates participating in the aspectual distinction

'partitive vs. non-partitive' corresponds to the class of homomorphic predicates. Given *bauen* 'build' is a homomorphic predicate, in *Alex baute an einem Haus*, and given that the denotation of *an einem house* (lit.: on/at a house) is a part of a house, it maps a part of a house into an event of building that part of a house. The mapping motivates the transposition of a partitive relation in the spatial domain (a relation of a whole individual to its proper parts) into a partitive relation in the temporal domain of events (a relation of a whole event to its proper parts).

My account differs from Krifka's in that I show that the partitive *an*-construction is restricted to a particular canonical subtype of an incremental situation type. In addition to the core partitive idea and mapping from objects to events, the description of the partitive *an*-construction requires the knowledge about the larger scenes that the linguistic material in a given partitive *an*-sentence evokes. We need to draw on cognitive frames that give us insight into structured ways of interpreting our experiences as well as on the larger discourse context. In short, there are both semantic and pragmatic conditions that figure in the description of the partitive *an*-construction in German.

The partitive relation in the spatial domain presupposes a certain implicational relation between a locative expression and partitivity in the spatial domain. In its original locative meaning, the preposition *an* 'on', 'at' specifies a locative relation of a Ground and a Figure,<sup>2</sup> whereby the Figure need not necessarily cover the whole Ground. In other words, *an* 'on', 'at' can mean (i) 'all over'; or (ii) it locates a Figure within a Ground that is larger than the Figure, as in *Das Bild hängt an der Wand* - 'The picture hangs on the wall'. These two readings have parallels in the domain of part-whole relations. The former can be interpreted as an improper part relation between the Figure and the Ground, while the latter as a proper part relation. The

<sup>2</sup> See Talmy (1978) who introduced these terms into the linguistic description.

locative proper part relation is the relevant meaning that is 'transposed' into the domain of situations and exploited in the expression of progressivity in German as well as in other Germanic languages. Prepositions with an originally locative meaning are systematically used for the expression of partitive meaning in German, Dutch and Swedish, for example. In Dutch, for example, we find partitive constructions like *hij is aan het tuinieren* 'he is gardening', literally 'he is at/on the gardening', with the verbal noun in *-en* (cf. Comrie 1976:98-9). Just as German so Dutch also has the partitive construction with 'on', 'at', in Dutch *aan*:

(7-a) *Katinka breide een trui.* Dutch  
'Katinka knitted a sweater.'

(7-b) *Katinka breide aan een trui.*  
'Katinka knitted at a sweater.'  
'Katinka was knitting a sweater.'

Compare this with the corresponding German and Swedish partitive/non-partitive alternations:

(8-a) *Katinka strickte einen Pullover.* German  
'Katinka knitted a sweater.'

(8-b) *Katinka strickte an einem Pullover.*  
'Katinka was knitting a sweater.'

(9-a) *Katinka stickade en tröja.* Swedish  
'Katinka knitted a sweater.'

(9-b) *Katinka stickade på en tröja.*  
'Katinka knitted at a sweater.'  
'Katinka was knitting at a sweater.'<sup>3</sup>

In what follows I will describe the semantic and pragmatic conditions on the use of the partitive *an*-construction in German. Although I only examined German, it may be assumed that the same or similar conditions apply in the comparable partitive constructions in Dutch and Swedish.

First, the partitive *an*-construction licenses a predicate that activates with an incremental situation type. This most general restriction correctly excludes predicates denoting states (both episodic and static) and processes. State and process verbal

<sup>3</sup> The Dutch and Swedish examples are taken from Verkuyl (1972) and Dahl (1981:87).

## Chapter 6. Aspect and Nominal Reference in German and Finnish: 421

expressions followed by the prepositional *an*-phrase are either ungrammatical, or if they are grammatical, they do not have a partitive reading. For example, the following sentence with a process verbal predicate and a *PP/an* is ungrammatical:

(10)

<i>*Eva</i>	<i>streichelte</i>	<i>an</i>	<i>einer</i>	<i>Katze.</i>
*Eve	stroked	on-PREP	a-SG-DAT	cat-SG-DAT

Such a sentence does not allow for either a locative or a partitive interpretation of the *PP/an*. Consequently, it does not allow for a partitive interpretation of the predicate: it is not possible to construe a situation in which parts of a cat would be mapped into the event of stroking a cat. The mapping from objects into events only makes sense within the frame characterized with an incremental situation type in which the state of parts of the lawn and their part-whole relationships can be mapped in the parts of the event and its part-whole relationships.

In the following sentence with the process verbal predicate, the *PP/an* has a locative interpretation, and it does not give rise to a partitive reading of the whole predicate:

(11)

<i>Berta</i>	<i>zog</i>	<i>an</i>	<i>einem</i>	<i>Wagen.</i>
Berta	dragged	on-PREP	a-SG-DAT	cart-SG-DAT
'Berta dragged/tugged at a cart.'				

The reason is that *ziehen* 'drag', 'tug' is not a homomorphic predicate.

The partitive preposition *an* cannot be used with stative verbal predicates, as the following examples show:

(12)

<i>Peter</i>	<i>hat</i>	<i>*an</i>	<i>einem</i>	<i>Haus.</i>
Peter	has	on-PREP	a-SG-DAT	house-SG-DAT

(13)

<i>Daniel</i>	<i>kennt</i>	<i>*an</i>	<i>einem</i>	<i>guten</i>	<i>Geschäft</i>	<i>in Berkeley.</i>
Daniel	knows	on-PREP	a-DAT	good-SG-DAT	store-SG-DAT	in Berkeley.

However, the use of the preposition *an* with stative verbal predicates can be grammatical if a partitive interpretation of the referent of the prepositional object can be construed:



(14)

*Alessandro liebte an Silvia, dass sie so klug war.*  
 lessandro loved on-PREP Silvia-DAT that she so smart was  
 'Alessandro loved about Silvia that she was so smart.'

Stative verbs like *lieben* 'love' and *bewundern* 'admire' do not entail any change or progression. Nevertheless, such a sentence can be understood in a partitive sense: it is felicitous if there were past instances of Alessandro bearing certain relations to a certain characteristic property of Silvia, namely her being smart. Such a sentence can be paraphrased with *Alessandro liebte Silvias Klugheit* - 'Alessandro loved Silvia's intelligence' and not with *Alessandro liebte Silvia* - 'Alessandro loved Silvia'.

The condition that the partitive *an*-construction only sanctions a predicate that is associated with an incremental situation type also predicts that the following *an*-sentence with a punctual predicate is ungrammatical:

(15)

\**Ich entdeckte an einem Schatz.*  
 \*I discovered on-PREP a-SG-DAT treasure-SG-DAT

With such verbs as *entdecken* 'discover', the transition from an initial state into a final state is usually conceived of as a point-like event. Since they have no proper internal subevents, they are trivially indivisible, and hence the partitivity operation cannot be applied to them. This explains why such predicates as *schlagen* 'hit', *brechen* 'break', *töten* 'kill', for example, cannot enter into the partitive *an*-construction.

Verbs of cognitive physical perception like *sehen* 'see' and *hören* 'hear' that are associated with a process situation type are excluded from occurring in the partitive *an*-construction:

(16)

\**Thomas sah an einem Baum.*  
 \*Thomas saw on-PREP a-SG-DAT tree-SG-DAT

(17)

\**Thomas hörte an einem Geräusch.*  
 \*Thomas heard on a-SG-DAT noise-SG-DAT

Such verbs denote experiences that are not under the volitional control of the experiencing individual, and they typically are not thought of as being structured in terms of distinguished consecutive phases.

Second, the partitive *an*-construction clearly prefers a particular subclass of homomorphic predicates, namely predicates like *eat*, *write*, *build*, *knit*, *sew*. A given object token can be subjected to an event denoted by such predicates at most once. The reason is that its existence is contingent on the event to which it is subjected, it comes into existence or disappears in the course of the denoted event. Consequently, the whole event is "non-resettable" with the same object token. Predicates with such *unique* Incremental Themes that are related to an appropriate *unique* event are the best candidates for the partitive *an*-construction (cf. Krifka 1992:41). In such prototypical cases, the partitive *an*-construction denotes an event whose boundaries are determined by the *extent* of the referent of the Incremental Theme argument in the concrete physical domain as it gradually comes into existence or disappears. To illustrate this point, consider the following examples:

- (18)
- |                                   |              |           |              |              |              |
|-----------------------------------|--------------|-----------|--------------|--------------|--------------|
| <i>Ich</i>                        | <i>trank</i> | <i>an</i> | <i>einem</i> | <i>Glas</i>  | <i>Wein.</i> |
| I                                 | drank        | on-PREP   | a-SG-DAT     | glass-SG-DAT | wine         |
| 'I was drinking a glass of wine.' |              |           |              |              |              |
- (19)
- |                                |                 |           |              |               |
|--------------------------------|-----------------|-----------|--------------|---------------|
| <i>Paula</i>                   | <i>strickte</i> | <i>an</i> | <i>einer</i> | <i>Jacke.</i> |
| Paula                          | knitted         | on-PREP   | a-SG-DAT     | jacket-SG     |
| 'Paula was knitting a jacket.' |                 |           |              |               |

The above sentences entail that only a part of the wine was drunk and only a part of the jacket was knitted, respectively.

The *an*-sentences in German activate one particular canonical subtype of the incremental situation type: in this subtype the incremental change is measured with respect to the quantity, extent or volume, of the participant denoted by the Incremental Theme argument. In addition, it must hold that the object is both gradually and *permanently* changed. Thus, homomorphic predicates with *performance* verbs like

*spielen* 'play', *singen* 'sing' as well as predicates with the Representation-Source Theme (cf. Dowty 1991:569) like *kopieren* 'copy' and *photographieren* 'photograph' cannot occur in the partitive *an*-construction. Consider the following examples:

(20)

<i>*Berta</i>	<i>spielte</i>	<i>an</i>	<i>einer</i>	<i>Sonate.</i>
<i>*Berta</i>	played	on-PREP	a-SG-DAT	sonate-SG-DAT

(21)

<i>*Ich</i>	<i>kopierte</i>	<i>an</i>	<i>einem</i>	<i>Aufsatz.</i>
<i>*I</i>	copied	on-PREP	a-SG-DAT	paper-SG-DAT

Performance predicates denote the realization of an abstract type of a certain performance piece, and predicates with Representation-Source Themes denote the realization of a given source object. Performance predicates and predicates with Representation-Source Themes denote resettable events. The same performance piece or the same source object can be reproduced many times without bringing about any changes in the original object or in the abstract type underlying the actual performance piece. For example, the same song may be sung many times, the repeated performance does not (necessarily) change the score or the words.

Predicates that are associated with the other main canonical subtype of the incremental situation type, namely the one in which the incremental changes correspond to the different degrees of some qualitative aspects of the Incremental Theme, rather than to its quantity, are typically odd or not admissible in the partitive *an*-construction. Hence such sentences as the following one are not well-formed:

(22)

<i>*Marco</i>	<i>kochte</i>	<i>an</i>	<i>den</i>	<i>Spaghetti.</i>
<i>*Marco</i>	cooked	on-PREP	the-PL-DAT	spaghetti-PL

Despite the fact the denoted event involves an incremental and permanent change of the spaghetti that can be measured along the property scale (the softness scale), such a qualitative incremental change does not satisfy the semantic requirement of the partitive *an*-construction. On these grounds expressions like *\*an den Nudeln kochen* 'lit.: on the noodles cook' or *\*am Bier kochen* 'lit.: on-the beer brew' are ungrammatical.

The assumption that the partitive *an*-construction requires that the boundaries of the event are determined by the *extent* of the referent of the Incremental Theme can be supported by the fact that a given *an*-sentence is well-formed if a suitable 'extent' construal can be found. For example, the *extent* may be understood in terms of a procedure. The following sentence

(23)

<i>Meine</i>	<i>Freunde</i>	<i>kochten</i>	<i>am</i>	<i>Abendessen.</i>
my	friends	cooked	on-the-SG-DAT	dinner-DAT
'My friends were cooking dinner.'				

is grammatical, because what is relevant here is not merely the fact that certain ingredients are subjected to an internal change in the process of cooking; but rather that a certain procedure with a number of ordered steps is followed so that a certain type of meal gradually comes into existence with all of its conventional sequence of courses. In order to describe such partitive *an*-sentences as the one above, it is necessary that the mapping between objects and events can be applied not only in a concrete physical domain but also in the more abstract domain, of prototypical procedures, for instance. Thus, in our example we might also include a mapping from the sequence of the steps in a prototypical dinner-cooking procedure into the event of cooking dinner.

In some cases, the judgements of native speakers seem to vary with respect to the acceptability of the partitive *an*-construction. In this group belong, for example, the following expressions:

- (\*) *an einem Hemd bügeln* 'on a shirt to iron'
- (\*) *an einem Hemd waschen* 'on a shirt to wash'
- (\*) *am Boden schrubben* 'on-the floor to scrub'
- (\*) *am Haar kämmen* 'on-the hair to comb'
- (\*) *am Buch lesen* 'on-the book to read'

These expressions denote events in which one and the same object token can be subjected to the same event type more than once. And consequently, events with such non-unique Incremental Themes are resettable. For example, the process in which somebody acquires information from a book does not change the book, neither its

physical appearance nor its contents in any way.

The expression *an einem Hemd waschen* (on-PREP a-DAT shirt-DAT to wash) 'to be washing a shirt' represents a borderline case. The acceptability of this expression depends on the context of use and on what the interpreter knows about the larger scenes that the linguistic material in the above sentence evokes. Such a sentence may be well-formed if it refers to a situation in which the shirt is gradually subjected to the event of washing. This is the case, for example, when the shirt is washed by hand. However, speakers who normally think of washing in terms of washing laundry in the washing machine, that is, for whom the event of washing consists merely in putting the laundry into the washing machine, consider the expression *an einem Hemd waschen* 'to be washing a shirt' as not well-formed. In this case the condition of gradual mapping from Incremental Theme arguments into events is not satisfied, and consequently the expression *an einem Hemd waschen* 'to be washing a shirt' cannot be felicitously uttered. This example also clearly shows that the acceptability of the partitive *an*-construction is not a purely syntactic or semantic matter, rather it also depends upon the possibility to interpret a given *an*-sentence against the background of the incremental event type. And this also means that the entire context of a verbal expression is relevant in considering a given object as being incrementally affected or not.

There are certain contexts that seem to enforce the possibility of the gradual manner in which the participant denoted by the prepositional object is subjected to the event. This improves the chances that a given *an*-sentence that refers to a resettable event with non-unique Incremental Themes will be acceptable. Consider the following example:

(24)

*Ich habe schon eine Viertelstunde an diesem Hemd 'rumgebügelt*  
 I have already a quarter-hour on-PREP this shirt all-around-ironed-PAST-PART  
*und es ist immer noch nicht glatt.*

and it is always still not smooth

'I have been ironing on this shirt for a quarter of an hour and it still is not smooth.'

Here, *herum* abbreviated as *'rum* '(all) around' is used together with the prepositional *an*-phrase to emphasize the notion of graduality necessary for the partitive reading of the whole sentence.

The partitive *an*-construction differs in one important respect from the accusative direct object construction to which it stands in an aspectual opposition. While the partitive *an*-construction requires that its Incremental Theme argument be bounded, and hence the whole construction is bounded (or telic), there is no such requirement on the boundedness of the Incremental Theme argument of the corresponding accusative construction. This point is illustrated by the following examples:

(25-a)

*Ich trank Wein.*  
I drank wine-SG-ACC  
'I drank wine.'

(25-b)

\**Ich trank an Wein.*  
\*I drank on-PREP wine  
\*'I drank on wine.'

(26-a)

*Paula strickte Jacken.*  
Paula knitted jacket-PL-ACC  
'Paula was knitting a jacket.'

(26-b)

\**Paula strickte an Jacken.*  
\*Paula knitted on-PREP jacket-PL-DAT  
'Paula was knitting jackets.'

The partitive *an*-construction makes an assertion about a proper part of a certain bounded object (singular or plural), and given the mapping from objects to events, it makes an assertion about a proper part of the bounded (or telic) event to which the individual is subjected. If the above requirement that the Incremental Theme argument in the *an*-phrase must be bounded is correct, then we need to assume that the mapping from objects to events, concerns two properties: their boundedness and their partitivity. First, both the participant that corresponds to the Incremental Theme and

the incremental event are bounded. Second, the partitivity of the *an*-phrase that contains the Incremental Theme argument gives rise to the partitive interpretation of the whole clause. Although the semantic properties 'boundedness' and 'partitivity' are both coded on the Incremental Theme argument in the German partitive *an*-construction, and both these properties are relevant for the mapping from objects to events that gives rise to the bounded (telic) and partitive meaning of the whole construction, we need to draw a clear line between the two categories, namely, telicity and aspect, that these two semantic properties characterize.

There is another dimension which interacts with the semantic-pragmatic conditions mentioned so far: the speaker's perception of control over the course of the incremental situation type, whether that control comes from the voluntary actions of an Agent, from the involuntary actions of his body's forces or from the natural forces. The partitive *an*-construction requires that its the subject be linked to the Agent thematic role. Note that the *an*-construction with the subject-NP linked to the Instrument or the Cause thematic role is ungrammatical. This is shown in the following examples:

- (27)
- |  |   |
|--|---|
|  | <i>*Die elektrische Mühle mahlte an den Kaffeebohnen.</i>               |
|  | <i>*the electric mill ground on-PREP the-PL-DAT coffee-beans-PL-DAT</i> |
- (28)
- |  |   |
|--|---|
|  | <i>*Die Sonne trocknete an der Wäsche.</i>        |
|  | <i>*the sun dried on-PREP the-DAT laundry-DAT</i> |

Third, the partitive *an*-construction only sanctions a very restricted class of two-place homomorphic predicates in German. The Incremental Theme argument must be a subcategorized argument of the main lexical verb, and not just an argument that has been added to the original argument structure, for example, by some argument structure augmentation process in the lexicon. Consider the following example:

- (29)
- |  |  |
|--|--|
|  | <i>*Gestern rannte Marco an einer Meile.</i>             |
|  | <i>*yesterday ran Marco on-PREP a-SG-DAT mile-SG-DAT</i> |

Such verb phrases as *eine Meile rennen* 'run a mile' denote events with an inherent terminal point, and parts of a mile can be gradually mapped into the event of running a mile. However, the measure noun phrase *eine Meile* 'a mile' is not a subcategorized argument of the head verb. *Rennen* 'run' is a one-place predicate that takes only an Agent argument. It may be concluded that only homomorphic predicates with subcategorized Incremental Theme arguments are sanctioned by the partitive *an*-construction.

### 6.2.3 Lexicon

Consider again the two examples given at the outset of this chapter:

(30-a)

<i>Alex</i>	<i>baute</i>	<i>ein</i>	<i>Haus.</i>
Alex	built	a-ACC	house-ACC
'Alex built a house.'			

(30-b)

<i>Alex</i>	<i>baute</i>	<i>an</i>	<i>einem</i>	<i>Haus.</i>
Alex	built	on-PREP	a-SG-DAT	house-SG-DAT
'Alex was building a house.'				

I suggest that the use of the *an*-phrase for the expression of partitivity should be encoded in the lexicon as a prepositional object governed by the verb. This lexical strategy is justified by the fact that the use of the *an*-phrase as a partitive marker is restricted to a very limited class of predicates and/or their uses that presuppose that the sentence in which they are used is interpreted against the background of a canonical subtype of the incremental situation type. My assumption is that the verb *baute* '(he/she/it) built' in the above sentences has two different subcategorizations in the lexicon. That is, there are two entries in the lexicon: one entry for the predicate with the Incremental Theme linked to the direct object realized in the accusative case and the other for the predicate with the Incremental Theme realized as the *an*-prepositional phrase. These two entries are encoded as two independent lexical entries



in the lexicon that are related by lexical rules (along the lines suggested in Dowty 1979, Ch. 6). They can be represented as follows:

(31)

[Lexeme BAUEN]			
[sem	[frame	BUILDING]	]]
	[sit	incremental-event]	]]
	[p-role	Part1: Part2:	]]
		builder artifact]	]]
[val	[θ-role	[Agent, Incremental Theme]]]	]]
[case		[NOM, ACC]	]]

(32)

[Lexeme BAUEN]			
[sem	[frame	BUILDING]	]]
	[sit	incremental-event]	]]
	[telicity	bounded +]	]]
	[p-role	Part1: Part2:	]]
		builder artifact]	]]
[val	[θ-role	[Agent, Incremental Theme]]]	]]
[case		[NOM, OBL (PP/an+DAT)]	]]

The relation between the two lexicon entries is captured by a lexical redundancy rule. Such a rule takes the predicate with the accusative noun phrase as "input" and renders as "output" the predicate with the partitive *PP/an*. This treatment implies that predicates with the Incremental Theme that is linked to the direct object are considered to be basic, while the predicates with the Incremental Theme linked to *PP/an* are derived from them. The predicate governing the Incremental Theme realized as a prepositional phrase inherits most of its syntactic, semantic, and pragmatic information structure from the predicate with the Incremental Theme realized as the direct object in the accusative case.

To summarize, the partitive *an*-construction in German sanctions two-place predicates that take an Agent and an Incremental Theme argument that is incrementally and permanently changed as a result of the denoted event. Over and above the core idea of partitivity and mapping from objects to events, my analysis emphasized semantic and pragmatic conditions on the felicitous use of the partitive *an*-construction. It has been shown that the acceptability of the partitive *an*-construction depends on the linguistic context as well as on the knowledge represented in the cognitive frames activated by this construction.

### 6.3 Aspect in Finnish

In Finnish, the partitive/accusative case alternation on nouns serves in certain contexts to convey the aspectual distinction:

- (33-a)
- |                          |                |   |                        |                 |
|--------------------------|----------------|---|------------------------|-----------------|
| <i>Join</i>              | <i>kahvia.</i> | - | <i>Luin</i>            | <i>kirjoja.</i> |
| drank-1SG                | coffee-PART    | - | read-1SG               | books-PL-PART   |
| 'I was drinking coffee.' |                |   | 'I was reading books.' |                 |
- (33-b)
- |                                |                |   |                           |                |
|--------------------------------|----------------|---|---------------------------|----------------|
| <i>Join</i>                    | <i>kahvin.</i> | - | <i>Luin</i>               | <i>kirjat.</i> |
| drank-1SG                      | coffee-ACC     | - | read-1SG                  | books-PL-ACC   |
| 'I drank up (all) the coffee.' |                |   | 'I read (all) the books.' |                |

The meaning of a completed event is required in such Finnish sentences as in (b), but not in those in (a), even though the verb does not carry any formal marking that would encode this difference.

This correlation between partitivity and imperfectivity is described in standard and traditional Finnish grammar handbooks in the following way: "The object is in the partitive when it expresses an indefinite, non-limited quantity (divisible words and plural words)" (Karlsson 1983:81). At the same time, it may be used if the action is

directed at an indefinite part of the object, if it does not lead to "any 'important' final result (i.e. the action is irresultative)" (Karlsson 1983:80). The accusative suffix marks the object for "a whole quantity or a definite quantity" (Karlsson 1983:94) and it also expresses a resultative action in affirmative sentences (cf. Karlsson 1983:94; Dahl & Karlsson 1976:11; Tommola 1990:361), that is, it may indicate a 'crucial change in the state of the object' (cf. Dahl & Karlsson 1976:8).<sup>4</sup>

However, the partitive/accusative alternation does not always convey a difference in aspect, as is shown in the following examples:

(34-a)

*Näin kukkia.*  
saw-1sg flowers-PL-PART  
'I saw (some) flowers.' - i.e. there were others I did not buy.

(34-b)

*Näin kukat.*  
saw-1sg flowers-PL-ACC  
'I saw the flowers.' - i.e. all of them, a total quantity.

I suggest that the core class of aspectually-relevant simple-clause sentences in Finnish is restricted to a semantically well-defined set, namely to those sentences that are associated with an incremental situation type. This restriction covers those sentences in which the Incremental Theme argument is a syntactically realized argument (as suggested by Krifka 1989:188-190). This is illustrated by the examples given at the outset of this section. And also by such examples as:

(35-a) *Tyttö luki läksyä (PART).*  
'The girl was doing her homework (PART)' (i.e., had not yet finished).

(35-b) *Tyttö luki läksyn (ACC).*  
'The girl did (i.e., finished) her homework.'

(36-a) *Väinö rakensi taloa (PART).*  
'Väinö is building a/the house.'

(36-b) *Väinö rakensi talon (ACC).*  
'Väinö is building a/the house.'

<sup>4</sup> See also Fromm and Sadeniemi (1956:120-21, 123).

- (37-a) *Presidentti ampui lintua (PART).*  
 'The president shot at (or: shot and wounded) a/the bird.'
- (37-b) *Presidentti ampui lintun (ACC).*  
 'The president shot at (or: shot and wounded) a/the bird.'
- (38-a) *Kalle lämmittää saunaa (PART).*  
 'Kalle is warming up the sauna.'
- (38-b) *Kalle lämmittää saunan (ACC).*  
 'Kalle will warm up the sauna.'<sup>5</sup>
- (39-a) *Suurensin valokuvan.*  
 'I enlarged the photo (to a given size).'
- (39-b) *Suurensin valokuvaa.*  
 'I was enlarging a/the photo.'  
 'I enlarged a/the photo (a bit, but I could have made it bigger still).'

In Finnish, as in German, we have the same mapping from objects to events that motivates the aspectual properties of the whole verbal expression. The German partitive *an*-construction is more constrained than the Finnish in so far as it requires that the Incremental Theme argument be bounded (under a single event interpretation). In Finnish, the Incremental Theme need not be bounded. This is shown in the following example:

- (40) *Silja joi maitoa (PART).*  
 'Silja drank (some) milk.'  
 'Silja was drinking (some) milk.'

Due to the unbounded property of the Incremental Theme argument 'milk', the above sentence is unbounded (atelic), and due to the partitive case marking on 'milk' it has an imperfective meaning.

The widening of our scope from the Incremental Theme to the incremental event type allows us to account for those sentences in which the partitive/accusative case that conveys the aspectual distinction is marked on the Holistic Theme (cf. Dowty 1991:569). To illustrate this point consider the following examples:

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<sup>5</sup> Examples taken from Karlsson (1983:80).

- (41-a)
- |   |             |               |  |
|---|-------------|---------------|--|
| <i>Hän</i>  | <i>ajoi</i> | <i>autoa.</i> |  |
| he-NOM  | drove-3SG   | car-SG-PART   |  |
| 'He was driving a/the car' or 'He drove a/the car.' |             |               |  |
- (41-b)
- |                                     |             |              |                 |
|-------------------------------------|-------------|--------------|-----------------|
| <i>Hän</i>                          | <i>ajoi</i> | <i>auton</i> | <i>talliin.</i> |
| he-NOM                              | drove-3SG   | car-SG-ACC   | garage-ILL      |
| 'He drove the car into the garage.' |             |              |                 |
- (41-c)
- |   |             |              |                 |
|---|-------------|--------------|-----------------|
| <i>Hän</i>                                | <i>ajoi</i> | <i>autoa</i> | <i>talliin.</i> |
| he-NOM                                    | drove-3SG   | car-SG-PART  | garage-ILL      |
| 'He was driving the car into the garage.' |             |              |                 |

(a) shows that the possibility of expressing the aspectual distinction by means of case suffixes is preempted when the directional argument is absent. The direct object of the Finnish verb 'drive' only takes the partitive case. The verb 'drive' is a manner of motion of verb and it is not homomorphic.

What is interesting about such examples like (b) and (c) is the fact that the accusative/partitive case marking that gives rise to the aspectual distinction is marked on the noun 'car'. It is an argument that Dowty (1991:569) calls a 'Holistic Theme'. The participant associated with 'car' undergoes a change of state in stages. However, it is not the part structure of the car that is correlated with the part structure of the event. Rather, it is the path delimited by the Goal phrase 'to the garage' whose part structure is mapped onto the part structure of the event. Sentence (b) with the accusative case marking on 'car' implies that the event was completed and as a result the car was in the garage. The corresponding sentence with the partitive noun phrase *autoa* in (c) most likely conveys 'he was in the process of driving the car into the garage'.

With verbs of manner of motion, directional prepositional phrases like 'into the garage' function as frame-creating adjuncts (cf. Fillmore 1989:101ff.).<sup>6</sup> The directional phrase added here to the verb 'drive' has a function that is not provided by the lexical semantic properties of this verb. The directional phrase creates a directed

<sup>6</sup> Cf. also 'superordinate adjuncts' in Jackendoff (1991:211).

motion frame and the verb of manner of motion specifies the way in which the motion takes place. The progress of this motion event can be measured by comparing the various locations of the moving entity 'car' (Holistic Theme) at different consecutive time points with respect to the goal specified by the directional phrase. In short, manner of motion verbs, such as 'drive', together with directional prepositional phrases, such as 'into the garage', constitute a verbal expression that activates an incremental event type.

To take a similar example, consider:

- (42-a) *Hän kantoi kassin (ACC) kotiin.*  
'He carried the bag home.'
- (42-b) *Hän kantoi kassia (PART) kotiin.*  
'He was carrying a/the bag home.'<sup>7</sup>

The expression of perfectivity in Finnish and in Slavic languages functionally overlaps in one important respect. Finnish has no grammatical future tense, and "the non-past form needs a marker elsewhere, usually in the object case marking" (Toivainen 1991:5). Finnish and Czech sentences with a perfective meaning and a present tense main verb have a future time reference (under a single event interpretation). Consider the following examples:

- (43-a)
- |  |                   |                     |
|--|-------------------|---------------------|
| <i>Tyttö</i>                                     | <i>heittää</i>    | <i>lumi-pallon.</i> |
| girl   | throw-NONPAST.3SG | snow-ball-SG-ACC    |
| 'The girl will throw the snowball.' <sup>8</sup> |                   |                     |
- (43-b)
- |   |                   |                     |
|---|-------------------|---------------------|
| <i>Tyttö</i>  | <i>heittää</i>    | <i>lumi-palloa.</i> |
| girl  | throw-NONPAST.3SG | snow-ball-SG-PART   |
| 'The girl throws/ will throw/ is throwing a/the snowball.' <sup>9</sup> |                   |                     |
- (44-a) *Syötkö kalan (ACC)?*  
'Will you eat a/the fish?'

<sup>7</sup> Examples taken from Karlsson (1983:95).

<sup>8</sup> Cf. also Weist et al. (1991:73) who observe with respect to this sentence that the non-past form, Finnish present, "combines with a direct object in the accusative case to produce future meaning".

<sup>9</sup> Examples are taken from Toivainen (1991:5).

- (44-b) *Syötkö kalaa (PART)?*  
'Do you eat fish?'<sup>10</sup>

Since the Finnish aspectual distinction is restricted to clauses that evoke the incremental event type, it has a much narrower range than the Slavic one does. A further limitation on the expression of the category of aspect in Finnish comes from the fact that there are contexts in which the opposition 'partitive/accusative' case is neutralized. For example, the case alternation is neutralized in negative clauses, as the object of a negative sentence is in the partitive case. This is shown by contrasting the following affirmative sentences in which the accusative and partitive case marking on the object is correlated with the difference in the aspectual meaning

- (45-a) *Silja joi maidon (ACC)*  
'Silja drank the milk'

- (45-b) *Silja joi maitoa (PART)*  
'Silja drank (some) milk'

with their negated counterpart:

- (46-a) *Silja ei juonut maitoa (PART).*  
'Silja did not drink the/any milk.'<sup>11</sup>

- (46-b) \**Silja ei juonut maidon.*  
\*Silja NEG drank-3SG milk-ACC

The case alternation 'partitive/accusative' case is also neutralized in clauses that are headed by psychological verbs. They require an object in the partitive case:

- (47-a) *Minä rakastan sinua (PART).*  
'I love you.'

- (47-b) *Suomi kiinnostaa minua (PART).*  
'Finland interests me.'

The hypothesis that the partitive or accusative marking on the Incremental or Holistic Theme argument serves to convey meanings comparable to the aspectual perfective/imperfective distinction in Slavic languages has one clear advantage over previous proposals: it allows us to narrow down the class of aspectually-relevant sentences to a semantically well-defined set, instead of relying on such vague notions as

<sup>10</sup> Examples are taken from Karlsson (1983:95).

<sup>11</sup> Examples taken from Karlsson (1983:79).

'resultativity' or 'a crucial change in the state of the object'.

Independently of their aspectual function, the partitive and accusative case tend to contribute to the differences in (in)definiteness. Since Finnish does not have an overt article system, the case alternation can, to a certain extent, compensate for its lack. Tommola observes that "the most obvious discourse functions could be found--in functions, related to those of articles" (Tommola 1990:361). "If compared with Germanic languages, the partitive can be said to correspond to the lack of an article, with at least as good evidence as it is said to correspond to NSV [imperfective aspect] if compared with Slavic languages" (Tommola 1990:351-2).

While in Czech both the differences in the aspectual properties and in the referential properties of Incremental Theme arguments arise from verbal morphology, in Finnish, they stem from the case marking on Incremental (and Holistic) Theme arguments.

Despite the different morphological strategies that Finnish and Slavic languages like Czech employ to convey the aspectual distinction, the Finnish perfective and imperfective construction and the corresponding constructions in Czech are associated with the same clustering of semantic properties: in particular, we can observe an affinity between perfectivity and a holistic and a bounded reading of Incremental Theme arguments, and imperfectivity and a partitive reading of Incremental Theme arguments.

Finnish and Czech have no overt article system. The functions that are ascribed to articles in English, for example, can be, to a certain extent, here taken over by the same devices that are used to convey the 'part-whole' relation (cf. Tommola 1990:351-352 and 361; Leinonen 1984; Kabakčiev 1984). In both Czech and Finnish, the part-whole relation is correlated with the unbounded and bounded interpretation of the relevant inherently unbounded nominal argument. The boundedness together with general pragmatic principles of interpretation gives rise to the difference in



(in)definiteness. Once an inherently unbounded argument is assigned a holistic interpretation, because it is in the accusative case (Finnish) or because it is an Incremental Theme of a perfective verb (Czech), its definite reading follows from the same general pragmatic principles. The assertion that the whole individual or the whole group of individuals was subjected to the event presupposes that their denotation be bounded. If the denotation of the nominal argument in question is inherently unbounded, the only way in which it can be given a holistic and bounded interpretation is to anchor it to a bounded entity or a set of entities easily identifiable in the discourse context (linguistic or non-linguistic).

If, on the other hand, the nominal argument has a partitive interpretation, because it is in the partitive case (Finnish) or because it is an Incremental Theme of an imperfective verb (Czech), it may be bounded or unbounded. Making an assertion about a subpart or subparts of an entity does not presuppose the existence of a whole bounded entity, rather it merely allows for the possible existence of some or other (contextually) relevant additional quantity or continuation.

It is important to emphasize that in both Czech and Finnish the correlation between 'holistic' interpretation and definiteness does not apply if the relevant nominal expression is already bounded: if it is a singular count or if it contains a determiner quantifier or a measure expression.

- (48-a) *Liikemies kirjoitti KIRJEEN valiokunnalle.*  
businessman wrote letter-ACC committee-to  
'The businessman wrote a letter to the committee.'
- (48-b) *Liikemies kirjoitti KIRJETTÄ valiokunnalle.*  
businessman wrote letter-PART committee-to  
'The businessman was writing a letter to the committee.'

This example shows that it would be wrong to claim that in Finnish perfective constructions the direct object reference is always specific, as Tommola (1990:352-353) seems to assume when he speaks of 'specific resultativity'.

## 6.4 Summary and a Proposal for a Unification Analysis

### 6.4.1 Summary

Under the prototype view proposed here, the category 'aspect' is characterized in terms of two aspectual prototypes 'on-going situation' and 'result' (in this I follow some suggestions in Slobin 1985). These prototypes are two extreme categories of aspectual meaning. They stand for clusters of aspectual properties that are associated with the grammatical expression of imperfective and perfective aspect. The systematic expression of aspect in any given language can be understood as realizing at least some of the properties that contribute to the prototypes 'on-going situation' and 'result'. The more of these properties are grammaticalized in a given language-specific aspectual category, the closer it is to the prototype 'on-going situation' or 'result'.

The 'on-going situation' prototype involves partitivity and the 'result' prototype the holistic meaning as one of its contributing properties. This reflects the long-standing intuition that perfective and imperfective verbs allow us to make an assertion about all and a part of a situation, respectively.

I propose that the partitive-holistic distinction constitutes the semantic core of many, possibly all, aspectual systems. This aspectual core lends itself naturally to a description within the theories of *mereology*, or the logic of part-whole relations. It has been proposed that at least some of the properties of the telic and atelic verbal predicates can be described in mereological terms (cf. Bach 1981). Such a mereologically-based characterization of aspect and telicity has the advantage that it allows us to describe in a straightforward way the integration of aspect and telicity in sentence's semantics. Aspect interacts in a systematic way with telicity and an adequate description of aspect must account for this systematic interaction.

If we assume that the partitive-holistic distinction constitutes the semantic core of aspectual systems in natural languages, then we can also describe in a

## Chapter 6. Aspect and Nominal Reference in German and Finnish: 440

straightforward way the parallels between various aspectual systems regardless whether they express aspect by means of verbs or some periphrastic verbal constructions or by means of nouns, noun phrases and various constructions with a locative or partitive origin. The comparison of English Czech, German and Finnish shows that their different strategies for expressing aspect can be viewed in terms of a difference in the grammatical encoding of the cross-categorial and cross-linguistic partitive-holistic distinction.

<b>primary expression of aspect</b>	<b>language</b>
verb-centered and syntactic	English
verb-centered and morphological	Czech
noun-centered and syntactic	German
verb-centered and morphological	Finnish

According to the traditional linguistic view, nouns name or describe individuals, while verbs typically denote or express situations or events. Given that the category of 'aspect' concerns distinctions in the domain of situations, the natural locus for the expression of the aspectual partitive-holistic distinction is the verb. This situation can be found in English and Czech, for example. English expresses the progressive aspect by means of a periphrastic verbal construction. Czech marks perfective and imperfective verb on the verb by lexical-derivational means

Examples of noun-centered means for the expression of aspect can be found in a number of languages belonging to various genetic and geographical families. In particular, various partitive and holistic operations in the domain of individuals are exploited for the formal expression of aspect. This occurs when partitive and holistic operations are transposed from the domain of individuals (space) to the domain of situations (time).

German and Finnish exemplify the expression of aspect by noun-centered means. In both German and Finnish a grammatical marking that primarily serves to express a

partitive and/or holistic meaning that concerns individuals is systematically exploited to indicate a partitive and/or holistic meaning in the domain of situations. In German, the imperfective aspect is conveyed by the partitive object 'an + NP'. The German *an*-construction represents one of the ways of expressing aspect in a syntactic or 'constructional' way. Finnish grammaticalizes the partitive-holistic distinction by coding it with case suffixes on nouns. A noun is case-marked with the partitive when it expresses an indefinite, non-limited quantity (substances and plural individuals), or a part of a bounded individual. The accusative suffix on a given noun marks the denoted individual for a whole quantity or a definite quantity (cf. Karlsson 1983:94; Dahl and Karlsson 1976:11; Tommola 1990:361). Since the partitive/accusative case alternation also serves to indicate the aspect of the whole clause, Finnish can be classified as having a morphological (synthetic) means for the expression of aspect.

The English progressive instantiates one extreme category of aspectual meaning, namely the 'on-going situation' prototype. One of its contributing features is partitivity. The English progressive operator relates situations denoted by simple sentences to their proper parts. For example, in asserting a sentence like *Max was crossing the street* the speaker explicitly excludes the final part of the situation, namely, that subpart of the situation that has Max on the other side of the street. The English progressive operator is treated here as expressing a 'proper-part' relation in the domain situations. By contrast, the Czech imperfective has a broader range of uses and it allows for the denoted situation *not* to be viewed in its entirety. Therefore, the partitivity involved in the Slavic imperfective is viewed in terms of the 'improper part' relation. It is a non-strict relation that can be circumscribed as 'part-of-or-equal'. The perfective aspect in Czech has a holistic meaning it presents a situation as a single whole. The Czech perfective aspect is situated close to the opposite extreme, the 'result' prototype.

The accusative and partitive case marking in Finnish that conveys aspect seems instantiates the 'result' and the 'on-going situation' prototypes. The partitive *an-*construction in German instantiate the 'on-going situation' prototype. It is characterized by all the requisite contributing properties: partitivity, extension along the temporal axis, dynamicity, temporary (contingent, potentially changeable) situation, expression of a situation without regard to its boundaries.

In Finnish and German an encoding system that is primarily designed to indicate the partitive-holistic distinction in the domain of individuals is exploited to convey the same distinction in the domain of situations, namely to convey aspect. It has been shown that a reverse situation can be found in Czech (and also in English). Here, the aspectual operators, perfective and imperfective, encode the partitive-holistic distinction in the domain of situations and at the same time they are exploited to effects similar to universal and partitive quantification, which is typically expressed by determiner quantifiers within noun phrases.

What is striking about these two general processes is that they point to the same fragment of conceptual structure, which I labeled the *incremental event type*. It represents one *cross-linguistic schematization*, one conventional way in which languages tend to conceptualize the structure of various states of affairs in the real world. It is associated with verbs, verb phrases and sentences. In the most straightforward cases, the rules that govern the interaction between verbal and nominal predicates in Czech, German and Finnish make reference to the Incremental Theme argument. The Incremental Theme is syntactically realized as the nominal argument that carries the marking of a partitive and a holistic meaning (Finnish and German) or that "acquires" the partitive and holistic meaning from the aspectual operator (Czech, English).

The fact that the partitive-holistic distinction is encoded on the verb in Czech and on the noun or noun phrase in Finnish and German is clearly not imposed by the

real world (facts, or states-of-affairs), but rather it is a matter of cognitive choices inherent in their *language-specific schematizations*. These choices, in turn, are contingent on the whole system of linguistic representations in a given language and on the underlying conceptual systems associated with them.

This strongly suggests that it is not a pure co-incidence that the same general constraints on the interaction between nominal and verbal predicates are operative in different Indo-European languages. This may be seen as providing further evidence for the parallels in the linguistic structuring of space and time across languages. investigation of the structure and interpretation Further of such linguistic means would certainly reveal more insights into the semantic differences underlying the verb-noun distinction and its relation to the ontology of individuals and events.

#### 6.4.2 A Proposal for a Unification Analysis

I have discussed three cases in which the Incremental Theme argument interacts with the meaning of verbal predicates. First, the boundedness property of the Incremental Theme argument determines the boundedness (telicity) of a complex verbal predicate. This holds generally across languages.

Second, the partitive and holistic meaning of the Incremental Theme argument determines the imperfective and perfective aspect (German and Finnish).

Third, the aspectual meaning, partitive and holistic, marked on the verb determines the partitive and holistic (universal) interpretation of the Incremental Theme argument. This holds for Slavic languages like Czech, but also for English (see Dowty 1977, 1979, among others, for the partitive reading of the Incremental Theme argument and the problems it raises, e.g., the 'imperfective paradox'). In addition, various derivational operators on verbs in Czech restrict the interpretation of the Incremental Theme argument. The restrictions concern such quantificational notions

as 'distributivity', 'many', 'much', 'one' as well as (ind)definiteness and boundedness.

These three cases have two fundamental characteristics in common. First, the interpretive rules make reference to the Incremental Theme argument. They rely on the assumption that we can establish a homomorphic mapping between the part structure of the individual denoted by the Incremental Theme argument and the part structure of the event (cf. Dowty 1988 and 1991; Krifka 1986, 1989, 1992).

Second, the interpretive rules are asymmetric. The verb and the Incremental Theme argument differ with respect to how much information they contribute to aspect and telicity of a complex verbal predicate. The asymmetry in the distribution of the relevant information gives the impression of the 'flow' of information between different linguistic forms in a complex linguistic structure. In German and Finnish, the Incremental Theme argument is specified with respect to the partitive-holistic distinction and bounded-unbounded distinction, while its governing verb is indeterminate on both counts. Since the Incremental Theme argument encodes all the information that is relevant to aspect and telicity of a sentence, this information spreads from the Incremental Theme argument over the entire sentence.

In Czech, the apparent 'flow' of information is reversed if the Incremental Theme is an undetermined mass or plural noun phrase. In such a case the verb encodes all the information about aspect, telicity and quantification. Hence, the information that concerns the universal, partitive, distributive, bounded (or unbounded) reading, and other information concerning quantity appears to 'flow' from the verb onto the Incremental Theme noun phrase. The meaning restriction of the Incremental Theme noun phrase by aspectual operators and derivational verbal affixes can be viewed as projecting a structure that is inherently present in the domain of verbal denotata onto the domain of nominal reference that has no or little inherent structure.

In English, the Incremental Theme argument is specified as bounded or unbounded, while its governing verb is indeterminate with respect to boundedness. Since the Incremental Theme argument carries more information about boundedness than its governing verb, this information appears to 'flow' from the Incremental Theme argument onto the complex verbal predicate that combines the Incremental Theme argument and its governing verb. This also holds in Czech imperfective sentences with a bounded Incremental Theme argument. In addition, the English progressive aspect imposes a partitive interpretation over the Incremental Theme argument.

In each case, the apparent 'flow' of information is due to the fact that certain linguistic forms specify more information than others or specify information that takes precedence over the information specified by other linguistic forms. The interaction between nominal and verbal predicates is motivated by the homomorphic mapping between their algebraically structured denotata. The direction of mapping is not a priori determined by the lexical semantics of verbs, as it may appear from Dowty's (1991) characterization of homomorphic predicates, but rather it is a function of the variation in the formal encoding of the information that concerns aspect and telicity. This view follows from Krifka's (1986, 1989, 1992) formal characterization of the mapping relations between objects and events and that provide for 'the transfer of reference mode' (Krifka 1986; 1989) from the Incremental Theme argument onto the complex verbal predicate, and vice versa.

Krifka's (and also Dowty's) approach to the description of the influence of nominal arguments on the telic and atelic interpretation of verbal predicates is implicitly procedural. In Krifka's (1986, 1989) work this is reflected in such formulations as 'the transfer of reference mode' (Krifka 1986; 1989) from the Incremental Theme argument onto the complex verbal predicate, and vice versa. In what follows I will discuss how such apparently directional influences can be treated in a declarative,



unification-based approach to language description. As far as the unification mechanism is concerned, I mainly draw on Shieber (1986), Karttunen (1988), Pollard and Sag (1987 and 1993) and Fillmore and Kay (1993).

Unification allows us to represent dependencies between linguistic categories which are represented as complex attribute-value pairs. Unification is a method of combining or relating compatible structures to define a new (coherent) structure. If two (or more) structures are compatible, a new structure is built that is compatible with both original structures. In a unified structure, compatible structures are linked to a single feature structure. Unification, in its purest form, is order-independent, non-procedural and non-directional. In its simplest form, all information accumulates in a monotonic way.

In unification terms, a verb and an Incremental Theme noun phrase each specify partial information about a single linguistic object, a complex verbal predicate or a sentence. In other words, a verb and an Incremental Theme noun phrase each impose constraints on the properties of a complex verbal predicate or a sentence. They introduce instances of the following feature attributes: 'bounded' and 'whole'.

The category 'telicity' is encoded in terms of the distribution of the cross-categorical feature specification '[bounded  $\alpha$ ]' in a given sentence, whereby ' $\alpha$ ' is a feature value variable standing which is positive '+', negative '-' or '[ ]'. The attribute 'bounded' is a cross-categorical feature attribute. It captures the inherent semantic properties of nouns and the semantic properties of noun phrases. It is also used for encoding the telicity of verbs and complex verbal predicates.

The category 'aspect' is encoded in terms of the distribution of the cross-categorical feature specifications '[whole  $\alpha$ ]' or '[part  $\alpha$ ]'. They encode the aspectual properties of verbs, verb phrases and sentences. They also concern the denotations of nouns and noun phrases, individuals which have a part-whole structure and can be viewed in terms of their part(s) or in their entirety.

The use of cross-categorial feature attributes 'bounded' and 'whole' allows us to represent the semantic parallels between nominal and verbal expressions and to cut across the ontological distinction between situations and objects. A description apparatus based on such cross-categorial feature attributes would ultimately allow us to formulate the rules of semantic interpretation of clauses in such a way that they need not be sensitive to the distinction between nominal and verbal expressions.

**Telicity.** Telic and atelic properties of verbs are marked with the cross-categorial feature specifications "[bounded +]" and "[bounded -]" in their lexical entries. A predicate like *eat* is homomorphic and it requires an Incremental Theme argument, which is associated with the built object. The lexical entry of *build* includes information about telicity as a value of the attributes 'telicity' and 'bounded'. This is encoded as '[telicity [bounded [ ]]]' and reflects the assumption that inherently homomorphic predicates are indeterminate with respect to telicity. The indeterminate value '[ ]' is an empty feature structure, or a variable that subsumes "all other feature structures, atomic or complex, because, as the trivial case, they contain no information at all" (Shieber 1986:15). According to Shieber (1986), the indeterminate value '[ ]' "can be viewed as being a non-monotonic device. That is, a system with ANY values can have an ill-formed functional structure become well-formed through further unifications. In this sense, ANY violates the spirit of declarativeness, although it does in such a weak way that we are willing to put up with it" (Shieber 1986:44).

The influence of the Incremental Theme noun phrase on the telic and atelic interpretation of a complex verbal predicate is encoded by matching the values of the feature attributes 'bounded' of the Incremental Theme noun phrase and the complex verbal predicate. For example, consider the following sentences:

(49-a) *He ate an / the / one apple.*

(49-b) *He ate the / five apples.*

If part of the feature specification of a verb is '[bounded [ ]]' and part of the feature specification of the Incremental Theme noun phrase is '[bounded +]', then as a result of the unification the feature structure of a verb and the feature structure of a noun phrase point to the same feature structure '[bounded +]' assigned to the verb phrase constituent '[cat V, max +, sbj -]'.<sup>12</sup> In a schematic way, this can be represented as follows:

$$\begin{array}{l}
 (50) \quad \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\
 \quad \text{sem } \left[ \begin{array}{l} \text{bounded [ ]} \\ \text{part } \beta \end{array} \right] \\
 \\
 \quad \text{U } \left[ \begin{array}{l} \text{Incremental Theme NP} \\ \text{sem [bounded + ]} \end{array} \right]_1 \\
 \\
 \quad = \text{VP} \\
 \quad \text{sem } \left[ \begin{array}{l} \text{bounded +} \\ \text{part } \beta \end{array} \right]
 \end{array}$$

The feature specifications of a verb and the Incremental Theme noun phrase are not equal, but they are compatible. We have a unification of an indeterminate value of a given feature specification with a specified value of another feature specification of the same type.

Since the indeterminate value '[ ]' is an empty feature structure, it subsumes all other feature structures, replacing '[ ]' value with a determinate '+' or '-' value amounts to taking information away. Such a unification of an indeterminate value of

<sup>12</sup> Shieber (1986:23): "interpreting the identity statements in the rule as *instructions to replace the substructures with their unifications* (...). This replacement process is conventionally (and ambiguously) referred to as *unifying* the substructures." Sometimes, this process is also called *destructive unification*. "After two substructures have been unified in this sense, a common value is thereby introduced, because the process involves replacement by the same, not merely similar, feature structures. In fact, for this reason, reentrant feature structures and unifications can be thought of as duals of one another."

a given feature specification with a determinate value of another feature specification of the same kind is a non-monotonic operation.

In a sentence like *He ate an apple* the feature specification '[bounded +]' is inherited by the semantics of the whole clause, as no other telicity determining constituents are present.

In the following examples the bare plural and mass noun phrases are associated with the feature specification '[bounded -]'.

(51) *He ate apple-sauce.*

(52) *He ate apples.*

As a result of the unification, the complex verbal predicate carries the feature specification '[bounded -]'.

(53)

$$\begin{array}{l} \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\ \text{sem } \left[ \begin{array}{l} \text{bounded [ ]} \\ \text{part } \beta \end{array} \right] \\ \\ \text{U } \left[ \begin{array}{l} \text{Incremental Theme NP} \\ \text{sem [bounded - ]} \end{array} \right]_1 \\ \\ = \text{VP} \\ \text{sem } \left[ \begin{array}{l} \text{bounded -} \\ \text{part } \beta \end{array} \right] \end{array}$$

If the Incremental Theme argument is omitted as in the following sentence by default the complex verbal predicate is specified '[bounded -]'.

(54) *John ate 0.*

This complies with the requirement that the value of the root attribute 'bounded' must have a determinate value. In the default case, this value is '-'.

In terms of the unification mechanism, the influence of the Incremental Theme noun phrase on the telic and atelic reading of a complex verbal predicate can be represented as follows:

$$\begin{array}{l}
 (55) \quad \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\
 \quad \text{sem } \left[ \begin{array}{l} \text{bounded [ ]} \\ \text{part } \beta \end{array} \right] \\
 \\
 \quad \text{U } \left[ \begin{array}{l} \text{Incremental Theme NP} \end{array} \right]_1 \\
 \quad \text{sem [bounded } \alpha \text{ ]} \\
 \\
 \quad = \text{VP} \\
 \quad \text{sem } \left[ \begin{array}{l} \text{bounded } \alpha \\ \text{part } \beta \end{array} \right]
 \end{array}$$

Inherently atelic predicate-argument relations as *push a cart*, *embrace somebody*, *pound the wall* in which the boundedness property of a direct object does not have any influence on the telic and atelic property of the complex verbal predicate are atelic and marked as '[bounded -]'. The following examples illustrate this point:

- (56-a) *He pushed a / the / one cart.*
- (56-b) *He pushed the / five carts.*
- (56-c) *He pushed carts.*

Inherently atelic verbs are marked as '[bounded -]' in their lexical entries. The negative feature value is inherited by the feature specification '[bounded -]' of the complex verbal predicate.

The lexical entry for an atelic verb *walk* contains the feature specification '[bounded -]'. The feature specification '[bounded -]' is inherited by the verb phrase constituent (i.e. '[cat V, max +, sbj -]'), if it occurs in a sentence that does not contain any telicity determining expression as its sister constituent with which it could unify.

The feature specification '[bounded -]' clashes with time-frame adverbials like *in ten minutes* that carry the feature specification '[bounded +]'. Such unification 'clashes' of incompatible values motivate the ungrammaticality of sentences like the following one:

(57) \**He pushed carts in ten minutes.*

And in a similar way, we can exclude ungrammatical sentences like the following one:

(58) \**He walked halfway.*

In the case of unification 'clashes', one of the operands may be given precedence and overwrites the value of the other operand, which must make some accommodation to it. On the level of the constitution of telicity of a verbal predicate or a sentence, this leads to a 'shift' in the situation type. Consider the following sentence

(59) *He walked to school.*

In terms of a unification-based approach, we have incompatible information: the prepositional phrase *to school* is marked '[bounded +]' and the verb *walk*, which is inherently an atelic process is '[bounded -]'. Since the whole sentence is grammatical and telic, it follows that the value of the feature specification '[bounded +]' assigned to *to school* overwrites the value of the feature specification '[bounded -]' assigned to *walk*. According to Shieber (1986:60), "[o]verwriting is a noncommutative operation akin to destructive unification except that, in the case of unification 'clashes', one of the operands (say, the rightmost) is given precedence. Thus, unlike unification, overwriting never fails".

In the case of 'overwriting' or 'priority union' we need to find some suitable criterion for choosing which of two incompatible substructures takes precedence (cf. Shieber 1986:63). In general, if the syntactic and semantic requirements of

constructions disagree with inherent properties of their constituting lexical items, the requirements imposed by constructions take precedence over the inherent properties of their constituting lexical items. Such 'unification' clashes between incompatible specifications of constructions and their constituting lexical items may trigger 'shifts' in the meaning of the lexical items that enter into the construction.

It may be suggested that the value of the feature specification '[bounded +]' of the prepositional phrase *to school* takes precedence over the value of the feature specification '[bounded -]' of the verb *walk*, because it functions as a frame-creating adjunct in the sense of Fillmore (1989). While the verb *walk* on its own is atelic (process), the goal phrase *to school* introduces an element of 'incremental change' into the semantics of a sentence. In other words, the sentence is associated with an incremental event. The goal phrase *to school* points to an incremental Path participant in the denoted incremental event. The adjunct *to school* introduces a frame to which the verb must make some semantic accommodation.

The above example illustrates a very productive pattern of accommodation in the case of a clash between the boundedness property of an adverbial adjunct and the boundedness property of the verbal predicate with which it combines. As a general rule, an adverbial adjunct in such examples as the one above determines the situation type of a whole adverbial construction with which the inherent lexical meaning of a verb must be reconciled. At first sight, it may seem that the unification mechanism in this case will obey the following pattern:

(60)      Adverbial Combining Rule

$$\begin{array}{l} \text{cat V} \\ \text{max +} \end{array} \quad \text{U} \quad \begin{array}{l} \text{cat Adv} \\ \text{bounded } \alpha \end{array} \quad = \quad \begin{array}{l} \text{cat V} \\ \text{max +} \\ \text{bounded } \alpha \end{array}$$

However, the application of this rule is complicated by the fact that a given adjunct

does not on its own confer the telic or atelic reading to the verbal expression with which it combines. We need to determine in which cases exactly the adverbial adjunct will behave in this way. This is by no means a simple task. For example, the directional prepositional phrase *into the orchestra pit* determines the situation type (incremental) and telic reading of the following sentence:

(61) *The conductor danced into the orchestra pit.* telic

However, the same adjunct *into the orchestra pit* does not automatically always override the lexical semantic properties of the verbal predicate with which it combines. For example, it does not induce any changes in the situation type and telicity in the following example:

(62) *The conductor smiled into the orchestra pit.* atelic

The unification mechanism must be sensitive to the lexical semantic properties of both the directional *into*-phrase and the lexical semantics of the verbal predicates with which it combines. Verbs of manner of motion and verbs of sound emission, which denote processes and are atelic together with a directional adjunct phrase yield complex verbal predicates that express situations involving a goal-oriented motion (incremental situations). However, this is not the case with other verbs denoting processes.

Similarly, the same directional adjunct *to the party* has a different status the following examples:

(63-a) *She wore the dress to the party.* atelic

(63-b) *She rushed to the party.* telic

Such examples show that the unification constraints must be stated over both the verb and adjunct, since the verb (its arguments) and the optional adjunct are mutually constraining (cf. also Chapter 3).



The addition of an optional adjunct which creates a frame that involves an incremental change is not always sufficient for a whole clause in which the adjunct is used to be telic. If the adjunct indicates a Path, the telic or atelic reading of a sentence is a compositional function of the boundedness properties of the Path and the Theme (moving entity). This is illustrated by the following examples:

- (64-a) *The earthquake shook a book off the shelf.*  
(64-b) *The earthquake shook books off the shelf.*

The Goal adjunct indicates the Path that the Holistic Theme (*books*) traverses, the incremental change is measured according to its positional change along the Path. Given that in (a) the Path is bounded and given that the Holistic Theme (*a book*) denotes a definite quantity, there is also a finite succession of positional changes. Consequently, the denoted event is bounded (telic). The presence of a directional adjunct is a necessary, but not a sufficient condition on the interpretation of the sentence as telic. By contrast, in (b), the Holistic Theme is unbounded, consequently the Path has a unbounded spatial extent and the denoted event is unbounded (atelic). Only if both the Incremental Path Theme and Holistic Theme indicate a bounded quantity, the clause to which they make their semantic contribution will be telic.

An even more challenging case of accommodation that is triggered by the clash of boundedness values of a complex verbal predicate and an adverbial adjunct is illustrated by the following example:

- (65) *(\*)Pat built houses in six months.*

The time-span adverbial *in six months* is marked as '[bounded +]' which clashes with the value of the feature specification '[bounded -]' assigned to such complex verbal predicates as *built houses*. However, the above example is acceptable provided that the time period *in six months* indicates the duration of building of one individual house, as in *When he was younger and had more energy, Pat built houses in six months. Now each house takes him a year* (cf. Fillmore and Kay 1993). In other

words, *Pat built houses in six months* is semantically well-formed if it has a habitual interpretation, namely if it means that there was an unspecified, and sufficiently large, number building events, each of which was associated with a different house, and the construction of each house took six months. The acceptable reading of such sentences cannot be derived in a systematic way by applying compositional semantic rules to independently motivated syntactic structures. The non-compositionality of such data provides a challenge to the statement of unification rules.

In some cases, the unification must be sensitive to the scopal properties of the unified constituents. Consider the following sentence:

(66) *He walked to school in ten minutes every day for three years.*

At first blush, the following sentence contains two seemingly contradictory compatibility requirements imposed by *in ten minutes*, which is '[bounded +]', and *for three years* and *every day*, which are marked as '[bounded -]'. However, these three adverbial phrases are not incompatible, because they differ in their scope and quantify over different domains. *For three years* takes wider scope relative to both *every day* and *in ten minutes*:

*in ten minutes* < *every day* < *for three years*

The scopal properties are directly reflected in the surface word order of the temporal phrases in the above sentence.

The fact that only *for three years* can be preposed, but *in ten minutes* or *every day* cannot, may serve as evidence for assuming that *for three years* takes wider scope with respect to both *in ten minutes* and *every day*.

(67-a) *For three years, he walked to school in ten minutes every day.*

- (67-b) \**In ten minutes, he walked to school every day for three years.*  
 (67-c) \**Every day, he walked to school in ten minutes for three years.*

The time-span adverbial phrase *in ten minutes* specifies the duration of each individual telic situation *He walked to school* marked as '[bounded +]' whose frequency is described by *every day*, which is assigned the feature specification '[bounded -]'. The frequency is a property of the situation whose overall duration is specified by *for three years* and which is assigned '[bounded -]'.

In addition to taking into account the scope properties of temporal adverbial phrases, we need a special rule for combining iterative and habitual adverbs, or 'adverbs of quantification' (cf. Lewis 1975), with the rest of the clause:

(68) Quantifier Combining Construction

$$\begin{array}{l} \text{cat V} \\ \text{max +} \\ \text{bounded +} \end{array} \quad \text{U} \quad \begin{array}{l} \text{cat Q} \\ \text{bounded } \alpha \end{array} = \begin{array}{l} \text{cat V} \\ \text{max +} \\ \text{bounded } \alpha \end{array}$$

Syntactically, iterative and frequency adverbials behave like modifiers. They do not change the syntactic category of the expression with which they combine. Semantically, frequency adverbials behave like "direct quantifiers over events" denoted by telic sentences (Bach 1981:74). Frequency and iterative adverbials determine the boundedness value of the complex expression of which they are constituents. For example, since the expression *every day* refers to an unspecified number of repeated "cases" or "occasions", it is marked as "[bounded -]" and, consequently, it imposes this feature specification over the whole sentence.

The most difficult problems related to the unificational account have to do with the organization of the lexicon and with the treatment of non-monotonic operations, that is those cases in which the combination of two (or more) constituents cannot be predicted on the basis of their individual meaning and the way they are put together.

The unificational treatment of telicity presupposes a lexicon in which lexical entries for verbs and nouns contain information about their boundedness properties and also about the way in which lexical items interact in the constitution of a telic and an atelic interpretation of complex verbal predicates and sentences. Provided that the lexical entries contain all the telicity relevant information and provided that the lexicon has the right structure, the unification of constituents into larger constituents will proceed in an automatic way in those cases in which the constituents are combined in a compositional way. We then simply match requirements of lexical items with the requirements of templates representing skeletal major syntactic patterns.

The second main problem is posed by various cases in which we have a clash of two incompatible values of the same feature attribute. Generally, the requirement assigned to the whole construction takes precedence over the inherent lexical properties of its constituting lexical items. The conflict between the structural and lexical specifications triggers a 'shift' in the meaning of the lexical item that enables its accommodation to the meaning of a construction. If the conflict cannot be reconciled, the combination of linguistic forms with incompatible values for the same feature attribute is ungrammatical.

**Aspect.** It is assumed that all verbs contain information about telicity and aspect in their lexical entries. Aspect is marked directly in the lexical entries of verbs, both in Slavic languages like Czech and also in English, for example.

As has been observed above, the English progressive is the marked member in the aspectual opposition and characterized in terms of the 'proper-part' relation. This is encoded as the feature specification '[part +]' assigned to complex predicates that consist of the progressive auxiliary *be* and the present participle of the main lexical verb. Non-progressive forms are marked as '[part [ ]]'.

(69)

$$\begin{array}{l}
 \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\
 \text{sem } \left[ \begin{array}{l} \text{bounded [ ]} \\ \text{part } \beta \end{array} \right] \\
 \\
 \text{U } \left[ \begin{array}{l} \text{Incremental Theme NP} \\ \text{sem [bounded } \alpha \text{ ]} \end{array} \right]_1 \\
 \\
 = \text{VP} \\
 \text{sem } \left[ \begin{array}{l} \text{bounded } \alpha \\ \text{part } \beta \end{array} \right]
 \end{array}$$

In the above schematic representation, the feature attribute 'bounded' can have a positive (happenings, culminations), negative (states, processes) and indeterminate value (in the case of homomorphic verbs). In '[part  $\beta$ ]' ' $\beta$ ' is a feature value variable standing for the positive (progressive) or indeterminate (non-progressive) value.

The influence of aspect on the partitive and non-partitive interpretation of the Incremental Theme noun phrase is encoded by matching the values of the feature attributes 'part' of the Incremental Theme noun phrase and the complex verbal predicate. In English, individual nouns are specified only with respect to boundedness, but not with respect to the feature attribute that pertains to aspect: 'part'. If part of the feature specification of a verb is '[part +]', this feature specification will be inherited by the Incremental Theme noun phrase via unification. As a result of the unification the feature structure of a verb and the feature structure of a noun phrase point to the same feature specification '[part +]' assigned to the verb phrase constituent '[cat V, max +, subj -]'.<sup>1</sup>

From this it follows that we need to distinguish between 'inherent (lexical) feature specifications' and 'structural feature specifications'. 'Inherent (lexical) feature specifications' are feature specifications that lexical items are assigned in their lexical entries. 'Structural feature specifications' are feature specifications that lexical items inherit from constructions whose argument slots they fill.

In German and Finnish the influence of the Incremental Theme argument on the telic and atelic interpretation and aspect of a complex verbal predicate is encoded by matching the values of the feature attributes 'bounded' and 'part' of the Incremental Theme argument and the complex verbal predicate. In German and Finnish, the syntactic argument that bears the partitive and in Finnish also the holistic marking is associated with the Incremental Theme role and determines the aspect of a whole clause. In terms of a simplified unification schema this can be represented as follows:

$$\begin{aligned}
 (70) \quad & \text{Finnish and German} \\
 & \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\
 & \text{sem [bounded [ ] ]} \\
 & \text{U [Incremental Theme NP]}_1 \\
 & \text{sem } \left[ \begin{array}{l} \text{bounded } \alpha \\ \text{part } \beta \end{array} \right] \\
 & = \text{VP} \\
 & \text{sem } \left[ \begin{array}{l} \text{bounded } \alpha \\ \text{part } \beta \end{array} \right]
 \end{aligned}$$

In German, the feature specification '[part +]' only co-occurs with '[bounded +]' (cf. *\*Er ass an Nüssen* - lit.: \*he ate on nuts), while the feature specification '[part [ ]]' co-occurs with both '[bounded +]' and '[bounded [ ]]'.

In Finnish, the feature specification '[whole +]' associated with the accusative Incremental noun phrase must match with the positive values of the attributes 'bounded' of the Incremental Theme noun phrase and the verb phrase. This is due to the feature co-occurrence restriction according to which a given language expression that is specified as '[whole +]' must also be specified as '[bounded +]':

$$[\text{whole +}] \rightarrow [\text{bounded +}]$$

In Czech also the Incremental Theme argument in a complex verbal predicate is associated with two feature attributes 'bounded' and 'whole'. The attribute 'bounded' is relevant to the telic and atelic reading of a sentence and the feature attribute

'whole' to the aspect of a sentence.

Aspect is marked directly in the lexical entries of verbs with the cross-categorial feature attribute 'whole'. The feature specification that encodes the perfective meaning of perfective verbs is specified as '[whole +]'. The feature specification that encodes the imperfective meaning of imperfective verbs in Slavic languages, is given as '[whole [ ]]'. The feature specification '[whole [ ]]' reflects the assumption that the Slavic imperfective aspect *lacks* the '[whole +]' property that characterizes the perfective aspect. That is, it does not oppose a negative meaning to that of the perfective aspect. The feature specification '[whole [ ]]' is to be understood as encoding the non-strict 'improper-part' relation. In a given Czech sentence, the feature specification '[whole +]' percolates upwards from the lexical head verb to the phrasal level and ultimately determines the positive value in the '[whole +]' feature specification of the sentence.

As has been observed in Chapter 4, aspect of the main lexical verb determines the distribution of temporal adverbials. Temporal adverbials are blind to the telicity of verbal expressions, they only "see" the aspect of the main lexical verb:

(71-a) imperfective verb + durative adverbial ('for-PP')

(71-b) perfective verb + time-span adverbial ('in-PP')

Implemented through the unification mechanism, this may be reformulated as follows:

(71-a')  
 imperfective verb + durative adverbial ('for-PP')  
 [whole [ ]]                      [whole -]

(71-b')  
 perfective verb + time-span adverbial ('in-PP')  
 [whole +]                      [whole +]

Imperfective verbs differ from perfective verbs in that the combination 'imperfective verb + time-span adverbial' is unacceptable under a single event

interpretation:

- (72)
- |     |                              |               |                      |
|-----|------------------------------|---------------|----------------------|
| (?) | <i>Četl<sup>I</sup></i>      | <i>knížku</i> | <i>za jeden den.</i> |
| (?) | read-3SG                     | book-SG-ACC   | in one day           |
|     | 'He read a book in one day.' |               |                      |

The above sentence is acceptable only under an iterative interpretation. The time-span adverbial here indicates the duration of each situation that involved the reading (and finishing reading) of one book. A complex verbal predicate *četl<sup>I</sup> knížku* 'read/was reading a/the book' is associated with the feature specification '[bounded [ ]]' by virtue of being headed by an imperfective verb. The time-span adverbial is specified as '[bounded +]'. We have a unification of an indeterminate value of a given feature specification with a specified value of another feature specification of the same type. The resultant structure has the feature specification '[bounded +]'. Since the indeterminate value '[ ]' subsumes all other feature structures, replacing '[ ]' value with a determinate '+' value amounts to taking information away. In the case of imperfective verbs this means that we constrain their potential wide range of use to the iterative use.

By contrast, perfective verbs, marked as '[whole +]' clash with durative temporal adverbials specified as '[whole -]'. The clash does not trigger any 'shift', any reconciliation process, because perfective verbs cannot be accommodated to the meaning of durative adverbials. No overwriting of the positive value of the feature specification '[whole +]' of the perfective verb is allowed. Hence, sentences like the following one are ungrammatical:

- (73)
- |   |  |               |                  |
|---|--|---------------|------------------|
| * | <i>Přečetl<sup>P</sup></i>                       | <i>knížku</i> | <i>celý den.</i> |
| * | PREF-read-3SG                                    | book-SG-ACC   | whole day        |
| * | 'He finished reading a/the book whole day long.' |               |                  |



Constraints on the compatibility of aspect semantics with nominal arguments come from the lexicon. Perfective verbs are specified with the feature specifications '[bounded +]' and '[whole +]' in their lexical entries. The feature matrix '[whole +, bounded +]' of a perfective verb is inherited by the external semantics of whole phrases headed by a perfective verb. A unification schema that combines a perfective verb and a noun phrase that functions as its Incremental Theme argument states that the verb and the noun phrase must match with respect to the feature specification '[bounded +]' and '[whole +]'. This allows us to represent the universal quantifier-like effect on the Incremental Theme noun phrase in Czech perfective sentences.

(74)

$$\begin{array}{l}
 \text{verb } [ \dots \text{IncrementalTheme}_1 \dots ] \\
 \text{sem } \left[ \begin{array}{l} \text{bounded +} \\ \text{whole +} \end{array} \right] \\
 \\
 \text{U } \text{Incremental Theme NP}_1 \\
 \text{sem } [ \text{bounded } \alpha \quad ]_1 \\
 \\
 = [ \text{verb + Incremental-Theme-NP}_1 ] \\
 \text{sem } \left[ \begin{array}{l} \text{bounded +} \\ \text{whole +} \end{array} \right]
 \end{array}$$

The most important feature specification is '[whole +]' associated with the perfective verb. It determines the positive values of the attributes 'bounded' and 'whole' of the Incremental Theme noun phrase and the verb phrase. This is due to the feature co-occurrence restriction according to which a given language expression that is specified as '[whole +]' must also be specified as '[bounded +]': [whole +] → [bounded +]

Since the feature attribute 'whole' is not an inherent attribute of noun phrase, the noun phrase that is associated with the Incremental Theme argument inherits the feature specification '[whole +]' from the perfective verb in a construction that combines the perfective verb with a noun phrase that satisfies its Incremental Theme argument requirement. Both the perfective verb and its Incremental Theme noun

phrase are associated with the feature matrix '[whole +, bounded +]'.

The accommodation of undetermined mass and plural noun phrases to the requirements of perfective verbs can be implemented within unification mechanism as follows: Mass and plural nouns are inherently unbounded and marked with the feature specification '[bounded -]' in their lexical entries. Undetermined mass and plural noun phrases inherit this feature specification from their head nouns, provided this is not prevented by various contextual factors. For example, this is preempted if they function as Incremental Theme arguments of perfective verbs. As a result of unification with a perfective verb, an Incremental Theme noun phrase that is headed by a mass or bare plural noun is marked as '[bounded +, whole +]' in its external semantics. In such a case, we assume that mass and plural nouns retain the feature specification '[bounded -]' in their internal semantics. In their function as Incremental Theme arguments of perfective verbs they acquire via unification a positive value for their feature attribute 'bounded' in their external semantics from the feature specification '[bounded +]' associated with their governing perfective verb. The feature specification '[bounded +]' is also inherited by the determiner in the Incremental Theme noun phrase. Consequently, noun phrases that function as Incremental Theme arguments of perfective verbs will have the feature specification '[bounded +]' in their external semantics.

This accommodation process is governed by a special construal rule that has the effect of mapping 'mass of the type X' into 'a bounded instance of the mass of the type X' and 'discrete individuals of the type X' into 'a bounded set of discrete individuals of the type X'.

If the Incremental Theme noun phrase is inherently bounded, the whole noun phrase and its head have the feature specification '[bounded +]'. In addition, the Incremental Theme noun phrase inherits the feature specification '[whole +]' from the perfective verb.

- (75) *Snědl<sup>P</sup>*                      *jablko.*  
 PREF-ate-3SG                  apple  
 'He ate an/one/the (whole) apple.'

The Incremental Theme noun phrase and the perfective verb match with respect to the feature specification '[bounded +]'. The matching constraints on the combination of a perfective verb with the Incremental Theme noun phrase can be represented in terms of a simple unification schema as follows:

- (76)
- $$\begin{array}{l} \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\ \text{sem } \left[ \begin{array}{l} \text{bounded +} \\ \text{whole +} \end{array} \right] \\ \\ \text{U } \left[ \begin{array}{l} \text{Incremental Theme NP} \\ \text{sem [bounded } \alpha \text{ ]} \end{array} \right]_1 \\ \\ = [\text{verb + Incremental-Theme-NP}_1] \\ \text{sem } \left[ \begin{array}{l} \text{bounded +} \\ \text{whole +} \end{array} \right] \end{array}$$

The feature specification that encodes the imperfective meaning of imperfective verbs in Slavic languages, is given as '[whole [ ]]'. As has been observed above, there is an asymmetry between perfective and imperfective verbs with respect to telicity, as all perfective verbs are telic. Imperfective verbs that denote states and processes are atelic, hence marked as '[bounded -]'. Imperfective verbs that denote culminations are telic and marked as '[bounded +]'. Imperfective verbs that denote incremental events (that are homomorphic in Dowty's terms) are indeterminate with respect to boundedness in their lexical entries. A complex verbal predicate that is headed by an imperfective verb that describes an incremental event is telic or atelic depending on the semantic properties of the Incremental Theme argument and of various optional adjuncts.

If a given imperfective sentence is used progressively it "acquires" the feature specification '[whole -]' from the external context of the utterance, the discourse-level

linguistic context or the sentence-internal linguistic context (i.e., temporal adverbials like 'right now', 'at that moment'). The feature specification '[whole -]' indicates that the denoted situation is not viewed in its entirety, but in terms of its proper part(s). This feature value is shared by all the verb headed phrases in a sentence.

Since both bounded and unbounded entities can be regarded in terms of their (proper) parts, there are no restrictions on the co-occurrence of the feature specifications '[whole -]', '[bounded +]' and '[bounded -]'. In other words, a verbal predicate marked as '[whole -]' can be telic or atelic. A unification schema that combines an imperfective verb (used progressively) and a noun phrase that functions as its Incremental Theme argument can be represented as follows:

$$\begin{array}{l}
 (77) \\
 \text{verb [ ... IncrementalTheme}_1 \text{ ... ]} \\
 \text{sem } \left[ \begin{array}{l} \text{bounded [ ]} \\ \text{whole -} \end{array} \right] \\
 \\
 \text{U } \left[ \begin{array}{l} \text{[Incremental Theme NP]}_1 \\ \text{sem [bounded } \alpha \text{ ]} \end{array} \right] \\
 \\
 = \left[ \begin{array}{l} \text{[verb + Incremental-Theme-NP]}_1 \\ \text{sem } \left[ \begin{array}{l} \text{bounded } \alpha \\ \text{whole -} \end{array} \right] \end{array} \right]
 \end{array}$$

A unification schema that combines an imperfective verb and a noun phrase that functions as its Incremental Theme argument then states that the complex verbal predicate and the noun phrase must match with respect to the feature specification '[whole -]'. This allows us to represent the partitive reading of the Incremental Theme noun phrase in Czech imperfective sentences. Individual nouns are specified only with respect to boundedness, but not with respect to the feature attribute 'whole'. Noun phrases that functions as Incremental Theme arguments of imperfective verbs inherit the feature specification '[whole -]' from the imperfective construction.

The assignment of the determinate value to the feature attribute 'bounded' of the complex verbal predicate that consists of a verb and an Incremental Theme noun phrase depends on the value of the feature attribute 'bounded' assigned to the noun phrase that functions as the Incremental Theme argument. The feature variable ' $\alpha$ ' can be either positive '+' or negative '-'. If the Incremental Theme noun phrase is '[bounded +]', the complex verbal predicate is also assigned the feature specification '[bounded +]', it is telic, as in the following example:

- (78)
- |                              |                |
|------------------------------|----------------|
| <i>Četl<sup>I</sup></i>      | <i>knížku.</i> |
| read-3SG                     | book-SG-ACC    |
| 'He was reading a/the book.' |                |

On the other hand, undetermined plural and mass noun phrases that function as Incremental Theme arguments give rise to an atelic interpretation of the whole complex verbal predicate, which is marked as '[bounded -]'.

- (79)
- |                                    |                |
|------------------------------------|----------------|
| <i>Četl<sup>I</sup></i>            | <i>knížky.</i> |
| read-3SG                           | books-PL-ACC   |
| 'He was reading (the/some) books.' |                |

- (79-b)
- |                                      |               |
|--------------------------------------|---------------|
| <i>Pil<sup>I</sup></i>               | <i>kávu.</i>  |
| drank-3SG                            | coffee-SG-ACC |
| 'He was drinking (the/some) coffee.' |               |

This apparatus yields the right results, namely that in perfective sentences, undetermined mass and plural noun phrases that function as Incremental Theme arguments are interpreted as bounded and universally quantified ('[bounded +, whole +]'). Given that the Incremental Theme noun phrase acquires the feature specification '[whole +]' from the perfective verb, this information may appear to 'flow' from perfective verbs to the Incremental Theme noun phrase and determines the bounded reading of this noun phrase. In imperfective sentences, undetermined mass and plural noun phrases retain their inherent unbounded property. In general, in imperfective

## **Chapter 6. Aspect and Nominal Reference in German and Finnish: 467**

sentences the telicity relevant information, encoded by the feature attribute 'bounded' on the Incremental Theme noun phrase may appear to 'flow' from noun phrases to complex imperfective predicates.

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