Nominal and Temporal Semantic Structure: Aspect and Quantification

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0. Introduction

Verbal aspect interacts with the expression of quantification in various ways in various languages. The exploration of this emerging area of semantic typology builds on work on type-shifting in Noun Phrase (NP) interpretations; on the relations among determiner quantification, adverbial quantification, and morphologically encoded quantification; and on studies of parallels and interactions between the telic/atelic distinction and the count/mass distinction.

It is interesting to compare English, where aspectual properties are not obligatorily disambiguated but determiners are generally obligatory, and the Slavic languages, where aspect is obligatorily marked but determiners are often optional. Do these differences reflect merely different syntactic and morphological expressions of some universal semantic content, or do they reflect language-particular differences in semantic content as well? Recent work by Hana Filip (1992, 1993) analyzes the way in which English and Czech show similar relationships between verbal aspect and quantificational properties of certain arguments and adjuncts, but with an opposite directionality of "flow of information"; information explicitly coded in NPs constrains underspecified aspectual interpretation in English, while explicit aspectual markings constrain underspecified NP interpretation in Czech. This work is reviewed here and some of its implications are examined.

The goal is to explore the interrelationship among some rather broad issues in "natural language metaphysics" concerning the structure of "conceptual models" with more specific issues in the syntax and semantics of such phenomena as quantification, anaphora, and reference. The theme is partly Jakobsonian insofar as it centrally involves issues of markedness and the search for invariants in the interpretation of aspect.

1. Mass/count and process/event

1.1 *The mass/count distinction*

A mass/count distinction among nouns is grammaticized in some languages, such as English and Czech, but not in others, such as Chinese and Thai. This does not mean, of course, that Chinese and Thai have no way to express the distinction between a plateful of potato and 3 potatoes; all languages seem to have some way or ways to express "massy" quantification and "counting" quantification. But not all languages force such a choice to be obligatorily made.

Where there is no grammaticized lexical distinction, all basic lexical items may be viewed as mass-like, i.e. undifferentiated with respect to individuation; countability can be added by use of classifiers, etc. We can remind ourselves that the mass/count distinction is not simply a reflection of the way the world presents itself to us by noting different choices that languages make with such things as peas and corn and berries, hair, pebbles and gravel, etc; the partial arbitrariness, or freedom of choice, that attends the distinction is particularly apparent in the realm of abstract nouns, as in (1a-c).

(1) (a)   one fact, many facts, *much fact
     (b)   *one information, *many informations, much information
     (c)   one trouble, many troubles, much trouble

Many languages that lack a grammaticized mass/count distinction are classifier languages, with the pattern (2a); languages like English also use classifier-like elements (Cl) to count some kinds of units of things or stuff denoted by mass nouns (N), as in (2b).

(2) (a)   classifier languages: *one N, *many N, one Cl N, many Cl N
     (b)   cf. one piece of information, one grain of wheat, etc.

The semantic innovations of Link (1983), described briefly below, provide a good basis for showing that mass is the semantically unmarked member of the mass/count opposition, and also for helping to explain some long-observed similarities in the semantics of mass and plural nouns.

What is mass/count a classification of? Primarily of PREDICATES of stuff and things, a perspective we take on describing things. There are differences in the nature of things in the external world, but linguistic evidence does not support the idea of a partition of the entity domain, even within a given lan-

guage. (Recall McCawley's classic examples of items that can be referred to by synonymous or near-synonymous terms which differ on the mass/count dimension: shoes - socks - footwear, hats - headgear; chairs - furniture, etc.)

There is no need for a mass/count distinction among entities themselves, then. And there is also no evident need for a mass/count distinction among full NPs, which are normally interpreted either as denoting entities, or as generalized quantifiers, i.e. sets of properties, the sorts of properties that might be denoted by verb phrases, for instance, among which there is also no mass/count distinction. The mass/count distinction is of importance in the internal building up of noun phrases (I will use "NP" to mean full noun phrases including determiners if any), and applies principally to common nouns and common noun phrases (CNPs). (Quine 1960 argued that notionally it can also apply to adjectives: e.g. *blue* is mass, and *spherical* is count. But that seems never to be grammaticalized.)

DETERMINERS are not themselves mass/count but they may differentially select for mass/count, so the main points in the grammar where mass/count matters are in places where determiners and nouns combine.

While the existence of the mass/count distinction in languages like English and Czech is indisputable, the classification of particular nouns as one or the other is subject to shifts, with or without explicit derivational morphology, as in (3a-b).

(3) (a)   beer, two beers; pivo, dvě piva, dvě pivečka ('portions')
     (b)   wine, a good wine ('kinds')

David Lewis's "Universal Grinder", discussed in Pelletier (1974), provides a thought-experiment recipe for converting anything denoted by a count noun into stuff denoted by a corresponding mass noun: put a chair into the grinder, turn the crank, and now there is chair all over the floor.

Pelletier & Schubert (1989) show how one can take various positions on the number and nature of the ontological distinctions made in the model and also on the number and nature of discrete senses of mass predicates relative to a given ontological background (this is discussed in Partee 1987). Their own proposals suggest letting the unmarked or default case for mass predicates be that a given mass predicate such as *beer* can apply indifferently to entities of a number of different sorts: quantities of beer, kinds of beer, conventional servings or kinds of servings of beer, etc., and involving what we might call sort-restricting operators as part of the semantics of constructions which limit the applicability of the predicate to some proper subset of these cases.

Also, like Chierchia (1984), they propose type-shifting operators convert-
ing mass PREDICATES of these various sorts to mass TERMS denoting substan-
ces and vice versa. So among the type- and sort-shifting phenomena involving
mass nouns there are at least shifts among mass-noun senses, shifts between
mass- and count-noun senses, and shifts between predicative and full-NP
("nominalization") senses. It may be worth keeping these in mind when con-
sidering meaning-shifting phenomena in the aspectual domain.

1.2 Link's atomic/non-atomic lattices for mass/count/plural

1.2.1 Introduction

Link (1983) proposed a treatment of the semantics of mass and plural nouns
whose principal innovations rest on enriching the structure of the model by
treating the domain of entities as a set endowed with a particular algebraic
structure. In the model Link proposes, the domain of entities is not simply an
unstructured set but contains some subdomains which have the algebraic struc-
ture of SEMILATTICES, structures which are similar to Boolean algebras with
a union or sum operation but no intersection operation. A distinction is made
between ATOMIC and NON-ATOMIC semilattices. Intuitively, atomic lattices
have smallest discrete elements (their atoms), while non-atomic ones (really
"not necessarily atomic") may not.

These atomic and non-atomic join semilattice structures, when used to
provide structures for the domains of count and mass nouns, give an excellent
basis for showing both what properties mass and plurals share and how mass
and count nouns differ, as well as for formally elucidating the parallelism
between the mass/count distinction and the process/event distinction (for this
last see Bach 1986).

1.2.2 Definitions

(4) *Join semilattice* $<E, \Pi_i, \leq_i>$,

- A join semilattice is a structure $<E, \Pi_i, \leq_i>$, where E is a set, $\leq_i$ is a
  partial order on that set, and the join operation Π_i is defined by the
  condition (5i); the supremum operation sup which appears in (5i) is de-
  fined in turn in (5ii).

(5) (i) $a \Pi_i b = \sup\{a,b\}$

    (ii) $\sup\{a,b\} = c$ iff c is the smallest element (w.r.t. the ordering
         $\leq_i$) in E which is greater than both a and b.

(6) *Atomic join semilattice* $<E, \Pi_i, \leq_i, At>$

- An atomic join semilattice is a join semilattice with the further condition
  that its set E has a subset At of atoms (defined below) and every element
  of E has at least one atom somewhere "below it" (less than it according
  to $\leq_i$).

(7) *Atom*

- An element of a semilattice is an atom if it is a smallest non-null element
  of the semilattice, smallest meaning that there is no element of the semi-
  lattice less than it (except for the 0 element if there is one) with respect
  to the ordering relation $\leq_i$.

Note that the weak negative property NON-ATOMIC actually means 'not neces-
sarily atomic', so the so-called non-atomic semilattices are the more general
case, since they may but need not have atoms. They simply lack the atomicity
requirement.

1.2.3 Denotations of mass and count nouns

The denotation of each count noun (including both singular and plural forms)
is taken to have the structure of an atomic join semilattice, where the entities
denoted by the singular form are the atoms and the "plural entities" denoted
by the plural form are the non-atomic elements. The denotation of a mass
noun, on the other hand, is taken to have the form of a non-atomic (not
necessarily atomic) join semilattice.

There is thus no assumption of smallest "individual" parts for the mass
nouns. It is not forbidden that there be such units, and intuitively there are for
some mass nouns such as *furniture* and *clothing*; but it is not structurally
presupposed that there are, so mass nouns do not enter into constructions that
require atomicity.

Figures 1 and 2 give a sketch of the denotations of the count noun *horse*
and the mass noun *water*. In Figure 1, we suppose there to be three horses in
the domain, indicated as a,b, and c; this set constitutes the set of atoms of the
horse/horses semilattice and is the denotation of the singular count noun *horse*.
The four "plural entities" in the semilattice constitute the denotation of the
plural noun *horses* (on a "strict plural" interpretation; there are also uses of
plural nouns which have the entire semilattice as denotation). The semilattice
for the mass noun *water* is indicated schematically in Figure 2; since there

may or may not be atoms, the strings of dots are meant to indicate indeterminacies in numbers of nodes in both horizontal and vertical dimensions.

Figure 1

Figure 2
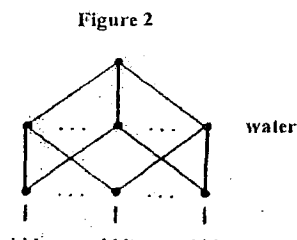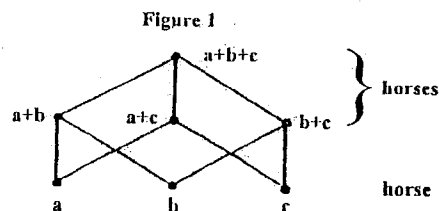
1.2.4 Determiner interpretations

These lattice structures make it possible to give a unified interpretation for those determiners (and other expressions) that are insensitive to atomicity, i.e. which can be used with what is intuitively a common interpretation for mass and count domains, such as *the*, *all*, *some*, and *no*.

For example, *the* can be elegantly and simply defined as a "supremum" operation that can be applied equally well to atomic and non-atomic structures, as in (8), where $\| P \|$ means a (sub)set of denotates of a predicate P.

(8)   *the horses*
       the water $\operatorname{sup}(\| P \|)$
       the horse

The supremum operation, defined above in (5ii), returns the topmost element of the *horses* semilattice or the *water* semilattice, thereby capturing the intuition of an implicit 'all' in the plural and mass cases, while allowing these NPs to be treated as entity-denoting rather than explicitly quantificational. In the case of the singular count noun, the supremum will be defined if and only if there is just one horse in the domain; only in that case will there be a "top" (namely that horse) for the subsemilattice corresponding to the singular noun. Thus this definition gives the same value as the traditional iota-operator for singular definites, without requiring stipulation of the "one and only one" condition.

The determiner *most* can be analyzed as requiring a measure but not explicitly requiring plurality. It can combine with mass nouns whenever some appropriate measure can be understood as given, and it can apply to most

plural nouns, since cardinality is usually available as an unmarked measure on count noun domains.

Some determiners such as *three* and *every* have interpretations that inherently require an atomic semilattice structure, so the fact that they only occur with count nouns is predictable.

1.2.5 Mass as the unmarked case

One of the most important features of this analysis is that the mass lattice structure emerges as unequivocally more general than the count noun structure, i.e. as the unmarked case. The domains of mass noun interpretations are simply join semilattices, unspecified as to atomicity. Atomic join semilattices are characterized as join semilattices with an added requirement, hence clearly a marked case. This means that languages without the mass/count distinction are describable as if all their nouns are mass nouns; we need not seek some alternative structure that is neutral between mass and count, since mass itself turns out to be the neutral case.

1.3 Processes and events and verbal aspect

1.3.1 Connections between mass/count and process/event distinctions

There are at least three kinds of connections between the mass/count distinction and the process/event distinction.

(i) Nominalizations: As noted by Mourelatos and others, process verbs regularly nominalize to mass nouns (*production*, *singing*), event verbs to count nouns (*explosion*, *arrival*). There are competing generalizations in this domain (e.g. in the work of Grimshaw), and the data are somewhat obscured by the existence of lexical shifts and idiosyncratic lexicalizations among both the verbs and the nouns, but this is in any case one area of interesting interactions among the two distinctions.

(ii) There are direct structural analogies between the two distinctions, as shown by Bach (1986), the basic analogy being that process verb is to event verb as mass noun is to count noun (see Section 1.4 below).

(iii) There are interactions and mutual constraints concerning verb phrases that contain mass or count noun phrases as constituents: *eat soup* is a process, *eat an apple* is an event (more on this in Section 2.1).

1.3.2 What is classified by aspect?

As with nouns and the entity domain, it is probably better not to posit an essential distinction within the domain of situations or "eventualities" (Bach's term), but to see the process/event distinction as one among predicates, dividing them into process predicates and event predicates, representing choices in the description of aspects of (perceived, conceived) reality. Example (9) is from Comrie (1976): the three Russian sentences can all be glossed as 'I stood there for an hour', but the first is imperfective, the second and third perfective. The perfective examples have given rise to considerable discussion in the literature on aspect, since it is unusual for perfectives to combine with durative adverbs like *for an hour*. These are often described as "atelic perfectives" (see discussion in Filip 1992, 1993); but the status of *an hour* in these examples seems to be debatable. (9ii) is a kind of diminutive, suggesting that an hour was just a little while in that case; (9iii) gives the sense of spending an hour standing, often carrying the suggestion that it was a long time and/or an unwelcome wait. In some Slavic languages for at least some speakers, (9iii) can be passivized, with *an hour* as the derived subject (Karel Oliva, p.c., and others, pro and contra).

(9) (i)   Ja stojal tam čas.
           I stood there for an hour.

    (ii)   Ja postojal tam čas.
           I stood there for an hour.

    (iii) Ja prostojal tam čas.
           I stood there for an hour.

Example (10), involving three ways of looking at orbiting, illustrates the "subjectivity" of some aspectual classifications, analogous to the subjectivity of some instances of mass/count classification illustrated in (1) above.

(10) (a)   The moon is in orbit around the earth.   [stative]
     (b)   The moon has orbited the earth for millennia.   [process]
     (c)   The moon has orbited the earth 10 times in
           the last 9 months.   [event]

1.3.3 The grammatical complexity of aspect

The process/event distinction is grammatically more complex in many languages than mass/count distinction, because many languages have a grammaticized aspectual system, and it may be distributed over various parts of the

grammar. In the noun domains, the operators are mainly determiners, and the relevant grammatical structure is usually fairly clear. In the verb-headed domains, the operators may be auxiliary verbs, modal verbs, adverbs of quantification, affixes (derivational or inflectional), etc. Distinctions to worry about (with sometimes conflicting uses of terminology) include process/event/state (semantic and/or ontological distinctions), telic/atelic (a classification of event types, with possible unclarity as to whether it is a linguistic or an ontological distinction), perfective/imperfective (an aspectual classification). It is not simple to resolve which of these are or should be seen as properties of (predicates of) things in the domain, which as properties of verbs, which as properties of Verb Phrases (VPs) or verbal complexes, or "inflectional phrases" or sentences.

1.3.4 Nouns and verbs as sortals

Philosophers of language speak of SORTAL predicates as predicates which provide the basic criteria for individuation and quantification over a given domain: predicates whose semantics provide not only a criterion of applicability, but also criteria for individuation and reidentification. (An appropriate generalization of the notion of individuation is needed if we are to speak of sortals in the mass noun domain, of course.)

With respect to quantification via determiners and via adverbs of quantification, it seems that nouns are the basic sortal expressions for domains of entities, verbs the basic sortal expression for domains of eventualities. This point is one of the main connections between aspect and quantification, and is discussed further in Section 2.2 below.

1.4 *Extending Link's semantics to eventualities: Bach 1986*

In Bach's (1986) extension of Link's analysis of the mass/count distinction to the analysis of the process/event distinction, the denotation of each EVENT predicate is taken to have the structure of an atomic join semilattice, where the "minimal" events denoted by the predicates are the atoms and the "non-minimal" events denoted by the predicates are the non-atomic elements. The denotation of a PROCESS predicate, on the other hand, is taken to have the form of a non-atomic (not-necessarily-atomic) join semilattice.

Just as there are determiners that are sensitive to the mass/count distinctions, such as *much* and *many*, there are temporal adverbials that are sensitive to the process/event distinction, such as *for 3 hours* vs. *3 times*, and it can be

argued that the distinction is the same in both cases, concerning modification of a domain that is potentially non-atomic vs. modification of a necessarily atomic domain.

There are also sort-shifting operations in the verbal/aspectual domain that are analogous to the operations that shift between mass and count. So just as every concrete count noun can have a mass counterpart via the Universal Grinder, so likewise every concrete "instantaneous" event can have a process counterpart via the Universal Slow-Motion Camera (falling, noticing, arriving, crossing the finish line, exploding).[1]

And there are analogies that go in the opposite direction (in a historical sense): The "progressive paradox" (Dowty 1979) is well-known in the aspectual domain, and Bach (1986) identifies a corresponding "partitive problem". The progressive paradox is illustrated by (11a): while a plausible interpretation of the English progressive would seem to be that the progressive of a sentence S is true at an interval (perhaps required to be a moment) if that interval is part of an interval at which the corresponding non-progressive is true (Bennett and Partee 1978), thus capturing the idea that the progressive takes a perspective "inside" the given event, sentences like (11a) show that the progressive can be true at a moment even if there is no interval at which the non-progressive is true. And it turns out that the corresponding problem arises for the nominal expression "part of". It would certainly seem plausible to say that the truth-conditions for "x is part of a P" would require that there is a (whole) P to which x stands in a part-whole relation. And yet (11b) could be used when looking at the thing that John was writing when he died: we may identify it as part of a symphony even if there is no complete symphony of which it is a part.

    (11) (a) John was writing a symphony when he died.
          (b) This is part of a symphony.

2. Aspect and quantification

2.1 *Mass/count and process/event interactions*

The fact that there are interactions between kinds of noun phrases in certain positions and aspectual properties of verb phrases and sentences has been noted and studied by many authors, including Vendler (1957), Verkuyl (1972), Dowty (1979, 1991), Hinrichs (1985), Krifka (1986, 1987, 1991), and Filip (1992, 1993, 1995).

In English, one of the main interactional effects is that quantificational properties of what Dowty (1991) calls the Incremental Theme argument constrain the aspectual interpretation of aspectually unmarked verbs, as shown in the chart in (12), where ✓ stands for 'acceptable', * for 'unacceptable', (*) for 'hardly acceptable'.

(12)	*for 30 minutes*	*in 30 minutes*	*up*
(a) John ate soup	✓	*	*
(b) John ate the soup	(*)	✓	✓
(c) John ate apples	✓	*	*
(d) John ate 2 apples	(*)	✓	✓

In Czech, on the other hand, verbs are almost never aspectually unmarked, and nouns are often used with no overt determiner; and in Czech, it is aspectually marked verbs that constrain the interpretation of unmarked bare mass and plural nouns in the Incremental Theme role, as discussed by Filip (1992), the source of the examples in (13) and (14).

    (13) (a) Pil kávu.
             He drank/was drinking (some) coffee.
        (b) Vypil kávu.
             He drank up (all) the coffee.
        (c) Pletla svetry.
             She knitted/was knitting (some) pullovers.
        (d) Upletla svetry.
             She knitted (all) the pullovers.

In (13a) and (13c), the verb is imperfective and the object NP, a bare mass noun in (13a) and a bare plural in (13c), is understood as indefinite. When a perfective verb is used, as in (13b) and (13d), the same NP is interpreted as definite, denoting all of some bounded quantity.

In the examples in (13), the object is an Incremental Theme; the verb in (13a,b) is a verb of consumption and that in (13c,d) is a verb of creation, both having a correspondence between parts of the object and parts of the event. When the direct object is not an Incremental Theme, there is no such effect of English NP interpretation on understood verbal aspect (14a) or of Czech verbal aspect on object interpretation (14b,c).

(14) (a) Agnes watched birds/the birds [for 30 minutes/*in 30 minutes].
(b) Děti viděly chřestýše.

The children saw (some/the) rattlesnakes.   [imperfective]

(14) (c) Děti uviděly chřestýše.

The children saw (some/the) rattlesnakes.   [perfective]

Filip (1992), following related work by Krifka (1986, 1991), explains the effect in (13) in terms of an association between the semilattice structure of the noun (phrase) and that of the event/process predicate in the case of Incremental Theme verbs. We return to this issue in Section 2.3 below.

2.2 Two quantificational ontologies[2]

2.2.1 Hypothesis

Hypothesis: There are at least two kinds of quantificational ontology, quantification over INDIVIDUALS and quantification over EVENTS or SITUATIONS, often interchangeable from a purely truth-functional point of view, but with a different conceptual organization and a clustering of different typical (but not absolute) properties, as listed below in (15).

(15)	Individual	Event/Situation
(a) Category	NP	Sentence
(b) Operator	Det	Adv of Quantification, Modal, Aux,...
(c) Sortal	Noun	Verb or Verb Frame
(d) Predicates in restrictors	Individual-level	Stage-level
(e) Typical restrictors	CNP, Relative clauses	if/when-clauses, Focus-frames

Looking first at the properties that I suggest typically go together in the case of quantification over individuals: a natural locus of such quantification is the NP, with the determiner as operator and the head noun as the principal sortal predicate. The use of an NP structure, which normally has a unique head noun, tends to give us one principal individual variable to quantify over. In this case we tend to have individual-level predicates as restrictors, adding additional specification of the domain of individuals being quantified over, typically expressed by the common noun phrase and the relative clause. (Note that this clustering of properties is clearly not absolute; I mention some atypical cases in Section 2.2.2 below.)

The typical clustering of properties in the case of quantification over cases, events, and situations (a grouping that clearly needs further refinement) includes the fact that the quantification is often expressed at the level of the sentence or VP, and that the operator is likely to be expressed by an adverb of quantification or a modal. The principal sortal is often provided by the verb. The domain of quantification, specified by such a sortal and by further restrictors that generally involve stage-level predicates and are typically expressed by if- or when-clauses, thus tends to be episodic, construable as consisting of events or situations or "cases" of some sort that we distinguish from individuals simpliciter. When there is no explicit restrictor, though not only then, a restrictor clause may be provided by the focus-frame of the sentence.

2.2.2 Discussion: events and entities

One natural challenge that confronts these suggestions is the following: if the hypothesis above is at all correct, why should these two very different kinds of quantification be so frequently interchangeable? English certainly allows us to express many things either way, and different languages seem able to prefer one kind over the other, or to do without determiner quantification altogether. My suggested answer is that the notion of an individual and the notion of a case or situation or episode or event are both ontologically extremely broad notions, and not mutually exclusive. There is no obstacle in principle to regarding an individual as a situation or an event; some individuals come with natural spatiotemporal boundaries, and for those that don't, there are various ways that spatiotemporal boundaries can be contextually supplied or imposed. And on the other hand, there's nothing that can't be an individual. The phenomenon of nominalization clearly demonstrates the human tendency to treat every robust ontological type as also a potential subtype of the type of entities. Via nominalization, virtually anything can be regarded as an entity or individual (Cresswell 1973), and we tend to nominalize when we want to talk about anything, including events, times, actions, etc.

Grammars of individual languages may grammaticize certain constraints and choices among the potentially available range of category-sort correspondences. Carlson (1977) observed that in English, all nouns function as individual-level predicates, even when they denote seemingly temporary properties. Most verbs are stage-level; adjectives are more evenly divided.

Less typical combinations of the properties in chart (15) include the use of NPs with stage-level modifiers as in (16), and sentences with individual-level main predicates as in Lewis's (1975) classic example (17).

(16) [How can there be a cherry that has no stone?] A cherry when it's blooming, it has no stone.

(17) A quadratic equation usually has two different solutions.

2.3 Type-shifting, sort-shifting, and markedness

2.3.1 Shifting and markedness

Items that are formally unmarked with respect to a given distinction can shift relatively easily among interpretations; items that are formally marked may not be able to shift without a change in formal marking, and the language may impose more or less tight constraints on the availability of such "marked shifts". Lexical items shift interpretation more easily than grammatical constructions. The semantics of a particular construction may facilitate or coerce a particular lexical shift.

For example, in English, the phrase *wash the dishes* is unmarked for perfectivity or telicity, and can shift easily between process and event readings under the influence of adverbs that require one or the other, as in (18).

(18) (a) He washed the dishes for 30 minutes (but only got half of them done / but didn't get any of them very clean).

(b) He washed the dishes in 30 minutes. [Conventional "packaging" of activity, with conventional beginning and end.]

Slavic verbs, on the other hand, which are marked for aspect, do not shift without supporting morphological change; and the morphology often signals a constrained choice among the possible readings within a given aspectual type.

English *be sick, be empty, be dark* can shift to inchoative readings easily, as illustrated in (19), where the construction requires an event reading for the *when*-clause (Partee 1984).

(19) When it was dark, they all came in.

The English (20a) is ambiguous; in Slavic languages, the choice between an inchoative reading and a reading that refers to the entire state of his sickness would be obligatorily signalled by choice of aspect as in Czech (20b).

(20) (a) I met him after *he was sick*.

(b) [...] byl nemocný / onemocněl
     'was sick'   / 'became sick'

Czech bare mass nouns and plural nouns can shift easily between "definite" and "indefinite" interpretations (or perhaps are not to be seen as ambiguous at all). English bare nouns have much more restricted interpretations, since English does not generally leave definiteness unmarked.

2.3.2 Incremental Theme and the "flow of information"

Dowty (1991) and Krifka (1991) provided a good account of the influence of noun phrase semantics on verbal aspect in English in terms of a homomorphism from the semilattice structure associated with the Incremental Theme to the lattice structure associated with the event.

Filip (1992, 1993) suggests that while English and Czech both show constraints on the relation between nominal interpretation and verbal aspect, the directionality of the "flow of information" in the two languages is different. English examples of the influence of the NP semantics on aspect were given in (12) in Section 2.1. In Czech it is the verbal aspect that influences the interpretation of the noun phrase, as illustrated in (13) above and in (21a-d), which also illustrate the effect of verbal prefixes on argument structure and choice of Incremental Theme.

(21) (a) Pavel přepsal dopisy (inkoustem).
     Pavel rewrote the letters [in ink].

(b) Pavel přepsal všechny dopisy (inkoustem).
     Pavel rewrote all the letters [in ink].

(c) Pavel přepsal dopisy (?*vším inkoustem).

(d) Pavel vypsal (na dopisech) (všechen) inkoust.
     Pavel used up [all] the ink [on (some/the) letters].

Filip (1992) suggests using a unification-based approach as a way of remaining maximally flexible about where the constraining information may come from in a given language.

[The] verbal predicate and an Incremental Theme NP each provide partial information about a single linguistic object, a complex verbal predicate. [...] Constraints imposed by the language require that information coming from these two sources be compatible. [...] Languages may differ with respect to the localization of the relevant information in the surface syntax and morphology. In Czech, it is the verbal predicate that specifies more information than the In-

cremental Theme NP. In English, on the other hand, it is typically the Incremental Theme. The apparent "flow" in one direction is due to this imbalance in the encoding of information in the surface structure. (Filip 1992)

In both English and Czech, the combination of an "unbounded" verbal predicate and an "unbounded" Incremental Theme leads to an atelic, process-type interpretation. Adding either marked perfectivity to the verb, as in Slavic, or bounded quantification (e.g. with a definite article) to the Incremental Theme, as in English, forces an event-type interpretation. Whether there are deeper differences in the semantics of the two language types, or whether the cited differences reflect only differences in the localization of semantic information within the sentence structure, is an intriguing question that remains open.

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NOTES

1. Elena Paducheva (p.c.) notes that this sort-shift is not universally available; some Russian perfective verbs allow only an iterative reading as a derived imperfective form, not the sort of "slow-motion camera" process reading described here.

2. The material in this section is drawn from Partee (1991).

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