AL PSYCHOLINGUISTICS

Perspect
Aspect

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PERSPECTIVES ON ASPECT

STUDIES IN THEORETICAL PSYCHOLINGUISTICS

VOLUME 32

The titles published in this series are listed at the end of this volume.

Perspectives on Aspect

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Springer

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN-10 1-4020-3231-5 (PB)
ISBN-13 978-1-4020-3231-8 (PB)
ISBN-10 1-4020-3230-7 (HB)
ISBN-10 1-4020-3232-3 (e-book)
ISBN-13 978-1-4020-3230-1 (HB)
ISBN-13 978-1-4020-3232-5 (e-book)

Published by Springer,
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.
www.springeronline.com

Printed on acid-free paper

Printed in the Netherlands.

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PREFACE

In December 2001 the Utrecht Institute of Linguistics (UiL-OTS) hosted a conference entitled 'Perspectives on Aspect'. The aim of the conference was to offer a retrospective view on the past thirty years of research on aspectuality and temporality as well as develop perspectives on the future development of the field. Invited speakers from different generations and different theoretical backgrounds gave overviews of the development of the field, presented the state of the art of current research, suggested new and upcoming lines of research, and debated important issues during very lively forum discussions. We sent out a call for papers so that other speakers could contribute their own work in presentations and poster sessions. An important theme throughout the conference was typological variation, and the relevance of empirical data for theory formation.

The current volume grew out of the papers presented at the conference. Not all speakers submitted a paper, so the full richness of the conference could not be repeated here. However, we think the volume reflects the main topics of the conference quite well. We thank the reviewers whose comments helped to improve the contributed papers. We are grateful for the financial support of the Netherlands Organization for Scientific Research (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW). We thank the Utrecht Institute of Linguistics (UiL-OTS) for financial and organizational help with the conference and with the preparation of this volume. Bert Le Bruyn provided invaluable editorial support. Finally, we wish to thank Jacqueline Bergsma and Jolanda Voogd for their support from Springer.

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ANGELIEK VAN HOUT, HENRIËTTE DE SWART & HENK J. VERKUYL

INTRODUCING PERSPECTIVES ON ASPECT

1. BACKGROUND

Talking about different perspectives on a particular domain of investigation in a certain discipline may suggest a lack of common ground about which different positions can be taken on the basis of agreement about the main issues. In the absence of such agreement, the discipline in question often turns out to have not yet been sufficiently developed so that the disagreement can be explained by the lack of progress in the field. Such a situation is not imaginary: before the fifties of the past century linguistics itself could not be considered a discipline on the basis of shared opinions and on the type of questions under discussion.

We are happy to see that in the domain of aspectuality there is certainly a great number of convictions and opinions shared by most or all investigators. This has been achieved by a remarkable interaction between quite different perspectives in the past forty years. One of the things to be noted right away is that before this period, aspect was generally viewed as a phenomenon typical of Slavic languages (especially Russian), and had hardly received any attention outside the circle of Slavonic scholars. The current successful investigation of this very complex area has arisen from different disciplines having contributed to what now can be seen as a common, worldwide and interdisciplinary enterprise: the study of temporal phenomena in natural and formal languages by linguistics, psycholinguistics, cognitive psychology, philosophical and mathematical logic, computational linguistics, and artificial intelligence.

If we focus on linguistics, we see that the view on aspect has changed quite a bit. The developments of the last forty years show that the scope of the analysis has extended from the domain of (lexical) word morphology to the sentential domain and the domain of discourse. This change of scope also involves a change of perspective: the transition from morphology to the sentential domain made it possible to study more properly the division of labor between tense and aspect in different languages. Likewise, the extension from the sentential domain to the domain of discourse made it possible to get a better understanding of the contribution of aspectual information to the discourse structure, because certain aspectual differences can be made visible only in discourse.

Finally, different perspectives constitute a dynamic force in theory formation: it is necessary to confront theoretical proposals to a variety of options. In that sense,

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one may observe that the aspectual domain is not only quite dynamic, but also that it has found a way to confront theoretical positions with real data. There is strong typological research in the area of tense and aspect, and the results substantially contribute to theory formation. The advent of electronic tools (real and accessible data bases) has facilitated this development. The typological and cross-linguistic papers included in the present volume confirm the current trend. Perhaps the fact that Slavic languages, in particular Russian, have traditionally been seen as the aspectual language(s) provides the ground for the conviction that an aspectual theory should be able to deal adequately (at least) with Slavic rather than with English before it can be taken seriously. And this may have led to a better sense for the need of an interplay between theory and data.

2. ASPECT AS A SEMANTIC PHENOMENON: A HISTORICAL OVERVIEW

This introductory chapter will be retrospective by giving a sketch of the most relevant developments that have led to the present situation and prospective by taking into account the contribution of current research and sketch some perspectives on future developments. In our view, the development that aspectuality came to be seen as a genuinely semantic phenomemon is due to the fact that formal semanticists became interested in it at a time that Chomskyan syntactic theory was mostly concerned with autonomous syntax. The cooperation between formal semanticists and linguists interested in semantic phenomena rather than syntax alone has determined the theory formation in the linguistic part of the domain of tense and aspect. Compositionality was the key notion that allowed linguists to go beyond the morphological encoding of aspect that we find in Slavic and address the scattering of aspectual information over the verb and its nominal complements in Germanic languages. Compositionality is necessary in order to break away from word morphology into the sentential domain. As Henk Verkuyl pointed out in his dissertation (1971, published as Verkuyl 1972), the idea was already available in the 1920's (Poutsma, Jacobsohn). The problem for the linguists in that period was the lack of a proper syntactic theory. This made it practically impossible for them to analyze the presence of complex semantic information in terms of the presence of more elementary elements in a syntactic phrase carrying this information. The gap between atomic and complex was simply too large at the time. Thanks to Chomsky's work in the fifties and sixties, Verkuyl was able to provide a syntactic basis for the interpretation of aspectual information as it is expressed in Germanic languages: at the VP level and higher. So, in fact, Verkuyl did what Poutsma could have done had syntactic trees been available to him: to use the possibility of combining semantic information contributed by V with the semantic information of the nominal complement of V into complex information at the level of VP (and carry this on to the sentence level).

Verkuyl's 1971-dissertation was available to David Dowty, who finished his PhD in 1972. Verkuyl had decided to use the polycategorial branch of generative semantics developed by Gruber (1965). For him the syntax of generative semantics

was not crucial for his view on aspectuality: what you can do to amalgamate the information MOVE + UNSPECIFIED QUANTITY OF X into DURATIVE, can also be done by [+move] + [- unspecified quantity of X] into [-terminative], as pointed out in Verkuyl (1972, 1976). Dowty's (1972) dissertation was genuinely generative-semantic in the sense that for him a node carrying word meaning may be structurally decomposed into more primitive nodes. This may explain, among other things, why Dowty adopted Vendler's system of aspectual classes: primitive nodes can be used to construe the four Vendler classes (states, activities, accomplishments, achievements). There are profound differences between the first two generative attempts to deal with aspectual phenomena, but they had one thing in common: both proposals were totally ignored in the autonomous-syntactic environment in which they were developed. Mainstream generative linguistics did not pay attention to aspectual phenomena in the early seventies. For both Verkuyl and Dowty this was the reason to extend their generative tool box with Montagovian machinery.

Barbara Partee attended one of the formal semantic courses taught by Richard Montague in the sixties. Thanks to Partee (1975), the American linguistic community was introduced to real semantics in the Fregean tradition. Partee's paper was very influential, the more so because Lewis (1972) had made it painfully clear that Katz/Fodor-semantics was nothing but a disguised form of the syntax of predicational logic. Richard Montague's 1966 stay in Amsterdam prepared the ground for what later became the Amsterdam branch of formal semantics: his lectures (together with Frits Staal) were attended by mathematical logicians, philosophers of language, and linguists. This interdisciplinary movement resulted in the well-known Amsterdam Montague colloquia that came about in the mid-seventies and that are still very much alive.

The American and European lines of Montague grammar came together in the early eighties when Barbara Partee and Emmon Bach spent a sabbatical year at the Max Planck Institute in Nijmegen in Holland. In that period formal semantics became at least as fashionable as generative syntax, and the first attempts were made to bridge the gap between the two streams. The cordial relations between MIT and Amherst made formal semantics acceptable to hard core syntacticians and this led to a situation in the mid-eighties and nineties in which generative attention directed itself to the study of aspect and tense including the results of the period in which formal semantics had laid the foundations for the proper study of temporal phenomena in natural language. Dissertations on aspectuality appeared at UMass, Amherst (Zucchi, 1989; Green, 1993; Terry, 2004) and MIT (Tenny, 1987; Kipka, 1990; Kearns, 1991; Klipple, 1991; Musan, 1995), among others.

The interaction between linguists and logicians in the period between the end of the sixties and the early eighties led to a number of major developments and events in the domain of formal semantics, which together made the domain of tense and aspect an important field of investigation. Here are some highlights. The use of temporal logic in linguistic studies on tense on the basis of Prior (1967) became necessary. It was clear that Prior's approach differed quite substantially from the way Reichenbach (1947) treated tense, and tenseless logic was extended with Prior's

machinery. The use of points in time to deal with time structure as expressed in temporal expressions of natural language became known by Montague's work in the seventies collected in Montague (1974). The development of categorial grammar as a syntactic backdrop for semantic interpretation due to his famous paper 'The Proper Treatment of Quantification in Ordinary English' became important in the study of aspectual compositionality because the relation of functional application between two sister nodes made it easier to do formal semantics.

The attempts to ground a temporal ontology led to studies on aspectual classes, for example, Taylor (1977) and Mourelatos (1978). The insight in Bennett and Partee (1978) that points in time cannot be properly used in explained aspectual phenomena promoted the development of interval semantics as used in Dowty (1979). The publication of Dowty (1979) was a major event, because it convinced many people of the potential marriage between a formal semantic machinery and an interesting empirical domain. It was the first real master proof of formal semantics in linguistics.

The birth of generalized quantifier theory in Barwise & Cooper (1981) similarly contributed to the feeling that mathematical logic provided very useful tools for the study of semantic structure. The two frameworks were merged in the study of adverbs of quantification like *always, sometimes, never* as generalized quantifiers in the temporal domain (De Swart, 1991), and the interaction of temporal and atemporal structure in sentences like *Three girls ate five sandwiches/no sandwiches* (Verkuyl, 1993).

In the seventies and eighties the logical properties of intervals were systematically investigated, e.g. by Van Benthem (1983). The rise of event semantics as developed in Davidson (1967) and explored by Kamp (1979, 1980) and Van Benthem (1983) raised the interest of many linguists due to its attractively simple ontology. Event semantics also provided the key to the study of temporal and aspectual phenomena at the discourse level, as shown by Hinrichs (1981, 1986), and Kamp and Rohrer (1983). In this context, the Reichenbachian theory of tense made a comeback. Temporal anaphora became an important topic in the dynamic semantic movement of the eighties and nineties (Kamp & Reyle, 1993; Lascarides & Asher, 1993).

3. MAIN STEPS IN THE DEVELOPMENT

The historical overview of section 2 is extremely brief and leaves out many important contributions, but in general and taken together it shows quite clearly that between (around) 1960 and (around) 1980 three break-through steps were taken for dealing linguistically with temporal phenomena in the broad sense. The first one was the step from tenseless logic to tense logic with points in time. This was done in the sixties but continued into the seventies in all sorts of linguistic work on tense. The step was inevitable: linguistics had been penetrated by tenseless first order logic and so the extension of this logic with temporality found its way into linguistic work.

But it led to difficulties, because the Priorean tense logic is based on points in time, which is not sufficient for the analysis of natural language.

The response constituted the second step; this was the development of interval semantics, in which intervals are allowed as primitives. Bennett & Partee (1978) made it clear that for the aspectual characterization of sentences like *She walked to Rome* it is impossible, or at least very implausible, to assign a truth value to it at a given moment of speech *n*: one cannot say (as Prior did) that this sentence is true if and only if there is a moment *t* preceding *n* such that at *t* she walk(s) to Rome, the idea being that the event of her walk to Rome took place at *t*. That cannot be because English speakers would have to say that at *t* she was walking to Rome. It is not possible to host the event 'She walk to Rome' inside the atomic element *t* as a whole. If one evaluates the sentence at *t* it is only possible to say that *She is walking to Rome* is true at t. So, a new notion had to be developed: a sentence may or may not be true for a given interval (Dowty, 1979, 1982; Richards, 1982; Heny, 1982; Van Benthem, 1983).

This second step made aspectuality a serious topic of investigation (Verkuyl, 1972, 1993; Dowty, 1972, 1979; Vlach, 1981; Moens & Steedman, 1987; Krifka, 1989). All sorts of mathematical techniques entered the scene in order to explain the differences between sentences like *Susan walked to Rome* and *Susan walked*. For example, it was argued that if Susan walked then (given some plausible limiting conditions) you can say for any subinterval of the Susan's walk that she walked. The idea is that a walk is sufficiently homogeneous to be considered as consisting of the same sort of substructure. This is not the case in *Susan walked to Rome*: here you cannot go down into the interval itself in order to get a similar structure: no proper subpart of Susan's walk to Rome can be called Susan's walk to Rome.

These sorts of techniques were well-known from set theory (in this case increasing and decreasing monotonicity vs. non-monotonicity), but they were not part and parcel of the linguistic training in the sixties and the seventies. However, thanks to the contribution of mathematical logicians to formal semantics it became normal practice to characterize the difference between the durative aspectuality of sentences like *Susan was afraid* and *Susan walked* (states and processes) and the non-durative aspectuality of sentences like *Susan became afraid* and *Susan walked to Rome* in terms of mathematical structures available from set theory. The interplay between mathematical logicians and linguists was impeccable: all sorts of colloquia were organized to train linguists in using mathematical tools to deal with temporal structure.

The focus on phenomena in interval semantics having to do with homogeneity also made it possible to investigate the structural relationship between the mass and count domain. Mass structure is homogeneous in the sense that if you have water you can take a proper subset of it which also is considered to water. Countable units have a minimum below which they do not count as countable: you cannot take a proper part of a bird which itself can be considered a bird. It is clear that the opposition between mass and count as sketched here is identical or at least quite similar to the opposition between eventualities like states and processes on the one

hand and events on the other. It is also evident that attempts were made to unify the account for both the temporal and the atemporal domains. This line was developed by Ter Meulen (1980, 1985) and Bach (1981). The count domain became secondary in the sense that the mass domain was considered primordial. From the late eighties on, mereology became the technical toolbox for those who underscore the correspondence between the mass and count domain based on the idea that count is a special case of mass structure (Link, 1983; Krifka, 1987, 1989; Landman, 1989, 1991).

The well-known *in/for*-test separating durative and non-durative sentences has been central to the study of aspect:

(1) She walked for an hour
(2) #She walked to Rome for an hour.
(3) ?She walked in an hour.
(4) She walked to Rome in an hour.
(5) #She walked a mile for an hour.

A large part of the past forty years has been used to sort out how this test works for Germanic and Romance languages, and which complements of the verb participate in the pattern. In particular, the difference between (1) and (5) and the correspondence between (2) and (5) have received a lot of attention. Moreover, the difference between (6) and (7) has led to systematic research into bare plurality as a factor in aspectual structure:

(6) #She walked three miles for an hour.
(7) She walked miles for an hour.

The question is why bare plurals cause an 'aspectual leak' into durativity so that *She walked miles* is interpreted as a process, whereas the presence of *three* in (6) makes it possible to interpret *She walked three miles* as an event that can be quantified. That is, if one tries to interpret (6), one is more or less forced to read it as saying that she repeated her three-mile walk an indefinite number of times.

Interestingly, the *for/in* test works out in different ways in different languages. For English and other Germanic languages, it targets what is often called Aktionsart or lexical aspect or aspectual class in the literature (cf. Comrie, 1976; Smith, 1991). In Germanic languages, aspectual class is highly sensitive to predicate-argument structure. In Slavic languages, on the other hand, the *for/in* test seems to correlate with (im)perfectivity, and the relevance of predicate-argument structure is much less transparent (Borik, 2002; Młynarczyk, 2004). The perfective/imperfective contrast depends on affixes on the verb stem, which is generally characterized as grammatical aspect. Languages often combine information about aspectual class and grammatical aspect. In English, the Progressive *–ing* construction pertains to grammatical aspect, but it is sensitive to

the aspectual class of the verb (it combines with action verbs as in *He is singing*, but not easily with state verbs, as in ?*He is knowing French*. The division of labor between aspectual class and grammatical aspect is not easy to determine, and has been subject to extensive linguistic investigation and different views (Smith, 1991; Depraetere, 1995; de Swart, 1998; Kabakčiev, 2000).

Of course, attention has also been given to a proper description of adverbials like *for an hour* and *in an hour*. (Verkuyl, 1976; Dowty, 1979; Krifka, 1987; Moltmann, 1991; Higginbotham, 2000; Pratt & Francez, 2001). What do they do? And why is it that they are crucial for the aspectual litmus test? It should be observed though that we have reached the limits of a proper understanding because too little is known about the nature of temporal adverbials in general to be sure about the specific properties of *for*-adverbials and *in*-adverbials. The basic idea about it is that *for*-adverbials quantify in some way — probably some sort of universal quantification is involved — whereas *in*-adverbials either contribute some sort of existential quantification or simply locate the eventuality. The strict blocking of the single event interpretation in sentences like (5) and (6) is not really accounted for by taking *for* as a universal quantifier, because the queer, forced plural interpretation does not follow from it.

The third step led to the domain of what is nowadays generally accepted as the main area of linguistic research involving time: Davidson's (1967) proposal to accept the existence of events as individuals in ontology was fully accepted by formal semanticists at the end of the seventies and early eighties (Kamp, 1979). Event-based semantics provided a clear ontology which fitted easily into the first order logic that had become generally accepted by then in the linguistic community as a way to deal with the logical form of sentences. Event semantics meant an easy extension of the well-known machinery. It became fashionable to quantify over 'eventualities', as they were called by Bach (1981), who used this name to cover the three ontological classes he distinguished (following Mourelatos (1978) and Comrie (1976)): states, processes and events.

The step from interval semantics to event semantics also opened the way for the study of discourse and more importantly for the connection between the study of sentences and the study of texts. It is not very natural to study discourse structure from the point of view of interval semantics. Intervals are typically objects that can be referred to by sentential elements, whereas they cannot be made easily recognizable in discourse, the more so because their role was to enhance the treatment of the truth conditions in tensed sentences. As soon as you work with individuals, you can give them a place in a discourse structure. Along these lines, Hinrichs (1981, 1986) studied the effect of aspectual properties expressed by a sentence on subsequent sentence(s). For example, the difference between (i) *The door opened. The president stood up. He welcomed us and asked us to sit down* and (ii) *The door opened. The president was sitting in his office. He did not see us. He was on the phone* can be understood by assuming that in (i) there were three events following, one after the other, the event described by *The door opened*. In (ii) such a sequence is absent: durative sentences do not create a chain of events; rather they

describe a state or a process going on without any information about the location of the eventuality. The distinction that is often made between Aktionsart or lexical aspect on the one hand, and grammatical aspect on the other evaporates at this level, for lexical states (*He was on the phone*) and progressive sentences (*The president was sitting in his office*) contribute the same discourse instruction, i.e. no progression of the temporal reference time.

Kamp and Rohrer (1983) push this insight even further by making the claim that all sentences in the French Passé Simple (the perfective past tense) introduce events into the discourse representation structure and all sentences in the French Imparfait (the imperfective past tense) introduce states. The mass/count contrast that had become so important in describing aspectual distinctions thus assumes a new life at the discourse level. Note that the emphasis shifts away from truth and truth conditions. The focus of dynamic semantics is on context change and update potential of linguistic expressions. This insight determined the further development of discourse semantics in which the study of tense and aspect has received a central position. In other words, we are now in a situation in which it can be sorted out whether aspectual phenomena are typically restricted to the sentential domain or whether they also contribute to the discourse. And conversely, whether some phenomena are only relevant to discourse structure and some can be seen as sentential.

4. NEW QUESTIONS: CROSSLINGUISTIC VARIATION

In this chapter we have argued that aspectuality can be considered a discipline which has converged towards consensus about the relevant issues, theories and questions in the field and which has developed common terminology and tools required for scientific progress. Given the present contours of the discipline, time is ripe to go beyond and raise issues for further research, formulating new pertinent questions for the domain of aspectuality. One of the important upcoming issues is how to deal with crosslinguistic variation and the possible parameterization of aspect, and, directly related to this issue, the question of how learners acquire aspectuality in various languages.

In order to further refine our theories, aspect data from more languages, especially from those outside the families of Germanic, Romance and Slavic languages, are required. Cross-fertilization between typology and theory can go both ways. On the one hand, additional languages may inform aspect theories about a possibly larger inventory of aspectual categories and other ways of encoding aspectual notions, and, crucially, will establish in more and more detail which elements of aspectuality are universal and which are not. On the other hand, today's theories with their batteries of aspectual tests define the test grounds for new languages and direct which empirical questions should be asked. Methodologies may include studies of single languages, pairs of related or unrelated languages, a variety of unrelated languages, language families and contrastive acquisition studies. Working with the diversity as presented by the world's languages, possibly

collecting data in aspectual-typological databases that are accessible to all linguists, is the next step to take in further aspectuality research.

This is not to suggest that such a crosslinguistic or even typological enterprise is a straightforward affair. Theoreticians need to become clear on the empirical test grounds for their aspect theories. Which tests will be acceptable to all for establishing telicity, which for establishing perfectivity? Which tests are translatable into other languages and yield relevant aspectual insights, and which are not? The difficult status of the *in/for an hour* adverbial test has already been raised above. Moreover, some telicity tests are 'contaminated' by the choice of tenses that one uses in the test sentences. For example, in English the telicity test based on the imperfective paradox works perfectly with past progressive and simple past sentences. If you know that *Rick was crying*, you may conclude that *He cried*, whereas if you know that *Rick was building a castle* you cannot be sure that *He built a castle*. If one were to apply this test in other Germanic languages (e.g., Dutch or German), it is unclear which tenses to use, given the lack of a progressive and the fundamentally different aspectual properties of the simple past in these languages. So, before doing crosslinguistic research into aspectuality the question is: which tests can be employed so that one can be sure to carefully compare the same properties across languages?

Crosslinguistic variation raises the fundamental question how much of aspectuality is universal, if anything, and how much of it is language specific. This is a very new question in the domain of investigation and is hardly ever raised so far. This question is extremely important, especially if one wants to develop a theory about the acquisition of aspect or its diachronic development. The tough issue underneath is: how can you tell what is universal about aspect? The answers to this question are far from trivial and need the combined inspiration of theoreticians and typologists. If we find a certain grammatical marking of a particular aspectual distinction in one language, does that imply that it is must be listed as a universal distinction that just does not surface as a grammatical category in every language?

A case that can illustrate this point is the category of (im-)perfective aspect. Clearly it is a grammatical category in the Slavic languages as it is encoded morphologically on (nearly) every single verb. Theoreticians may quibble about their analyses of aspect in the Slavic languages, but the real hard question is this: does the category of aspect extend universally to all other languages, even if they do not mark it in such a morphologically pervasive way as the Slavic languages do? The alternative may be to propose semantic parametrization: the parameter for perfective/imperfective aspect can be switched on or off per language, and children and second language learners need to acquire its setting on the basis of the evidence in the input (cf. Smith, 1991; Slabakova, 2001; Van Hout, in press a).

Clearly, the semantic notions of perfectivity and imperfectivity are present in languages that do not encode it with dedicated morphology. Many of the Romance languages have two aspectually different simple past tenses, one perfective, the other imperfective (e.g., in standard Italian the Imperfetto and the Passato Remoto, in Spanish the Imperfetto and the Preterito Indefinido, and in French the Imparfait

and the Passé Simple). One may thus conclude that these languages have the grammatical category of aspect and that it gets conflated with the tenses in its formal encoding. But what should one conclude about languages that do not have a (complete or half) perfective/imperfective paradigm, do they have aspect as a grammatical category? Again, the answer seems a straightforward yes, if one analyzes free morphemes in languages, including – to mention two that are presented in this volume – African American English (Jackson and Green, this volume; Terry, this volume), Chinese (Soh and Kuo, this volume), and also Creole languages such as Papiamentu (Andersen, 1990). If aspect is indeed taken as a grammatical category in the languages mentioned so far, the variation one finds may be reduced to a morpho-syntactic parameter: free vs. bounded aspect morphemes. But even in languages without dedicated aspectual encoding, the semantic notions of perfective and imperfective are present, and may be carried by certain tenses. For example, the English Simple Past is considered a perfective tense (Smith, 1991), whereas the Dutch Simple Past is claimed to be neutral between perfective and imperfective (Boogaart, 1999). So maybe aspect is a universal category after all. The point of this little exercise across languages is that our aspect theories need to develop arguments to be able to tell what is universal and what is not.

Other potential alternatives for the crosslinguistic analysis of aspect need to be explored. Possibly there are default mappings of each kind of aspect onto morpho-syntactic or lexical elements in certain domains. Telicity seems to be the kind of aspect that is determined at the level of the VP, whereas grammatical aspect (perfective/imperfective) is associated with aspect or tense projections higher up in the tree. So there would be a natural division into what has been called high and low aspect, where high and low are defined by the syntactic tree. Alternatively, maybe there are no absolute universals, and languages do not all have all the aspects, but there are universal grammaticalization mappings, so that if a language has a certain aspect it will fit in a particular grammaticalization pattern. Yet another possibility is that language variation arises from different ways in which lexical conceptual notions are mapped onto syntax. The field of aspectuality research is getting ready to raise the question about the universality of aspect and explore the options.

5. MORE NEW QUESTIONS: ACQUISITION OF ASPECT

Answers to the questions related to universality and crosslinguistic variation are needed in order to develop aspect acquisition theories to explain the process of first language acquisition by children or second language acquisition by children and adults. In the mid-seventies and eighties many studies have looked at the acquisition of tense and aspect in spontaneous production, and for many languages we have a pretty clear picture which forms children and second language learners first use and by what age or stage of development they do so. It turns out that learners initially use the tenses or aspects (depending on their language) in an atypical pattern, reserving certain tenses or aspects for verbs from certain aspectual classes and not yet generalizing them to all verbs. In English, for example, the Simple Past is

initially mainly used with telic and not with atelic verbs, while the progressive *–ing* morpheme is generally reserved for activity verbs (Bloom, Lifter & Hafitz, 1980), and in French the Passé Composé is produced with telic verbs, while actions that do not lead to any result are mainly described in the present (Bronckart & Sinclair, 1973). Similar such skewed patterns have been found in German, Italian, Greek, Polish, Mandarin Chinese, Turkish, Brazilian Portuguese, Hebrew, Japanese and Inuktitut. Seeing these patterns many researchers have argued that children initially form incorrect form/meaning mappings, in particular, that their tense or aspect morphemes carry the semantics of telicity (a lexical aspect notion), rather than the tense or (grammatical) aspect semantics that these morphemes carry in the target languages.

However, these patterns in production are not absolute, but present tendencies (i.e., the Simple Past in English occasionally appears on atelics and *–ing* occasionally on telics), which to some extent reflect similar patterns in the input (Shirai & Andersen, 1995), but not completely (Olsen & Weinberg, 1999). The fact that there are no absolute form/meaning mappings in child language is not expected by theories that claim that lexical aspect is incorrectly carried by the initial tense and aspect morphemes. Moreover, in the languages of the world (that we know of so far) telicity is not typically carried by verbal inflections. So theories that posit incorrect form/meaning-mappings need to explain why child grammars initially posit such an atypical mapping — tense or aspect inflections associated with the semantic notion of (a)telicity — which is not strictly obeyed and will have to be abandoned later on in development.

Questions such as these and the development of novel experimental techniques to test comprehension rather than production have revitalized the interest in the acquisition of tense and aspect since the late nineties. In order to test theories which posit initial incorrect form/meaning mappings on the basis of production data, one can design well-structured experiments that target just those claims and ask children to interpret carefully chosen sentences. This can be done, and is being done with children as young as 2, employing methods such as act-out tasks, picture or movie selection and truth value judgment (Van Hout, 1998, in press a, b; Kazanina & Philips, 2003; Schulz & Wittek, 2003; Stoll, 1998; Vinnitskaya & Wexler, 2001; Wagner, 2001; Weist, Wysocka & Lyytinen, 1991). As it turns out, the hypothesis that early tense or aspect encodes lexical aspect does not seem stand up against the new comprehension data coming in. So the question remains what then determines the skewed production pattern?

More in general, how do learners establish the form/meaning mappings of tense and aspect? Do they associate forms with the right meanings from the moment they start using them, and, if not, what makes them change the form/meaning associations at some point in development? Triggering contexts for learning are few, especially for aspect, since the aspects often present different points of view on the same situation rather than establishing different truths values. There must be some role for Universal Grammar, which may pave the way as to which are possible form/meaning associations, and which are not. But exactly how does Universal

Grammar help the language learner? Questions such as these are only just being asked, and so future research will undoubtedly present new and exiting answers to the acquisition of aspectuality.

6. CURRENT TRENDS AND THEIR VISIBILITY IN THIS VOLUME

The historical overview and new questions raised by typological research and research in language acquisition bring us finally to current trends in the research on tense and aspect. Over the last forty years or so, many different faces of aspectuality have been studied, and different tools have been developed for the proper analysis of a wide range of phenomena. Anyone who has ever taught a seminar on tense and aspect knows that for young researchers in the field, it is not always easy to sort out that toolbox, and find what they need to address their problems. **Verkuyl** (this volume) makes an attempt at surveying the ingredients of aspectual composition. He focuses on the role of the verb and its arguments in the construal of aspectual classes. He also compares different proposals that have been made in this domain, and tries to establish connections between interval-based and event-based approaches. And he compares languages in which aspect is 'low' (Slavic) with languages in which aspect is 'high' (Germanic) in the syntactic configuration.

As pointed out above, mainstream generative syntax developed an interest in aspectual phenomena in the late eighties. This research was strongly influenced by research on argument structure and thematic roles that clearly had aspectual implications (Borer, 1994; Van Hout 1996, 2000; Levin, 1993; Levin & Rappaport Hovav, 1995; Tenny, 1987, 1994). In the present volume, the papers by Smollett, Di Sciullo and Slabacova, and Folli and Ramchand illustrate this line of work. **Smollett** continues the discussion on aspectual composition from Verkuyl's article, and focuses on quantized objects that should delimit the event according to standard insights, but don't do so in certain contexts. The variability in judgments is explained by the claim that objects establish a scale, but do not enforce an endpoint to that scale. Unlike resultatives, goal phrases and particles, objects are not true delimiters.

Di Sciullo and Slabacova (this volume) pick up a different line from Verkuyl's paper. They discuss the contrast between the expression of aspect in Germanic and Slavic languages in terms of the distinction between D-quantification and A-quantification. But even within Slavic, not all prefixes are the same. Internal prefixes may change the telicity of the verbal projection they are part of, whereas external prefixes do not have this effect. Di Sciullo and Slabacova's configurational asymmetry hypothesis has empirical consequences for the interpretation of the subject.

Folli and Ramchand analyze the formation of goal of motion interpretation in English and Italian. It is well known that Germanic and Romance differ in the expression of the (located and directed) goal of motion events. Folli and Ramchand locate the characterizing properties of each language in the syntax-semantics interface. Obviously, the relation between form and meaning remains an important

topic in current linguistic research, so we expect more fine-grained analyses along the lines of these papers in the foreseeable future. A better understanding of the lexicon-syntax-semantics interface and typological variation thereof is of major importance to the field in general.

Earlier in this introduction, we referred to the importance of confronting aspectual theory with real data. Di Sciullo and Slabacova underline the relevance of Slavic data in the current theory formation, and go beyond standard views by establishing connections with morphological processes in Romance. Folli and Ramchand also go beyond the standard contrast between Germanic and Romance, and attempt to fine-tune the analysis by looking at individual languages in each class. **Van Geenhoven**'s article (this volume) constitutes another example of the current line of combining theory formation with extensive empirical study. Van Geenhoven argues that the overt continuative, frequentative and gradual aspect markers that are found on verbs in West Greenlandic support the view that atelicity is a matter of unbounded pluractionality, that is, plurality in the domain of verbs and events. Bringing in these markers, Van Geenhoven extends the discussion from the domain of inner aspect, to the domain of outer aspect, thereby putting the discussion on adverbial quantification (cf. de Swart, 1991), and mereology (both mentioned above) in a new perspective.

Piñón (this volume) brings in a different class of aspectual adverbs in his study of *completely, partly, half*. He argues that these adverbs relate events, objects and degrees. Given that verbs do not normally have degree arguments, he introduces measurement functions that create a notion of degree.

Filip (this volume) continues the discussion of plurality and measurement by studying Slavic aspect from the perspective of event semantics. The notion of weak indefiniteness (measure expressions involving something like *many*) is crucial to her analysis of perfective prefixes and bare mass and plural incremental theme arguments. Van Geenhoven, Filip and Piñón all stress the complexity of event structure that arises out of the interaction of predicate-argument structure, grammatical aspect and aspectual markers or adverbs. It is clear that the language data here take us well beyond the traditional aspectual tools. The roads that are explored in these papers suggest that we may expect more work on the enrichment of formal semantics dealing with complex event structures in the years to come.

Language diversity is a strong point of the theoretical proposals made in the papers discussed so far, and the emphasis on typology grows stronger as we move on. **Bach** contributes the most philosophical paper of this volume, by reflecting on the relation between language and culture as far as the classification of eventualities is concerned. Questions concerning ontology and metaphysics are relevant to linguistics as languages exploit the 'abstract' universal underlying model structure in different ways in their lexicon and grammatical systems. Bach uses data from native North American languages to make the claim that language diversity is real, and linguistic theory better deal with it.

Tatevosov's (this volume) paper is in some sense a realization of Bach's ideals, in that it deals with diachronic and typological patterns in a wide range of

languages in an attempt to develop a theory of grammaticalization. Tatevosov studies verbal forms from Nakh-Daghestanian languages (East North Caucasian) that can have both a habitual and a future interpretation, and argues that ability and possibility are crucial notions in the diachronic development. The stage/individual contrast plays a role in this development, because of its interaction with habituality.

Soh and Kuo (this volume) present a study of aspect in Chinese. They show that the perfective marker *–le* indicates completion in some contexts, whereas in other contexts simple termination of the event is also a possibility, even with verbs of creation. They locate the source of the difference in the object. Thus there are clear connections with the work by Smollett (this volume). According to Soh and Kuo, the mass-like character of nouns in Mandarin Chinese allows even more unbounded readings of objects than we find in English.

The last three papers in this volume deal with special aspectual features of varieties of English different from Standard American English. Terry and Jackson and Green study African American English (AAE); Fong's work bears on Colloquial Singapore English. **Terry** (this volume) studies the ambiguity of African American English simple past tense forms between a perfective past tense reading, and a present perfect reading. He reconciles the two readings by positing that the *–ed* morphology in AAE denotes precedence. If *–ed* interacts with a null present tense, it gets an aspectual interpretation (present perfect); if it is the highest tense/aspect marker in the sentence, it is interpreted as past tense.

Jackson and Green (this volume) address African American English from the perspective of language acquisition, focusing on aspectual *be* (a habitual marker). Child speakers need to learn to distinguish aspectual *be* from auxiliary *be* both syntactically and semantically. The production and comprehension experiments carried out by Jackson and Green show that three-year olds still have trouble with the distinction, but four-year olds have acquired the basic uses of *be* in AAE, and five-year olds can use them in combination with negation as well.

Finally, **Fong** (this volume) examines the use of the aspectual marker *already* in Colloquial Singapore English as indicating 'near future', 'just started' and 'ended'. Fong proposes a semantics of *already* in terms of opposing phases, separated by a contextually determined transition point. This allows her to analyze *already* as the emergent unmarked aspectual operator for expressing change of state. An optimality-theoretic analysis with reranking of constraints derives the language-internal and cross-linguistic variation in the expression of the perfect meaning.

The papers in the second half of this volume illustrate that semantically oriented typological research on tense and aspect goes far beyond a mere inventory of forms and global classification of meanings. It usually requires in-depth knowledge of the language(s) at hand, which makes it hard to carry cross-linguistic generalizations beyond a comparison of two or three languages. As pointed out by Bach (this volume), this fact of life is a major impediment to progress in linguistic theory formation. At the same time, we see that the descriptions of temporal-aspectual phenomena in a variety of languages have multiplied in the last decade, and hopefully will continue to grow in the future. More and more, we see that the

descriptions are cast in widely accepted theoretical terms. This makes them empirical test cases for the theories of tense and aspect that have been developed by logicians and linguists, as well as breeding grounds for the development of new analytical tools. This growing tendency of combining very fine-grained analyses of rich empirical data with techniques that build on well-known syntactic and semantic insights will hopefully give rise in the future to a better understanding of both the similarities and differences in form and meaning between languages.

Many more issues could have been – and maybe should have been – addressed in this volume, such as discourse analysis, computational modeling, and implications of linguistic diversity for theories of human cognition. We hope that the papers presented here provide a starting point for anyone interested in broadening the study of tense and aspect.

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HENK J. VERKUYL

ASPECTUAL COMPOSITION: SURVEYING THE INGREDIENTS

Abstract. This paper discusses some of the ways in which the notion of compositionality is understood in the literature. It will argued that on a strict (Fregean) view a verb has a constant meaning to make in the aspectual composition independently from the information contributed by its arguments, that the VP (verb+internal argument/complement) forms a substantive aspectual unit that should be recognizable as such complex aspectual information; and finally, that aspectual composition forces Discourse Representation Theory into revising the way states and events are taken.

Keywords. Aspectuality, composition, terminativity, DRT, aspectual classes, state, event.

1. INTRODUCTION

The notion of aspectual composition belongs in the wider perspective of developments in two domains of research. The first domain harbours the tradition of the so-called Fregean compositionality. This has been a very important compass in semantics and as the title of my 1971- dissertation *On the Compositionality of the Aspects* suggests, I was guided by it, although I did not have first-hand knowledge of Frege's work at the time. My first contact with Fregean compositionality was via the Katz/Fodor-semantics of the sixties which expressed Frege's ideas on building the complex meaning of phrases and sentences on the basis of their smaller parts. It was that insight of Frege's that—after the collapse of the markerese semantics provoked by Lewis (1972)—turned out to be common ground for the philosophical-logical tradition that took over semantics in the seventies. I have always considered aspectual composition as part of this broader tradition whose major players are well-known: Frege, Russell, Carnap, Quine, Montague, among many others. It makes compositionality a guiding principle in the domain of aspectual phenomena, as it is in other semantic domains. Sometimes the fact that complex units are to be taken as more than the sum of their parts is used as an argument against Fregean compositionality. This objection is wide off the mark. After all, the existence of molecules did not prevent chemistry from looking at atoms as building blocks.

The second domain is linguistic. The notion of aspectual composition hovered already over the literature of the twenties discussed in my dissertation. It grew on trees, as the English proverb says, but the tragedy for my aspectual heroes of the late twenties, Poutsma and Jacobsohn, who in Poutsma (1926) and Jacobsohn (1933) were well aware of the non-atomic nature of aspectual information, was that there were no (syntactic) trees at the time. At the end of the sixties, I could decide

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 19 - 39.

relatively easy that aspectuality should be treated on the basis of amalgamating the meanings of the verb and its arguments into larger units. This was due to the fact that since Chomsky (1957, 1965) the notion of phrase structure had been fully available, whereas it was still absent or at best rudimentary in the twenties and thirties. The idea of aspectual composition started to grow on trees.[1] Phrase structure opens the way to a strict(-er) interpretation of Fregean compositionality.

The thesis that the meaning of a complex expression is computable on the basis of its constituent parts has been attacked in semantic "Gestalt-circles".[2] It seems to me that such attacks are too early. To continue the metaphor used above: a molecule is built from atoms by the way these are grouped together. So one cannot do away with Frege without taking into account constructional meanings, context information, or other ways of complementing the information that is present at first sight.

Let me explain this point in more detail with the help of Figure 1 in which the semantic information expressed by the features [±ADDTO] and [±SQA] may be taken as semantic atoms. The idea of the picture as a whole is that a Verb is specified for some semantic property, that it takes NP_2 which is also specified for some semantic property, that it forms a VP at which level a complex semantic object is construed, here labeled as [$\pm T_{VP}$], that the VP combines with NP_1 yielding a tenseless sentence S that carries the complex aspectual information labeled [$\pm T_S$] and collected from the lower levels in the form of a complex semantic feature. Then this process comes to an end after which other principles are operative in a higher domain.

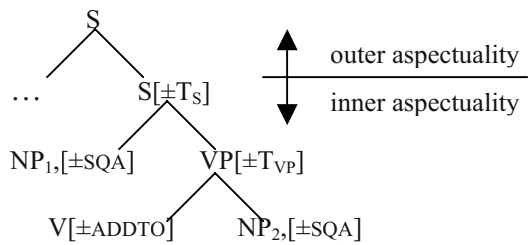

Figure 1. Aspectual composition

To mark this transition a distinction is made between inner and outer aspectuality. The [+ADDTO]-property of the verb expresses dynamic progress, change, nonstativity or whatever term is available to distinguish it from stative verbs, which have a minusvalue. The [+SQA]-feature expresses that the NP pertains to a specified

1 Chomsky's notion of recursivity comes from the same logical tradition that I mentioned earlier, so the idea of composing new complex structures on the basis of simpler ones had also a syntactic underpinning as clearly visible in the Katz/Fodor-semantics.

2 Quite fiercely by Lakoff, e.g. in Margolis and Laurence (1999:413) and by some of the prototype theorists included in that collection. An interesting attempt to stick to compositionality in a cognitive approach in which gestalts are clearly recognized is Jackendoff (2002:378–94).

quantity of things or mass denoted by its head noun as in (1a) or contains [-SQA]-NPs as in (1b):

(1) a. She played *a sonata*, *three sonatas*, *some sonatas*, *a piece of music*, *that sonata*, *Schumann's last sonata for piano*
b. She played *music*, *sonatas*, *that (sort of) music*, *from there to the end*

Contrary to what Dowty (1979:64) said about my position, this distinction has nothing to do with definiteness or indefiniteness. A [+SQA]-NP pertains to something discernible that can be separated from other things and as soon as you can do that, one may count or measure (cf. Verkuyl 1972:59ff.).[3] This semantic information is located in the determiner part of an NP.

The process of amalgamating the information contributed by V and its internal argument NP_2 should be different from the process of amalgamating the information expressed by the VP and the external argument NP_1, there being two different levels of phrase structure involved. Part of the difficulty of taking the sum S as more than the sum of its parts is that we know so little yet about the type of information that is collected at the S-level. As I will show below, the relation between NP_1 and VP can be taken in terms of a multiplication relation in which each of the members of the NP-denotation obtains its own VP. Where do we store this particular information? Is it made explicit by the algebraic machinery that computes meanings? Does the fact that there are two ways of multiplication that seem to govern the NP_1 VP-relation, follow from a general cognitive principle? At the present stage we do not yet have answers to these questions, but what we do know is that they are raised by stubbornly following the hard road of Fregean compositionality. It pays off to take this road by trying to compute the meaning of S on the basis of semantic information expressed at lower levels.

Figure 1 provides a simplified scheme for showing how compositionality based on phrase structure operates. The simplification concerns the fact that Figure 1 covers only two-place predicate verbs and one-place predicates with complements. In spite of the drastic reduction, it enables us to ask some relevant questions about how to shape the idea of aspectual composition. I will organize these questions into three main topics.

1. What is the contribution of the Verb to aspectual information?

2. Is the VP an aspectual unit on its own due to aspectual asymmetry?

[3] On pages 79ff. discernibility expressed by mass nouns was analyzed in terms of the notion of partitivity: one insulates a part of a larger whole. Krifka's notion 'quantized' can be considered as the mereological explicitation of the [+SQA]-notion, although there are some remarkable differences having to do with NPs like *more than three sonatas*, something, etc. which I consider [+SQA] and Krifka as cumulative and not quantized.

3. How does this asymmetry relate to the DRT-notions of event and state?

The first topic will be discussed in section 2. It focusses on the question of how constant the meaning contribution of a verb should be kept. The second topic, discussed in section 3, concerns the question of how the VP is formed and how it behaves as an aspectual unit in the interaction with the external argument. Section 4 will discuss the question of how aspectual information formed by compositional rules is (to be) given a place in the Kamp boxes of DRT. Their major division between event and state may be disputed on compositional grounds.

2. THE VERB AND ITS ROLE IN ASPECTUAL COMPOSITION

2.1. The constancy of verb meaning

What happens in the composition of the sentences in (2)?

(2) a. Mary walked three miles
b. Mary walked miles

In terms of the feature system above, the difference between the VPs *walk three miles* and *walk miles* is accounted for as in (3):

(3) a. $V_{[+ADDTO]} + NP_{2,[+SQA]} \Rightarrow [+T_{VP}]$
b. $V_{[+ADDTO]} + NP_{2,[-SQA]} \Rightarrow [-T_{VP}]$

It should be underscored that the features abbreviate information that has received a precise (= formal) second order type-logical characterization in Verkuyl (1993).[4] In spite of the abbreviatory nature of the features, they help to show that the value of the verb is kept constant in the two cases of (3): it is the complement of the verb that should be held responsible for the different aspectual values of the two VPs that are compared, $[+T_{VP}]$ in the case of the terminative VP *walk three miles*, $[-T_{VP}]$ in the case of the durative VP *walked miles*. The semantic information at the level of the VP differs crucially from the lower-level information. The features also yield a helpful feature algebra part of which is visible in (4).

(4) a. $[_S$ Mary $[_{VP}$walk three miles]]
$[+TS$ $[+SQA]$ $[+T_{VP}$ $[+ADDTO]$ $[+SQA]]]$ $\Rightarrow$ terminative
b. $[_S$ Mary $[_{VP}$walk miles]]
$[-TS$ $[+SQA]$ $[-T_{VP}$ $[+ADDTO]$ $[-SQA]]]$ $\Rightarrow$ durative

[4] In Dowty (1979) they are taken as syntactic in spite of the fact that they have always stood for the semantic information explained in section 1.

c. [$_S$ Children [$_{VP}$walk three miles]]
[-TS [-SQA] [+T_{VP} [+ADDTO] [+SQA]]] ⇒ durative
d. [$_S$ Mary [$_{VP}$save three miles]]
[-TS [+SQA] [-T_{VP} [-ADDTO] [+SQA]]] ⇒ durative

This algebra leads to the formulation of the Plus-Principle, which says that one minus-value below is sufficient to yield a [–T] at the top of Figure 1, the natural domain of the Principle appearing to be the domain of inner aspectuality. Being skeptical about the use of aspectual classes—they lure linguists into doing ontology rather than linguistics—, and being skeptical about Vendlers quadripartition, I adopted the tripartition State-Process-Event in the eighties. The tripartition emanated on a line followed by Comrie (1976), Mourelatos (1978) and Bach (1981), among others. It took a while before I realized that the tripartition simply results from encoding the feature-information in (4). The feature algebra construes the three aspectual classes that are relevant in aspectual composition as shown in Figure 2.

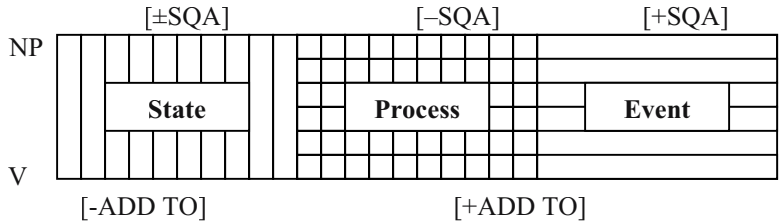

Figure 2. Construal of three aspectual classes

It follows that verbs do not express states, processes and events (accomplishment and achievements), but that the tripartition is a higher level classification, which means that it cannot be ontological in the strict sense.[5] Neither can it be in a wider sense. In saying *Mary walked miles* rather than saying *Mary walked three miles* we are simply less precise. With the choice about how to say it, we (as language users) select a certain way of informing on what happened. That, after that and only from a meta-point of view, we may be able to construe processes and events explicitly is because we want to have some easy way to distinguish between something that is experienced as not discernible as a separate unit and something that can be discerned as a countable or measurable unit. So, Figure 2 is a nice way to reduce the factor ontology in linguistic analyses.

[5] That is, if the lexicon stores our knowledge of the world, one could say that lexical categories reflects ontological categories. However, as soon as phrase structure comes in, the relation between language and ontology is far too complex to assume that aspectual classes are ontological categories of (temporal) individuals.

2.2. Lower level coercion

Neither Dowty (1972) nor Dowty (1979) did follow the above line of thought of giving the verb a stable, constant meaning in the sentences in (2). Dowty clearly took a different option by using Vendler classes in order to characterize the lexical differences between verbs. His 1979-representation of them is given in Table 1.

Table 1. Dowty's four aspectual classes

State	$V(x_1,\ldots, x_n)$
Activity	DO$(x_1,V(x_1, \ldots ,x_n))$
Accomplishment	DO$(x_1,V(x_1, \ldots ,x_n))$ CAUSE(BECOME $V(x_1, \ldots ,x_n))$
Achievement	BECOME $V(x_1,\ldots,x_n)$

States do not have an operator of the sort present in the other three classes: states merely express timeless predication. Activities are constructed from States, Agentive Accomplishments are built up from Activities and Achievements.

For Dowty there are two verbs *walk* in (2), one of which pertains to an Activity as in (2b) *Mary walked miles*, and one in which CAUSE and BECOME appear as operators, so as to obtain the Accomplishment verb *walk* as in (2a) *Mary walked three miles* (1979: 66 – 71). Now, at this point there are two options: (a) to postulate two verbs *walk*; and (b) to choose one of the verbs as basic and to introduce rules operating on this basic meaning. The first option is traditionally considered very unattractive, so in the wake of Dowty, the second option is abundantly present in the literature of the eighties and early nineties. This is how it proceeds. Lexically one characterizes the basic meaning of the verb *walk* as V_{Act}, which says that the verb is to be considered an Activity verb. In (5a) the verb *walk* simply takes its complement because the [–SQA]-NP *miles* may co-occur with a V_{Act}. To make the Activity verb *walk* compatible with bounded information *three miles* in (5b), some operator say $\Uparrow$ changes V_{Act} into V_{Acc} so that the Accomplishment verb can take the [+SQA]-NP *three miles*.

(5) a. Mary walked miles V_{Act}
b. Mary walked three miles V_{Acc} (= $\Uparrow V_{Act}$)

Adapting the kernel meaning of a verb to the context in which it appears is by no means considered an unnatural thing to do. In fact, Poutsma (1926:291) did so, by saying that "the normal aspect of the [English] verb is often modified or even utterly changed by the context". In the sixties, the idea of tuning a constituent to the context in which it appears, became visible again outside the aspectual domain in Weinreich (1966), who made use of so-called transfer rules. In a sense, transfer rules are precursors of the type-logical instruments developed in Partee and Rooth (1983) under the name of coercion rules. One difference is that transfer rules are "low-level

coercion rules" in the sense that they operate on the relation between a verb and its possible complements.

The idea of transfer rules differs from the view in which the verb provides a constant contribution to the making of the VP. The issue involved is this: suppose that a certain verb V has a basic meaning X selecting a meaning Y of its complement while not being able to select meaning Y'. Transfer adherents let an operation O apply to X changing the meaning X of V into a verb meaning O(X) that may take Y' into the VP-meaning [O(X)](Y'). In this way one ends up with X(Y), exemplified in (5a) and [O(X)](Y') exemplified in (5b). The alternative way is to say, as I do, that X may take both meanings Y and Y' so that at the level of VP one obtains X(Y) and X(Y'). In that case, the difference at the VP-level is explained in terms of the difference of the verbal complement.

The question arises of whether it is possible for Moens (1987) and Moens and Steedman (1987) to have Vendler's quadripartition at the S-level without an appeal to lower level coercion. Recall that the tripartition into states, processes and events of Figure 2 is derived from the presence or absence of linguistic material. It would be a compositional miracle to be able to derive the Vendler quadripartition from the same information. Consider the following sentences where the Vendlerian aspectual class labels are assigned to the S-level:

(6)	a. John discovered nothing	State
	b. John discovered treasures	Process
	c. John discovered three treasures	Accomplishment
	d. John discovered a treasure	Achievement

The suggestion made by Mark Steedman (pers. communication at the conference) that the four classes can be compositionally derived along the lines of Figure 1 assuming a stable verb meaning cannot be made true: a treasure does not contribute a (culmination) point to obtain an Achievement as opposed to three treasures which on that line of thought should contribute a closed interval so as to obtain an Accomplishment. Given the fact that the NP *a treasure* may occur in a sentence expressing a state (as in *John hoped for a treasure*), the differences between the four classes must be found in verbal differences.

The conclusion should be that what I call the Edinburgh approach is forced into low level coercion, this being the only way to obtain four Vendler classes at the S-level. Along this line, Vendler's four classes can only be derived on the basis of the differences between the complement meanings Ya, Yb, Yc and Yd requiring four types of verb meanings Oa(X), Ob(X), Oc(X) and Xd, if the basic meaning of discover is to express achievement. In this way, one may relate the four resulting meanings at the sentential level, [Oa(X)](Ya), [Ob(X)](Yb), [Oc(X)](Yc) and Xd(Yd), to four aspectual classes. It is hard to escape from the impression that a low coercion analysis is a complex way of saying that there are four verbs *discover*. Why having three meaning operators Oa, Ob, Oc. . . on X in (6), if one can do with one

stable X in all four cases?[6] I fail to see why the simple solution of keeping the verb meaning constant in aspectual composition is so difficult to accept.

2.3. The Notion of Culmination

The promotion of the four Vendler classes to the S-level as given in Moens (1987 has been formalized in Lascarides (1988). In sentences like (7),

(7)	a. Mary walked	[$_{Pr}$Mary walk]
	b. Mary walked three miles	[$_{Cp}$Mary walk three miles]
	c. Mary walked miles	[$_{Pr}$Mary walk miles]

the label Pr stands for propositions expressing a process such as (7a) and (7c) and the label Cp for propositions expressing a culmination point. The two notions are tied up to the scheme in Figure 3.

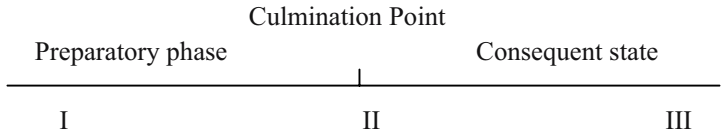

Figure 3. Phasal structure

To obtain the interpretation of sentences like *Mary ran in four minutes* expressing that today Mary accomplished her daily run in four minutes, Moens/Lascarides put Cp as an operator in front of [$_{Pr}$Mary run]. The result [$_{Cp}$[$_{Pr}$Mary run]] leads to an interpretation expressing a culmination point. Pr can also be taken as an operator. It may coerce the Cp-proposition *Mary walk three miles* into a proposition expressing the preparatory phase as in *Mary was walking three miles*: PROG(Pr)([$_{Cp}$Mary walk three miles]). So, the Pr-operator brings one in the Preparatory phase, the Cp-operator at the culmination point. It is clear that the notion of culmination is quite crucial, both in the form in which it is expressed by (7b) and in the form of an operator Cp coercing a sentence into expressing a culmination point.

Figure 3 is used by many scholars in the domain of aspectuality. In Kamp and Reyle (1993), for example, it plays a crucial role in their analysis of aspectuality and tense. However, Figure 3 raises the question (not often raised in the literature) of whether or not the notion of culmination point is something that has an explanatory

[6] The notion of coercion was developed in order to deal with the type-logical clash problem: only when two constituents do not match as in *She began a book*, is it necessary to put a sort of lubricant between the two non-matching types. But why should *walk* in (2) be incompatible with *three miles* and compatible with *miles*? Isn't it the task for verbs to be able to take their complements without making too specific restrictions?

force in aspectual composition. For the analysis of (7b) the question boils down to asking which element contributes the culmination point allegedly expressed by the sentence directly and straightforwardly? Can one tell this information from the predication itself?

In my view, the answers to these questions are negative. The notion of culmination turns out to be not really compatible with the idea of compositionality. This is because culmination is crucially a phasal (ontological) concept rooted in the idea that a closed interval has marked bounds and given the direction of change the final point is even more marked. It is the final bound that is given a prominent place in Moensian analyses, but one fails to find any argument for it on the basis of the presence of linguistic material expressing specifically a culmination point. It is revealing to compare here. The information expressing culmination cannot be detected in the same way in which quantificational information can be found in a sentence, as in the compositional approaches along the lines of Verkuyl (1972) and Krifka (1989a). On those approaches, the [+SQA]- or quantized information is contributed by the determiner of the internal argument-NP. It is given a place in the complex information at the VP-level as a whole expressing a Path.[7] Relating the NP_{int} to a V so as to form a VP is "going through (= computing) the way in which quantificational information contributed by the internal argument is integrated in a temporal structure". The relation itself can be accounted for in terms of a Pathfunction ℓ_x picking its input values from the successor function s contributed by the verb and providing the sense of additivity connected with progress. The NP *five letters* in (8) provides the co-domain of this function. It is taken as a set with a certain cardinality.

(8) Mary mailed five letters while still in France

A simplified picture of a possible application of this function is given in Figure 4, where the progress expressed by (8), say as further comment on sentence (10) below, may count three mailing (sub-) events (say, 2 letters in Jaujac, 1 in Vienne and 2 in Plomion), although we do not know what really happened, unless more specific information is given.

[7] In the localistic tradition the process of accommodating an NP to its functioning in the temporal structure of a sentence is associated with the notion of Path where the development of the change can be followed. This Path notion dates back to the sixties, in particular to the work of Gruber. I followed him in the analysis of Source-Goal structures and in Verkuyl (1978) the notion of Path was formalized in the cognitive setting of Herb Clark's work on spatial orientation. The framework of generalized quantification made it possible to formalize the localistic heritage in set-theoretical terms: [+ADDTO] can be taken as the moving from a zero point by adding. It also makes it possible to escape from impressionistic notions like Goal, Source and Theme and Path as part of the theory itself. At best they are handy metaphoric labels.

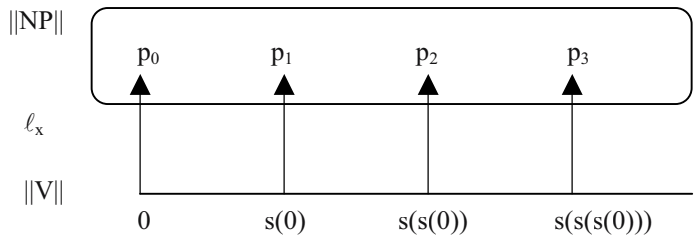

Figure 4. A Path

So, this is just one of many combinatorial possibilities in (8). The final point of a Path has no specific value on its own and certainly there is no single linguistic element in the sentences discussed so far that on its own provides it. What is provided by an internal argument is its quantificational information and this makes the Path bounded or unbounded. [+SQA]-internal arguments do not contribute a culmination point, neither do verbs. In other words, from a strictly compositional view the notion of culmination point is highly suspect.[8]

The source of the problem with the notion of culmination seems to me to be a (mis-)leading metaphor. I am afraid that culmination is a suggestive holistic term dating from the (Aristotelian) time that some verbs were seen as expressing a specific inherent goal (a telos) as if there are "goal movements". Now, the notion of an inherent goal is quite suspect if connected with changes, because it pertains to human considerations. Why should the verb *fall* express an inherent goal whereas celestial bodies may fall eternally? Why should *die* express an inherent goal rather than expressing something like 'cease to live'? Why should *explode* express an inherent goal rather than something like 'cause to scatter'? Why should (7b) *Mary walked three miles* have an inherent goal? One might equally well maintain that the walking event came to an end because the [+SQA]-NP *three miles* restricts the otherwise unrestricted walking process. The appropriate metaphor for looking at the relation between the internal argument and the verb *walk* seems to me to come closer to the internal argument preventing that the unbounded verbal additivity should continue: [+SQA]-NPs like *three miles* and *the letter* restrict the progress expressed by the verbs *walk* and *write* rather than providing culmination or telos: the

[8] Note that a Path harbours both continuous information (the verb contributes a structured interval which can be described in the Reals) and discrete information (the verb also provides indices, counting points p indicating structured parts of the Path necessary to distinguish sub-events (cf. Verkuyl (1993) for the details.). Here is an important difference between Krifka and myself: Krifka's mereological approach really reduces all temporal information to information described in the system of real numbers (the physics line), whereas my system tries to focus on the interaction between two numbers systems: the naturals (indices, partition structure, etc.) and the reals (at the ground level). In my opinion, it is necessary to have them both because natural language and our cognitive system uses both independently. We count minutes, hours, days, weeks, etc. by indexing them with the help of natural numbers knowing that these stand for intervals (the symbolic species line, so to say).

internal argument leaves no room for further walking or writing, so to say.[9] We need no apotheosis at the end of an event: the notion of a bounded Path as discussed shortly does not require that its final point be given a specific place. The Path-notion simply requires that the trajectory as a whole be taken as a complex unit consisting of verbal and nominal ingredients. That a bounded Path has a final point simply follows but is closer to being an epiphenomenon than being a central element in the meaning: it is simply not encoded.

3. ASPECTUAL ASYMMETRY: THE VP AS A UNIT

In memorizing the meaning of verbs, language learners tend to learn VPs rather than Vs. Learning verbs often happens in a larger context of providing schemes which are easy to memorize: to write a letter, drink a glass of milk, answer the phone, see a bird, etc. Prototypically these V(y)-schemes are terminative (telic, accomplishment) VPs. There is nothing strange about that: terminativity is marked, prototypes are marked too. This is another way of saying that the VP is an important unit in learning to capture temporal structure: it is a way to learn about event structure. But learning verbs is something different from learning VPs. Therefore it is necessary to have a closer look at the difference.

3.1. Separating verbal information from VP-information

Vendler is a philosopher: he tried to connect ontological categories to linguistic clues in order to be able to distinguish between them. In metaphysical issues, linguists seem to agree on an important point: knowledge of the world is to be stored in our lexicon. That is, the question of what a bike is amounts to asking 'What is the meaning of the word *bike*?' So, quite standardly, the notion of an ontological category is on the same footing as the notion of a lexical category (verb, noun, adjective). It follows that as soon as one gets into phrase structure, it is quite hard to maintain the notion of ontological category as a stable notion (*to walk three miles* is in different category from *to walk miles*). For exactly this reason, Vendler has to call his paper *Verbs and Times*, not *Verb Phrases and Times*, because his ontological investigation could or should not bring him at the level of phrase structure. At phrase level there is no or hardly any room for fixed ontological entities due to variable parts in the complex meanings.[10] In this sense, one cannot escape from

[9] The second metaphor is closely related to the Keplerian astronomic definition of movement of a celestial body as unrestricted until some force operates on it in order to stop it. So, it helps to put some eternal beings or robots in our examples: *The flying Dutchman was doomed to sail eternally* as opposed to the *The flying Dutchman was doomed to sail three miles eternally*. This helps to remove human fragility as a hidden factor in the analysis of verbal meaning.

[10] The attempts in Jackendoff (2002) to extend the notion of lexical item with phrasal information support the skepticism one may have against matching language directly with ontological categories, certainly if these categories are taken realistically.

observing that Vendler's contribution has caused a lot of opaqueness rather than transparency, for his linguistic readership, that is to say.

As far as I can see, two steps are to be taken to get rid of the effects of mixing linguistic and ontological reasoning. The first one is to see what logicians tend to do if they characterize a predicate like *write*: the meaning of the two-place predicate W is generally taken as the set W of pairs $\langle x,y\rangle$, where in the case of (9a) $\langle m,l_{25}\rangle \in$ W.[11]

(9)	a. Mary wrote the letter	a'. W(m,l_{25})
	b. Mary wrote letters	b'. W(m,{l_i, …, l_{i+j}})
	c. Mary wrote poetry	c'. W(m,P)

A lot of linguists have followed a logical course, so they are happy to reduce the verb meaning of verbs like *write* to singular arguments (i.e. to pairs) leaving the task of characterizing the real meaning of the verb to lexicographers and mostly ignoring the results in that domain. The common linguistic practice is to smuggle information about the arguments, especially the internal argument preferably into a singular form. That is, *write* is treated as if it means 'to write a letter', 'to write a book', etc. This makes the verb *write* an accomplishment verb. In other words, the meaning of W is based on interpreting it as a set of pairs each having two individual members.

Prima facie, this is not unreasonable for the first argument of a pair if the verb is not a verb like *meet*, *convene*, etc. But in the aspectual literature on word meaning considerations about collective and mixed predicates do not seem to apply to the second argument: generally *write* is analyzed as taking a singular second argument and if it occurs with a bare plural argument it is simply taken as pertaining to a conjunction of individuals in whatever form of representation.[12] In the same way this holds for *discover*, even more so it seems, because *discover* is aspectually often taken as 'discover some individual in one swoop', so to say.

However, contrary to what is suggested by (9b') *Mary wrote letters* does not necessarily say that Mary's writing resulted in a countable number of letters: Mary's letter writing may have resulted in drafts, unfinished letters, etc. There is only a minimal requirement that at least some letters were finished, but the predication may cover more than a set of finished letters. The same applies to the mass term *poetry* which is simply represented in (9c') by a capital P in order to abbreviate mass information, the actual point being that Mary's poetry is not restricted to what she published or considered as finished. Likewise to discover treasures may include failures or attempts with no result.

Since Vendler's paper, many linguists see the verb *discover* and *win* as achievement verbs because they discuss sentences like *John discovered a treasure* and *Ellen won the race*, both with a singular NP rather than sentences with a plural

[11] In the representations in (9) I leave out the quantifier, because a full representation would not add anything relevant in the present context. So, I simply give the letter an arbitrary index.

[12] In Verkuyl (1993) I have argued that bare plurals are to be treated as sets without a cardinality. In fact, in what follows here I will explore some of the consequences of that position.

internal argument. The leading thought is then that in both cases the sentences express an event with no duration. Unfortunately, Kamp and Reyle (1993) also follow this linguistic practice.

The tendency is certainly to ignore sentences like *John discovered very valuable treasures* or *John discovered much more than he expected.* As soon as one includes these sentences in the analysis, the question arises of whether it makes really sense to say that these verbs express a point event as part of the verbal meaning. The sentence *John discovered three treasures* may after all pertain to a situation in which John discovered them one by one in such a way that after taking away the soil above the first treasure a tiny part of the second treasure became visible and after digging up the second one, he continued to dig and after some while the third treasure became discernible. Replace *treasure* by *dino bone* and it will be clear that the prototypical picture of a discovery situation might be one of careful digging. Maybe it is also good to break away from *Ellen won the race* in favour of *Ellen won the competition* or *Last year Gary won three matches with a 85% score*. The idea of a point event becomes highly absurd here.

It would indeed be wise for linguists to have a closer look at the lexicographic tradition in which the verbs discussed so far are defined. Looking at the meaning of *write* in dictionaries we find in the beginning of the list of senses something like 'produce written signs' where the signs in question should be taken as the alphabetic letters making up the letter written by Mary in (9a). In other words, the kernel meaning of *write* includes a lower level activity as part of the way to bring about a structured written object such as posted letters are. Likewise, we find *discover* defined as 'take away a barrier or barriers from' or 'find what is covered'. Looking at *find*, we see there 'come across something by going or doing' and *win* as 'to appear as a winner in a struggle'. To do this exercise is quite fascinating and it demonstrates exactly what is fully suppressed by a straightforward Vendlerian treatment: the meaning of a verb can be described in terms of other meanings on the basis of (the ideal of) translational equivalence, i.e. (near-)synonymy without being forced to stay in the same aspectual (Vendlerian) class. It is possible (as standard lexicographic practice shows) to define *discover*, *find* and *win* without any sense of achievement: *to take away*, *to come across* and *to appear as winner* can be taken to be indifferent as to the length of the process involved. They do not express any need to restrict oneself to an unanalysable point. The exercise is based on the idea of trying to get rid of as much information about the content of a specific argument y in a pair $\langle x,y\rangle$ as possible.

The second step to be taken is to acknowledge that there is a difference between *write* and *discover* but that this difference is not aspectually relevant and should be accounted for at the level of the VP built up from the information of its nominal and verbal parts. This has to do with the observation that the difference between *write* and *discover* in the opposition pair O_1 *Mary wrote a letter* vs. *Mary discovered a letter* deviates quite clearly from the difference between the two verbs in the pair O_2 *Mary wrote a plot* vs. *Mary discovered a plot* (apart from the fact that *Mary discovered a plot* is ambiguous between a concrete written plot discovered say in an

archive of a theater company and a conspicary). In O_1 the direct object *a letter* promotes the sense of concreteness expressed by the predication, whereas in O_2 the abstract nature of the NP *a plot* may lead to an interpretation in which *discover* no longer expresses a relation between Mary and a concrete individual. *To discover a plot* may often describe a more protracted eventuality than *to discover a letter* (in a box), whereas *to write a plot* generally takes much longer time than *to write a letter*. On the other hand, the writing of a letter may take as much time as the discovery of a plot. The protracted sense in these cases is due to the nature of the internal argument rather than to the nature of the verb. Note that aspectually nothing changes in the transition from O_1 to O_2, or reversely: in alle cases, the VPs are terminative.

This sort of exercise shows that the VP tends to act as a substantive level of information on its own, so that one can better think of a predicational scheme of the form W(y)(x) where W(y) forms an aspectual unit on its own. It is at that level that the full interaction between the verb and its complement can be made visible. The Path-construction demonstrated above accounts exactly for this: the function amalgating the verb information and the complement-information makes the semantic atoms into a semantic molecule.

3.2. The VP as a factor in a non-commutative multiplication

An important argument for taking the verb + its internal argument as a semantic aspectual unit on its own, is to see that, in the distributive interpretation of sentences like (10),

(10) The three girls mailed five letters

each of the girls may have had her own set of configurations in which she mailed the letters (all at one, 1+4, 2+3, etc.) In the collective interpretation we know that we are speaking about one VP-denotation to which the three girls relate without any further information about their individual contribution. Note in passing that the terminativity itself is distributed, for example, in a durative sentence like *Girls used to mail five letters in those days*, which expresses that each girl of an unbounded series of girls was involved in a terminative event of mailing five letters each realizing one of the combinationarial possibilities given the cardinality of the internal argument NP.[13]

An adequate way of representing the choice between distributive and collective is in terms of the law given in (11) that appears to govern it: the interpretation is constrained either by (11a) or by (11b).

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[13] It has turned out to be necessary to underscore here that [+SQA] does not mean the same as 'quantity with identified cardinality or measure'. In (10) we happen to know the exact quantity providing a set of combinatorial possibilities, but in most cases we are given the information that there is a specified quantity involved but we simply are not informed about the exact cardinality or measure, as in *She mailed many letters*, *She mailed at most five letters* or in *She drank some wine*.

(11) a. 3×5 (distributive) b. 1×5 (collective)

On the distributive interpretation, we have to deal with a multiplication sorted out as $(1\times5)+(1\times5)+(1\times5)$, which amounts to saying that each of the three individuals receives the value of a terminative VP. As each VP harbours the information that a set of five letters was mailed, the sum total of mailed letters in (10) is fifteen. On the collective interpretation, each of the girls is mapped to the same VP-information, so that their individual contribution is blurred. In short (and as argued for extensively in Verkuyl (1993) and Verkuyl (1999a), each of the three girls "gets her own VP", but on the distributive interpretation there is a constraint differing from the constraint on the collective interpretation.

There are several ways to characterize the function amalgamating the information expressed by the external argument and its VP. One way to understand the essence of this procedure is to take the VP-factor in the multiplication in terms of a λ-function operating on the elements of the external argument denotation g_1, g_2 and g_3, so that we have: VP : NP $\rightarrow$ {1,0}, spelled out as:

$\lambda x[M(l)(x)](g_1) = M(l)(g_1)$
$\lambda x[M(l)(x)](g_2) = M(l)(g_2)$
$\lambda x[M(l)(x)](g_3) = M(l)(g_3)$

To meet the law expressed in (11) the function is constrained either as a constant function for the collective interpretation or as an injective function for the distributive interpretation. It is important to see that the VP is taken as a factor in a non-commutative multiplication. The difference between the status of the two factors means that the external argument and the internal argument have an essentially different role to play: the internal argument information is part of the Path, the external argument denotation forms a domain checked by the λ-function in order to make sure that all its elements are given an individual VP. This underlines the importance of the VP as an aspectual unit.

At this point it is necessary to signal a problem for those who use the first order conjunctive normal form for representing the information expressed by sentences like (9a) *Mary wrote the letter*: they need to have a proper syntax from which these forms are derived.

(12) a. $\exists e \exists x \exists y \exists t$[Write($e$,$x$,$y$) $\wedge$ Mary(x) $\wedge$ the-letter(y)]
b. $\exists e \exists x \exists y \exists t$[Write($e$) $\wedge$ Agent(x,m) $\wedge$ Patient(y,l)]

It is the problem of how to account for the asymmetry of the two arguments. In the logical representation it cannot be made visible. The problem cannot be resolved without assuming a syntax from which (12a) or (12b) are derived as one of its logical forms. But this means that the interpretation should make use of information

provided by the syntax and to give this a place in some way in one of the two forms in (12). One thing is clear, interpretation of (12) does not provide a closer tie between the verb and its internal argument.

In Kamp and Reyle (1993) there is a connection between a syntactical structure and its semantic representation in the sense that a structure containing an NP [$_{VP}$ V NP]-configuration is translated into the box language of which (12a) can be made a part. But I fail to see how the closer ties between the verb and its internal argument have been given a place leading to the VP as a substantive aspectual unit in their work. On the contrary, as I will show shortly in more detail, Kamp & Reyle do not give a semantic implementation of the closer syntactic ties within the VP. They translate syntactic asymmetry into logical equipollence loosing the asymmetry information. The same holds for the neo-Davidsonian Parsons (1990): Parsons recognizes the VP as a syntactic unit and assumes that the information presented by his predicates Culm (expressing a culmination point) and Hold (expressing a state) are expressed by the VP but he does not indicate how this proceeds on the basis of smaller elements.[14]

The only Davidsonian offering a sufficiently precise account in which the closer relation between the internal argument and the verb is expressed is Krifka. In Krifka (1989b), the idea is to introduce the verb write as a verb stripped from its arguments: λe[Write(e)]. The determiner of the internal argument NP is then defined as receiving the values of its Noun and of the verb: $\lambda Q \lambda P \lambda e \exists y$[P($e$) $\wedge$ Patient(y,e) $\wedge$ Q(y)], so that one obtains $\lambda e \exists y$[Write(e) $\wedge$ Patient(y,e) $\wedge$ the-letter(y)]. In this way, Krifka accounts for the VP as a semantically relevant unit which as such plays a role in the system of postulates that distinguishes between different aspectual properties.

His approach is discussed in detail in Verkuyl (1993: 259–267), which criticizes the fact that Krifka harbours too much information in these postulates. For example, the information that an NP is quantized cannot be "read from" the presence of the information itself: it is formulated as a general constraint on predicates. One has to check one's own knowledge about the meaning of *the letter* to observe that a proper subpart of its denotation cannot be called *the letter* rather than relating the specific place where the quantificational information is located to other parts of the complex information. The formal machinery proposed in Verkuyl (1999a), chapter 1 consists of a set of interacting mathematical functions that operate within the sentential domain. Looking for the strictest form of compositionality is a way to express the hope to be able to connect these functions with cognitive computations.

I would not like to suggest that Krifka's way of accounting for terminative aspectuality is not compositional but there are quite loose forms of it which all evade the hard way of finding out which elements in a complex structure do contribute and how they do it together.[15] In one sense, I can see the merits of mereology (for

[14] For a detailed criticism of this approach, see Verkuyl (1999a: 40–43).

[15] In Krifka (1998), Krifka deals differently with the matter at issue. Rather than matching the verb with a thematic role, he derives the VP by putting the internal argument NP into a lambda-expression introducing a two place relation in which both the verb and the internal argument are put. This yields

ontological purposes lattices are quite helpful), but I think a more restricted approach along the lines of strict compositionality trying to discover how information is encoded in the language, is to be preferred. It is certainly necessary to follow this line, because it triggers questions that otherwise would be put aside. The next section is a demonstration of what happens if some questions are not raised at all.

4. ASPECTUAL ASYMMETRY AND THE NOTION OF EVENT

4.1. The VP and eventhood

Arguments for aspectual asymmetry as discussed above were presented in two ways. Firstly, one can observe that in sentences of the simple sort, such as *Mary walked three miles* or *Mary mailed five letters* the VPs *walk three miles* and *mail five letter* are terminative without taking into account the nature of the external argument NP. That is, in cases like (13a),

(13) a. Nobody walked three miles [$_S$Nobody [$_{VP}$walk three miles]]
b. Nobody walked [$_S$Nobody [$_{VP}$walk]]

the VP retains its terminative property [+T_{VP}] but at the S-level it is neutralized by the [–SQA]-property of the external argument resulting in [–T_S], along the (abbreviatory) line of the feature algebra in (4). In the resulting phrase the [+T_{VP}] is given a subordinated place in a larger durative structure but it remains visible as such. In other words, it should be possible to distinguish between (13a) and (13b), the latter being analyzed in terms of [–T_{VP}] and [–T_S]. It is important to see that it is quite natural to say that the sentences in (13) pertain to states as it is natural to say that (2) *Mary walked three miles* pertains to an event, just in case the speaker does not present a sum total of walking (sub-)events making up three miles (just replace *three* by *hundred* to see the problem of using the term 'event' for the whole walk).

The second way in which aspectual asymmetry shows up quite convincingly is visible in sentences with a plural external argument as discussed in the preceding section. But here some interesting observations are to be made with respect to the notion of event. Firstly, in sentences like (10) *The three girls mailed five letters* only the collective interpretation fits our intuition about what an event should be: a sufficiently coherent spatio-temporal semantic object such as the event on a sunny afternoon on which the three girls made a walk and put five letters into the postbox in one of the streets they passed by. As soon as the distributive interpretation comes in the notion of event is under tension. Locally, if one of the combinatorial possibilities of the collective interpretation turns out to have been the case: the three girls used to walk once a month and on each of these occasions they mailed a letter.

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the same sort of expression as in the earlier approach. One could see the '98-version as a way to provide a machinery for the (old) Davidsonian approach of (12a).

On this interpretation it becomes very hard to use the notion of event in a proper way. More globally this also holds for the interpretation in which each of the girls mailed five letters. It is quite hard then to select a combinatorial possibility which really comes close to our intuitive every-day notion of what counts as an event (there should be sufficiently large temporal overlap between the three mailing Paths).

My skepticism against the use of events in the analysis of aspectuality is based on problems like these, the more so because one could argue that on the distributive interpretation the most natural way to use the term 'event' is to apply it at the level of VP. That is, one could argue that each of the girls is involved in her own event because the essential ingredient for eventhood is located in the Path-information. But this means that the *e*-argument in Davidsonian analyses should be connected more closely to the internal argument than to the external argument. The problems I have with Davidsonian event-semantics is that it is too rough-grained for a proper view on the inner aspectual composition. Yet events are handy for discourse, one could say and given their success in DRT, it seems quite impossible to convince people that life is not that easy. I will demonstrate this with the help of a closer view on what Kamp & Reyle say on *e*'s and *s*'s.

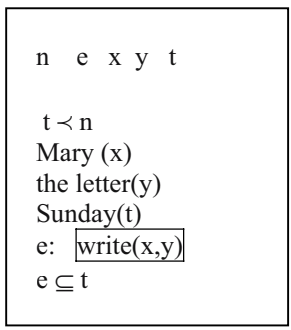
4.2. Events and states in Discourse Representation Theory

The transition from inner aspectual information to higher levels has not yet been given a precise formal treatment. If the claim in DRT would be that such a treatment has been given, then we have to focus on what what Kamp and Reyle say about two of the well-known boxes attributed to the sentences in (14), of which (14a0) is the box in K&R p. 511.

(14)

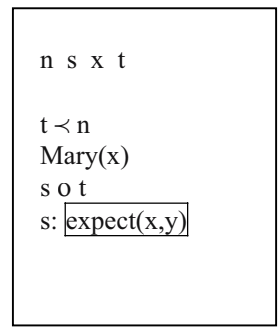
a. Mary wrote the letter on Sunday

a'.



b. Mary expected the letter on Sunday

b.'



The first line of the boxes contains two sorts of discourse referents: *x* and *y* are atemporal individuals, *n*, *e*, *s* and *t* are temporal. The *e* is introduced as Davidsonian which is to say that, according to Kamp and Reyle (1993), sentence (14a) would receive the representation in (15):

(15) $\exists e \exists x \exists y \exists t[\text{write}(e,x,y) \wedge \text{Mary}(x) \wedge \text{the-letter}(y) \wedge \text{Sunday}(t) \wedge \text{Time}(e, t)]$

Davidson does not work with states, but in the Kamp/Reyle framework of Davidsonian event semantics it has become standard to introduce states s as counterparts to the events e.

Against the background of the Davidsonian commitment in representations like (15) the following quotation is of importance

> First we must settle some matters of notation. In ([a box harbouring (15)]) we represented the statement that **e** is an event of **x** writing **y** as **write(e,x,y)**. From now on we will present such conditions in a slightly different form. Insofar as it is right to see such conditions as specifying the type of a given event, the discourse referent for that event has a status different from the other discourse referents in the condition. We make this special status of the event discourse referent explicit by putting it in front of the verb. Thus we will, for instance, write **e:** **write(x,y)** instead of the condition **write(e,x,y)** of (15). (K&R, p. 511)

This is an important passage because it seems as if K&R just introduce a notational variant from the Davidsonian way of taking write as a three-place predicate, whereas what they do is to carry out a major conceptual operation rather than giving a "slightly different form". They are fully aware that they give the Davidsonian event argument a status different from the other arguments. What they do not say is that by this very change they introduce a compositional approach to the aspectuality of the predication. That is, in the notation **e:** **write(x,y)** the **e** can no longer be taken as a primitive. It is an entity that is allowed only on the basis of conditions expressed by the information in the box itself.

This point becomes immediately clear if we give the relevant counterpart in sentences like (14b) *Mary expected the letter on Sunday*. Given their treatment of states later in their chapter on Tense and Aspect, Kamp and Reyle are bound to assume **s:** **expect(x,y)** . But this can only mean that the choice between **s** and **e** is dependent on the aspectual information in the box. In this case, it is the nature of the verb that differentiates between **s** and **e**. But why is there only a choice between **s** and **e**? Arguments of the predicate also decide on what sort of eventuality is yielded. Sentences like *Mary wrote letters* in *Mary wrote letters on Sunday* should neither be analyzed as **e:** **write(x,y)** nor as **s:** **write(x,y)** . K&R's choice between states and events could be considered highly arbitrary given the fact there are good reasons to end up with states, processes and events. As shown in Figure 2, the three aspectual classes are the outcome of the compositional process of getting the aspectual information of elements in a sentence to the top of the predication.

The above discussion of Kamp & Reyle treatment of *e* and *s* shows that DRT-representations cannot escape from the principles of inner aspectual composition that yield State, Processes and Events. In spite of that Kamp and Reyle (1993) find it necessary to accept the Moens diagram in Figure 3 as basic for their analysis and to extend their machinery with Vendler classes. So, they end up with all the problems discussed in sections 2 and 3 above: the impossibility to encode the information associated with the ontological notion of culmination point and the impossibility of deriving the four Vendler classes compositionally.

5. CONCLUSION

It is time to round up. I have tried to show that it pays off to take aspectual composition seriously in the sense of trying to operate from the bottom to the top in an attempt to find the elements by which natural language encodes aspectual information in different parts of a complex phrasal structure. A strict form of compositionality takes the domain, i.e. the language side, of the model-theoretic (logical-semantic) interpretation function as the point of departure rather than its co-domain, the domain of discourse itself. From this it follows that aspectual classes are not stable persistent ontological categories at the level of lexical categories: whatever contact is made with the domain of discourse, it is at the phrasal level, which amounts to saying that the ties between a language element and its denotation $I(\alpha)$ existing at the bottom level at which the interpretation function I begins, are rather complex at the phrase levels at which α is a VP or an S. It has been the purpose of the present paper to contribute the insight that the analysis of aspectuality should be focussed on the ways in which aspectual information is really encoded in the elements and in the ways they relate to one another syntactically.

6. ACKNOWLEDGEMENTS

I would like to thank Olga Borik, Anna Młynarczyk, Angeliek van Hout and Henriëtte de Swart for comments on earlier versions.

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REBECCA SMOLLETT

QUANTIZED DIRECT OBJECTS DON'T DELIMIT AFTER ALL

A revised account of the role of quantized direct objects in aspectual composition

Abstract. In the literature on aspectual composition, it is generally claimed that the combination of a verb of a certain class (Tenny's "measuring-out" verbs, called here "measuring" verbs) and a quantized direct object yields a delimited expression. However, judgments of such expressions are in reality highly variable. In this paper I show that, with adequate context, all expressions with a verb of this class and a quantized direct object allow both non-delimited and delimited readings. I conclude that, while the direct object does establish a scale along which the event progresses, making delimitation possible, it does not itself delimit. In addition to accounting for the variable judgments of these expressions, the analysis presented here clarifies the distinction between the aspectual role of a direct object and that of true delimiting elements such as goal phrases, resultatives, and particles, elements that delimit obligatorily. This analysis requires us to reject the homomorphism usually posited between objects and events; however, it reveals instead a consistent parallel between the aspectual role of a quantized direct object of a measuring verb and that of a spatial path.

Keywords. Semantics, English, aspect, delimitation, telicity, quantization.

1. INTRODUCTION

A standard claim in the literature on delimitation (or telicity) is that a quantized NP as the direct object of certain classes of verbs delimits the expression it appears in (see Krifka 1989, 76; Verkuyl 1993, 14-23; Tenny 1994, 24-29, among many others). This is typically illustrated using the familiar test for delimitation based on felicitousness with temporal adverbials of the type "for X time" and "in X time" (Vendler 1957, 1967 and Dowty 1979). Expressions like the ones in (1)—it is usually claimed—cannot be combined with an adverbial of the type "for X time" and are thus shown to be delimited.

(1)	a. Kathleen ate an apple	?for a couple of minutes.
		in a couple of minutes.
	b. Jack built a house	?for a month.
		in a month.

Tenny (1994, 10-18) refers to verbs that receive a delimited reading with a quantized direct object as being "measured out" by the quantized direct object. For Tenny,

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 41 - 59.

"measuring-out" involves two components—the establishment of a scale along which the event progresses, and the establishment of an endpoint to that scale (p. 15).[1] For example, as Tenny describes it, in (1a) the event progresses "through" the apple and the end of the apple provides the endpoint to the event.

Unfortunately, judgments of expressions with a verb of Tenny's measuring-out class and a quantized direct object are much more variable than this account would lead us to expect. They vary according to the semantic subclass the verb belongs to, with some expressions readily allowing a non-delimited reading. In addition, judgments of the same expression often vary from speaker to speaker. Finally, most authors acknowledge that all expressions with a verb of this class and a quantized direct object in fact allow a non-delimited reading to some extent. In this paper, I argue that a quantized NP as the direct object of a verb of Tenny's measuring-out class does establish a scale, but that it does not enforce an endpoint to that scale. In other words, a quantized direct object of these verbs does not itself delimit the event. Where a delimited reading is favoured, we are led to it by world knowledge of the processes and entities involved. In addition to accounting for the murky judgments elicited by sentences of the kind in (1), this analysis will allow us to distinguish the aspectual role played by direct objects of this class of verbs from that played by true delimiting elements such as goal phrases, resultative secondary predicates, and verb particles. Finally, it will reveal a consistent parallel between the aspectual role of a quantized direct object of these verbs and that of a spatial path with a verb of motion.

2. THE STANDARD ACCOUNT

Since Verkuyl (1972), it has been generally acknowledged that delimitation is compositional: whether an expression receives a non-delimited or a delimited reading depends on both the choice of verb and the choice of object. Delimitation is typically viewed as arising in a straightforward way from the combination of a particular kind of verb and a particular kind of direct object. For example, in Verkuyl's algebraic account, the verb and the object are each assigned a semantic feature: a positive value for both features yields a delimited expression; a negative value for either feature yields a non-delimited expression (Verkuyl, 1989).[2]

A typical set of examples illustrating the compositional nature of delimitation is shown below. (I will define the two relevant features labelled here as [Q] and [M] shortly.) I have selected different verbs from those in Verkuyl's example sets for reasons that will soon become clear.

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[1] A "scale" should be pictured as a "graded parameter," as Tenny refers to it elsewhere, extending in a single direction from the starting point of the event. Crucially, it allows infinitely many potential endpoints. My thanks to Östen Dahl for discussion of this point.

[2] Verkuyl's algebra also takes into account the role of the choice of subject in determining the availability of delimited and non-delimited readings. Here, I will focus on the roles of the verb and object only, choosing singular count noun subjects for all example sentences.

(2)	Eleanor patted [-M] dogs [-Q]	→ [NON-DELIMITED]
(3)	Eleanor patted [-M] a dog [+Q].	→ [NON-DELIMITED]
(4)	a. Kathleen ate [+M] ice cream [-Q].	→ [NON-DELIMITED]
	b. Jack built [+M] houses [-Q].	→ [NON-DELIMITED]
(5)	a. Kathleen ate [+M] an apple [+Q].	→ [DELIMITED]
	b. Jack built [+M] a house [+Q].	→ [DELIMITED]

Here, the sentences in (2), (3), and (4), with a negative value for one or both of the features, are non-delimited, whereas the sentences in (5), with a positive value for each feature—it is usually claimed—are delimited.

There is general agreement in the literature that the relevant characteristic of the object is "quantization," or some equivalent notion, represented above as the feature [Q]. As defined by Krifka (1989), quantized NPs include count noun NPs, as well as quantified NPs such as "a litre of ice cream." Non-quantized NPs include both mass nouns and bare plurals.

In contrast, the characteristic of the verb that is considered relevant to aspectual composition differs from one analysis to another. As mentioned earlier, Tenny identifies a class of verbs in which the action in some way progresses "through" its object, as "measured" by either the extent of the object or a change in its properties. Tenny defines this class of "measuring out" verbs (assigned the feature [M] in examples (2)-(5)) primarily by example, including verbs of consumption and creation, performance verbs, and verbs of change of state. Her "measuring-out" verbs thus correspond roughly to Vendler or Dowty's "accomplishments" (Vendler, 1957, 1967, and Dowty 1979).

Verkuyl assigns the feature [+ADD TO] to a class of verbs which he predicts to yield a delimited reading with a quantized direct object. At first glance, his definition of this class seems to resemble Tenny's definition of measuring-out verbs: as he describes it, the feature [+ADD TO] represents a change or a "going through time" of the entities involved in the event (Verkuyl 1989, 81). However, the class of verbs that Verkuyl identifies as [+ADD TO] is broader than Tenny's measuring-out class. Verkuyl in fact includes all non-stative verbs (see Verkuyl, this volume). In other words, in addition to "accomplishment" verbs, he includes "activities," for example, intransitive verbs of motion such as *walk*, and verbs whose object is displaced, such as *push*, or contacted but not changed, such as *stroke* (and, I would assume, also *pat,* as in examples (2) and (3)). Verkuyl's analysis runs into trouble by predicting expressions with an "activity" verb and a quantized direct object, as in (3), to be delimited. He addresses this problem by defining a special class of exceptional [+ADD TO] verbs he calls "push verbs" (see Verkuyl 1993, 329-349). This class includes verbs like *push* and *stroke*, which would be unproblematic under Tenny's classification because they would not be classed as measuring-out verbs and thus would not be expected to yield a delimited reading with a quantized direct

object.[3] It also includes verbs like *paint* that would be included in Tenny's measuring-out class but that readily allow both non-delimited and delimited readings; verbs of this latter type will be accounted for by the analysis presented here. Crucially, the argument I present in this paper is based on the verb classification of Tenny, not that of Verkuyl. To try to capture the redefinition I will propose here of the aspectual role played by objects of Tenny's "measuring-out" verbs, I will refer to them simply as "measuring" verbs.[4] This shift in terminology is not intended to imply a redefinition of membership in the class.

Virtually all analyses of aspectual composition are based on the judgments represented in (2)-(5), in particular on the assumption that the combination of a measuring verb and a quantized direct object, as in (5), yields a delimited expression. The conclusion usually drawn from these judgments is that there is a homomorphism between the properties of the direct object NP and those of the event; in other words, the physical limits of the entity the object refers to impose a limit on the event. As Krifka (1989, 76) puts it, both a quantized NP and a delimited event ("telic" in Krifka's terminology) have "precise limits," whereas a non-quantized NP and a non-delimited event have "no clear limitation." (See also Dowty 1991, 567.) In re-examining the standard account of aspectual composition, I will question the judgments on which it is based and will conclude by rejecting the homomorphism usually thought to hold between direct objects and events.

3. THE PROBLEM

The immediate problem with the standard account is that judgments of an expression with a measuring verb and a quantized direct object are much more variable than one would expect if a delimited reading arises in a straightforward way from the combination of these two elements. To begin with, while the standard account predicts all measuring verbs to play the same role in aspectual composition, different subclasses of these verbs seem to yield different judgments. Tenny acknowledges these differences by offering a typology of three canonical ways that an event can be "measured out" (1994, 15-18). With a verb of creation or consumption, as in (6), the event is measured out by a progression "through" the object, in this case the apple. With a verb of change of state, as in (7), the event is measured out by a progression along a scale corresponding to the degree of change in a property of the object, the degree of ripeness in this case. And with a performance verb, as in (8), the event is

[3] Incidentally, the verb *push* has caused particular confusion in the literature. Tenny (1992, 6) analyses *the cart* in *John pushed the cart* as measuring out the event. However, Tenny (1994, 75) revises her initial analysis of this verb, this time giving the expression *John pushed the cart* as an example of an expression with a "non-measuring-out" direct object. As Jackendoff (1996, 309) points out, it is the location of the cart, as expressed, for example, by a PP, that measures out the event here, and not the cart itself. Aspectually, I would consider verbs where the object is displaced to be identical to intransitive verbs of motion.

[4] My thanks to Elizabeth Cowper for this terminological suggestion.

measured out by a progression along the extent of the object, the tune in this case.[5] (The verbs in the examples below are those given in Tenny (1994).)

(6) Kathleen ate an apple. (*consumption*)
(7) Carol ripened the tomato. (*change of state*)
(8) Carolyn played the tune. (*performance*)

Tenny's stated goal is to offer a unified account of the aspectual properties of measuring verbs, yet she offers different judgments for expressions with verbs of the three semantic subclasses. She claims that for most speakers, expressions like (6) and (7), with a verb of consumption or creation or with a verb of change of state, allow only a delimited reading, whereas an expression like (8), with a performance verb, is truly "ambiguous," allowing both non-delimited and delimited readings (Tenny 1994, 32-35). In addition to this variation in the judgments from one subclass of verbs to another, judgments of a single subclass vary from speaker to speaker. To give just one example from the literature, while Tenny considers an expression with a performance verb, like in (8), to allow both non-delimited and delimited readings, Jackendoff (1996, 332-333) judges a similar expression to be obligatorily delimited, and Moens and Steedman (1988, 20) judge the equivalent expression to be "basically" non-delimited. Tenny (1994, 32-35) suggests that even judgments of individual verbs vary from speaker to speaker and attributes this "messiness" to the fact that English does not mark delimitation morphologically. Thus, she claims, aspectual properties must be included in the lexical entry of each verb for each individual speaker.

Finally, most authors acknowledge that even those expressions that seem to allow a non-delimited reading least readily—typically expressions with a verb of consumption or creation—do allow one to some extent. Verkuyl (1993, 6) and Jackendoff (1996, fn. 2) judge this reading to be in some way exceptional: for Verkuyl, it requires the event to be "stretched," while, for Jackendoff, the temporal adverbial has "coerced" the expression to take on a non-delimited reading. This reading does indeed seem to be disfavoured out of context. However, significantly, judgments of expressions with a measuring verb and quantized direct object are much less categorical than those of expressions like (2), (3) and (4) with a non-measuring verb or a non-quantized direct object: here, speakers agree that the delimited reading is categorically excluded.

[5] I have adapted Tenny's terms somewhat here: she calls her first class "incremental theme verbs," borrowing the term from Dowty (1991). In my reading of Dowty (1991, 567-568), however, it seems to me that he intends the term to apply to all measuring verbs. I thus adopt here the more transparent term "verbs of consumption and creation," a term used by Jackendoff (1996), among others. Tenny calls her second class "verbs of change of state" and I have retained her term here. She calls her third class "route verbs," including both the performance verbs discussed here and verbs of motion with a direct object, as in *Sue walked the Appalachian Trail* (Tenny 1994, 17). I will briefly address expressions of the latter type in Section 4.1.

In summary, whereas the standard account predicts expressions with a measuring verb and a quantized direct object to yield a delimited reading only, judgments of these expressions vary greatly, with some verbs of this class readily allowing both non-delimited and delimited readings, and all verbs allowing a non-delimited reading to some extent. In the next section I take a closer look at the judgments of these expressions, arguing that all measuring verbs allow both non-delimited and delimited readings. I show that the variability in judgments of these expressions can be attributed to pragmatic factors. We will see that a unified account of the aspectual role of measuring verbs can be maintained, but that it requires us to abandon the proposal of Tenny and others that a quantized direct object of a verb of this class imposes an endpoint on the event.

4. ANOTHER LOOK AT THE JUDGMENTS

Recall that Tenny (1994, 15) defines "measuring out" as including two ingredients: first, the establishment of a scale along which the event progresses; and second, the establishment of an endpoint along this scale. She stresses the significance of the second "ingredient," the endpoint, by emphasizing that all measuring verbs entail that an endstate is reached. As she describes it, (6) would entail that the apple is completely consumed, (7) would entail that the tomato is ripe, and (8) would entail that the tune is finished (pp. 22-23). This claim seems to be called into question, however, by the differences in the judgments she offers for expressions with these three types of verbs. If a unified account of measuring verbs is to be achieved, it would seem to lie in the first element of her definition of measuring out, the establishment of a scale, not in the establishment of an endpoint.

Jackendoff, in a 1996 response to Tenny, offers just such an account, one based on the first element of Tenny's definition of measuring out, the establishment of a scale. For Jackendoff, what expressions with a measuring verb and a quantized direct object all share is that an "axis" representing the change in the object is bound to an "axis" representing the progress of the event, and to one representing time. What distinguishes the verbs of the three semantic subclasses is whether the axis to which the event is bound is interpreted as having a necessary endpoint or not. In particular, with a verb of change of state, the axis representing a change in a property of the object can be interpreted either as being open-ended or as having an endpoint; such an expression thus allows both non-delimited and delimited readings.

For Jackendoff then, what all measuring verbs really share is that a quantized direct object establishes a scale; an endpoint to that scale may or may not be entailed. My claim is a stronger one, namely that all measuring verbs with a quantized direct object allow both a non-delimited reading and a delimited one. In other words, while a scale is established in all cases, an endpoint is never entailed. Rather, where we favour a delimited reading, the endpoint has been established by world knowledge. In this section, I begin by taking a closer look at Jackendoff's account of the ambiguity of expressions with a verb of change of state and a quantized direct object. I show that with adequate context, performance verbs and

verbs of creation and consumption also allow a non-delimited reading, arguing that Jackendoff's account of verbs of change of state can thus be extended to all measuring verbs.

Before proceeding, some notes are in order regarding the examples offered in the remainder of the paper and the relevant readings of them. First, it should be borne in mind that all expressions that would normally be interpreted as delimited are compatible with a temporal adverbial of the type "for X time" under an iterative or habitual interpretation. Thus, *Pete drove to work for 20 years* is perfectly acceptable under an interpretation where Pete drives to work habitually. This is not the interpretation relevant to our discussion here. Similarly, expressions that would normally be interpreted as non-delimited are compatible with an adverbial of the type "in X time" if the adverbial is understood to refer to the amount of time required before the action is undertaken. So, for example, *Noah patted the tiger in only 10 minutes!* could refer to a contest in which a number of people are timed on how long it takes them to get up their courage to pat the tiger. Again, this is not the interpretation relevant to our discussion here. (For a discussion of "coercion" with temporal adverbials, see Moens and Steedman 1988.) Finally, since I am not aware of an effect of the choice of a definite or indefinite quantized object on the readings available, I have chosen whichever is pragmatically most natural in each example.

4.1. Verbs of change of state

Jackendoff (1996, 331) makes the parallel between expressions with a verb of change of state and those with a verb of motion: the change in a property of the direct object can be viewed as having an endpoint or being open-ended, exactly like a spatial path. Jackendoff notes the ambiguous role of the prepositional phrase in an expression like (9), which can identify either an open-ended path or one with an inherent endpoint, perhaps the end of the field (p. 309).

(9) John walked through the tall grass for 15 minutes.
in 15 minutes.

Similarly, Tenny (1994, 32-33) discusses examples of typically intransitive verbs of motion used with a direct object, as in (10), noting that both non-delimited and delimited readings are readily available for most speakers. (See also Tenny 1995.)

(10) Sue walked the trail for an hour.
in an hour.

To illustrate the parallel between expressions with a verb of motion as in (9), and expressions with a verb of change of state, Jackendoff (1996, 331) chooses the verb *redden*, as in his example in (11):

(11) The chemical reddened for half a minute.
in half a minute.

Here, Jackendoff chooses a verb of change of state with a cognate adjective, in this case the adjective *red*: in the non-delimited reading, the chemical becomes "redder and redder," and in the delimited one, it becomes "red." Several authors note that verbs of change of state with a cognate adjective typically allow both readings (see Dowty 1979, 88-90; Abusch 1986, 2-9; and Levin and Rappaport Hovav 1995, 172-173). In fact though, numerous other verbs of change of state that imply a gradual change of state in their object readily allow both readings in the same way as those with a cognate adjective.[6] A couple of examples are given below:

(12) a. Thomas mixed the batter for 5 minutes.
in 5 minutes.
b. Anne Marie polished the countertop for 15 minutes.
in 15 minutes.

In the non-delimited reading of (12a), Thomas spends 5 minutes stirring the batter, while in the delimited reading, he stirs it until it reaches a state of whatever can be conventionally considered "mixed" in the particular circumstances—say an appropriate consistency for making crêpes. In the non-delimited reading of (12b), Anne Marie spends 15 minutes polishing the countertop and then moves on to another task, leaving the countertop "more polished" than it was before; in the delimited reading, it takes her 15 minutes to achieve whatever degree of shine she considers "polished."

Returning to the verb *ripen*, in (7), that Tenny selected to represent the change-of-state class, I would argue that where the delimited reading is favoured with a verb of change of state, as it is here, a particular endstate is suggested by pragmatic factors. So, in this example, we generally wish to ripen a piece of fruit until it has reached what we consider the "endstate" of the process, that is, the point at which we consider it "ripe." But imagine a situation where Carol and Danny buy a couple of bananas but disagree as to how ripe they like them. Here, (13) would be appropriate.

(13) Danny ate his banana immediately, but Carol ripened hers for a day.

(Here *let ripen* would perhaps be more natural, but were an action, say shining a heat lamp on them, necessary to ripen bananas, (13) would be fine.)

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[6] Dowty (1979, 88-90) attributes this ambiguity to the class of verbs he terms "degree achievements," which appear roughly equivalent to the class of verbs of change of state discussed here. However, he says that verbs with cognate objects are the most "typical" members of this class, and it is these verbs that Abusch, and Levin and Rappaport Hovav select for their examples.

So why, we might ask, is it verbs of change of state in particular that so readily allow both non-delimited and delimited readings? As both Tenny and Jackendoff agree, with these verbs it is a change in a property of the object, not the physical extent of the object itself, that measures the event. Since, in theory, a property such as degree of polish or of ripeness can increase indefinitely, with an appropriate pragmatic context the event can be readily interpreted as open-ended. But what about verbs of performance and verbs of consumption and creation, where it is the physical extent of the object, rather than a changing property, that measures the event? Does the physical limit of the object here impose a limit on the event as is usually thought? As I illustrate in the next section, these events too can be interpreted as open-ended.

4.2. Performance verbs and verbs of consumption and creation

As discussed in Section 3, judgments of performance verbs vary greatly from speaker to speaker. In my judgment, an expression like the one in (14) readily allows both readings: in the non-delimited reading, Carolyn spends 15 minutes engaged in the activity of playing the tune, whereas in the delimited reading it takes her 15 minutes to accomplish the playing of the tune.

(14) Carolyn played the tune for 15 minutes.
in 15 minutes.

Once again, I think that where we favour the delimited reading, we do so for pragmatic reasons: in a performance, a performer typically sings or plays a piece through. However, a non-delimited reading of an expression like the one in (14) is perfectly appropriate if the piece is one that can be extended indefinitely, for example a folk dance tune.

Let us now turn to verbs of consumption and creation, such as those in (1), repeated below:

(15) a. Kathleen ate an apple ?for a couple of minutes.
in a couple of minutes.
b. Jack built a house ?for a month.
in a month.

Out of context, most speakers do indeed judge expressions like those above as allowing a delimited reading only. However, with these expressions, the non-delimited reading is made more accessible with the addition of adequate context, or by changing the actual entities referred to.[7] So, speakers who reject the non-

[7] It seems possible to me that the fact that authors so commonly choose verbs of consumption and creation to illustrate aspectual composition may have helped maintain the standard account.

delimited reading of (15a) typically find the sentences in (16), where the context highlights a non-delimited reading, quite natural:

(16) a. Kathleen ate an apple for a couple of minutes while talking on the phone.
b. Kathleen ate an apple for a couple of minutes, and then she read her novel.

Simply changing the actual entities referred to by the subject and object can also make the non-delimited reading more accessible, as in (17). Whereas a person eating an apple typically finishes it, we do not necessarily expect the ant to finish its apple.

(17) The ant ate the apple for a week before it rotted into the ground.

Similarly, (18) contrasts with (15b) simply because a Lego tower is something that can be added onto indefinitely without being considered "finished," whereas there is often a point when we consider a house complete and construction ceases.[8]

(18) Steven built a Lego tower for three hours.

It thus appears that the parallel between the scale established by a quantized direct object of a measuring verb and a spatial path holds for all measuring verbs; both establish a scale that can be interpreted either as having an endpoint or as being open-ended.[9] Whereas the physical reality of most situations referred to by expressions with performance verbs and verbs of consumption and creation might seem to clash with the conceptualization of the event as open-ended, these uses are in fact possible with adequate context. In other words, these verbs are being forced into the same mold as verbs of change of state. This conclusion will be examined more closely in the next section.

[8] Soh and Kuo (this volume) make a similar observation for Mandarin, noting that "the same verb of creation may or may not require that the event be completed, depending on the choice of the object."

[9] Both Tenny (1994) and Jackendoff (1996) note that some verbs are measured by a change in a property of the object and others by the physical extent of the object. Oddly though, in neither Tenny's nor Jackendoff's account do the author's judgments correlate with the readings they judge expressions with each class of verbs to allow. For Tenny, it is the extent of the object that is relevant for both verbs of creation and consumption and performance verbs, but the former yield delimited expressions and the latter do not. And for Jackendoff, it is a property of the object that is relevant for both verbs of creation and consumption and verbs of change of state (verbs of consumption and creation are measured out by a "property of existence" of the object), but the former yield delimited expressions and the latter do not.

5. A REVISED ACCOUNT

The homomorphism usually claimed to hold between objects and events is based on the assumption that it is the physical extent of an object that measures an event. Jackendoff's observation that, for an expression with a verb of change of state, a change in a property of the object measures the event, establishing a scale that is potentially open-ended (Section 4.1), calls into question that homomorphism. However, this homomorphism must in fact be abandoned for expressions with any measuring verb. As I have shown, even expressions where we might expect the physical extent of the object to impose a limit on the event do allow an interpretation in which the event is conceived of as open-ended. Perhaps this should not really be so surprising. After all, even events that we commonly conceive of as open-ended may have a limit in the physical world. So, for example, we can very naturally talk about heating a bowl of soup for a few minutes, without being bothered by the fact that if we heat it long enough it will boil away. Similarly, events of motion along a spatial path, which appear to serve as the model for our conceptualization of events with a measuring verb, may also have an endpoint in the physical world. For example, unless he is walking in circles, once John reaches the end of the meadow, the event referred to in (9) presumably ends. This reality does not prevent us, however, from talking about the event as if it were open-ended. As illustrated in Section 4, in the delimited reading of such expressions, the endpoint is supplied by world knowledge, not imposed by the direct object itself.

The source of the two possible readings of a measuring verb with a quantized direct object might be pictured as in Figures 1-3. In the schemata, the scale that is established by the direct object and measures the progress of the event is represented by an arrow. For a verb of change of state, as in Figure 1, the scale is established by a change in a property of the object. For a performance verb or a verb of consumption or creation, as in Figures 2 and 3, it is established by the extent of the object. In all cases, the endpoint is represented by a dotted line to indicate that it is optionally established by world knowledge, rather than by the object itself.[10]

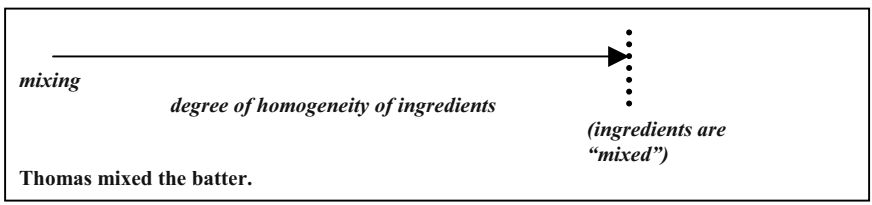

Figure 1. Verb of change of state with a quantized direct object

[10] Note that my use of the arrow here differs from that of Verkuyl (1989, 84), who uses it to represent any process that can be "extended indefinitely in time," that is any non-stative situation (see Section 2).

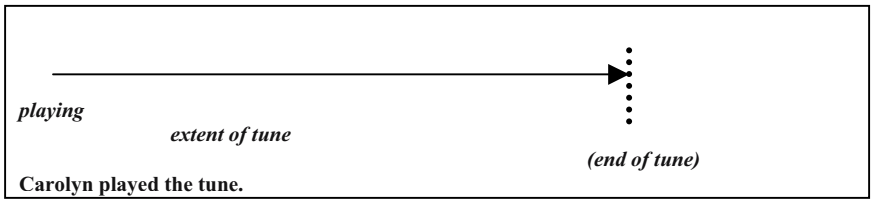

Figure 2. Performance verb with a quantized direct object

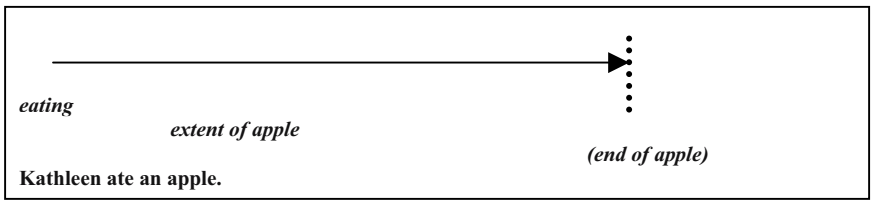

Figure 3. Verb of consumption with a quantized direct object

Tenny (1994, 134-140) in her definition of "aspectual roles," distinguishes between a "path" and a "measure," with a measure being equivalent to a path plus a "terminus." In contrast, under the present analysis, a spatial path and a measure (or what I have been referring to as a "scale") would be aspectually equivalent. An expression describing motion along a spatial path can thus be represented in exactly the same way as an expression with a measuring verb and a quantized direct object. Here an arrow representing the path takes the place of the arrow representing the extent or property of the direct object.

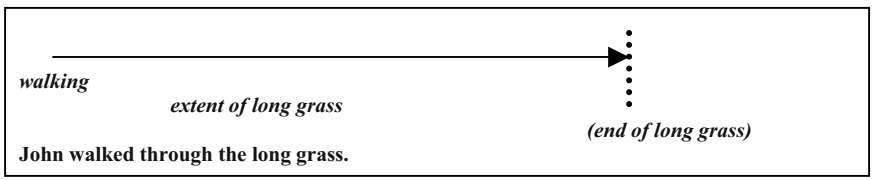

Figure 4. Verb of motion with spatial path

At this point, if we acknowledge that a quantized direct object only optionally provides an endpoint to an event, we might ask whether it in fact plays any necessary role in aspectual composition at all. If not, we would expect to find no difference between readings of an expression with a measuring verb and a quantized direct object and those of an expression with a non-quantized direct object. Recall however, that the variable and non-categorical judgments of the non-delimited reading of an expression with a measuring verb and a quantized direct object contrast with judgments of an expression that lacks either a measuring verb or a

quantized direct object. The examples in (2)-(5) are repeated below in (19)-(21) with the relevant judgments.

(19)	Eleanor patted dogs	for 10 minutes.
		*in 10 minutes.
(20)	Eleanor patted a dog	for 10 minutes.
		*in 10 minutes.
(21)	a. Kathleen ate ice cream	for 15 minutes.
		*in 15 minutes.
	b. Jack built houses	for a month.
		*in a month.
(22)	a. Kathleen ate an apple	?for a couple of minutes.
		in a couple of minutes.
	b. Jack built a house	?for a month.
		in a month.

The difference in the judgments of the disfavoured reading in the examples above illustrates that a quantized direct object of a measuring verb, as in (22), does indeed play a role in aspectual composition: by establishing a scale, it makes delimitation possible. In an expression like the one in (21), with no quantized direct object, no scale along which the event can progress is established and thus no endpoint can be defined; delimitation is therefore impossible in such expressions. Aspectually, an expression with a measuring verb and a non-quantized direct object, as in (21), is equivalent to an expression with a non-measuring verb, as in (20). Neither progresses or is "measured" in time. Once again, a parallel can be made with an expression referring to motion through space. Without a path, such an expression cannot receive a delimited reading. So, for example, the expression in (23) is obligatorily non-delimited, just like those in (19)-(21). It contrasts with the expression in (9), repeated here as (24), where, just like a quantized direct object of a measuring verb, a spatial path makes it possible to measure the progress of the event in time and a delimited reading is thus possible.

(23)	John walked	for 15 minutes.
		*in 15 minutes.[11]
(24)	John walked through the tall grass	for 15 minutes.
		in 15 minutes.

While a quantized direct object of a measuring verb does not in itself delimit, there are other elements that do. In the next section we will see how the aspectual

[11] The delimited reading would be available were a path clearly specified in the discourse context, as for example in: *Mary drove to school in 5 minutes, and John walked in 15 minutes* (see Dowty 1979, 61).

contribution of true delimiting elements such as goal phrases, resultative secondary predicates, and particles contrasts with that of a direct object of a measuring verb.

6. TRUE DELIMITERS

Goal phrases, resultative secondary predicates, and verb particles have been analyzed by a number of authors as markers of aspectual delimitation: see Tenny (1994, 36-37), as well as Levin and Rappaport Hovav (1995, 34) on resultatives, and Brinton (1985; 1988, 163-184) on particles. However, the standard account of aspectual composition creates a puzzle regarding the exact aspectual contribution of these elements. For if, as is usually assumed, an expression like the one in (25) is already delimited, what is the aspectual contribution of the added element in the sentences in (26)? In other words, how does the delimiting role of the added goal phrase, resultative, or particle differ from the delimiting role the direct object itself is generally thought to play?[12]

(25) Anne Marie polished the countertop.

(26) a. Anne Marie polished the countertop to a shine. (*goal phrase*)
b. Anne Marie polished the countertop smooth. (*resultative*)
c. Anne Marie polished up the countertop. (*particle*)

Tenny (1994, 37-38) confronts exactly this problem in discussing the aspectual contribution of resultatives and particles. Since she acknowledges that some expressions allow both non-delimited and delimited readings for some speakers, she proposes that in these cases, the particle or resultative excludes the non-delimited reading. However, for expressions where she claims most speakers accept only a delimited reading, she proposes that the particle or resultative simply "enforces" this reading.[13] Verkuyl (1993, 9) offers a similar analysis of the role of the Dutch particle *op*, suggesting that it "strengthens" the existing delimited reading. Thus, the role of delimiting elements such as particles and resultatives is understood by these authors to be essentially one of emphasis. Moreover, Tenny is forced to propose a somewhat different role for the delimiter depending on the readings of a particular expression available for an individual speaker: in some cases they exclude a non-delimited reading, while in others they simply emphasize the delimited one.

The revised account of aspectual composition offered here allows us to identify a more clearly consistent semantic role for these elements, and to contrast this role

[12] Vanden Wyngaerd (2001), in an analysis of the role of resultatives, also tackles this contradiction, but he adopts an approach exactly opposite to the one presented here. For him, a resultative does not establish an endpoint to an event; rather, it is the resultative in these sentences, not the direct object, that establishes the scale along which the event advances.

[13] Tenny adds that the particle emphasizes the fact that the object is completely consumed; however, as noted in Section 4, in her analysis, complete consumption of the entity referred to by the direct object is already an entailment of the same expression without a particle.

with that of the direct object of a measuring verb. Under the analysis proposed here, where all expressions with a measuring verb and quantized direct object allow both non-delimited and delimited readings, we can apply the analysis Tenny proposes for certain expressions with a measuring verb and quantized direct object to all such expressions: the addition of the delimiter enforces the delimited reading as the only possible reading, excluding the non-delimited one that would be otherwise available.

The aspectual role of delimiters can be most clearly illustrated with a verb of change of state, since these verbs most readily allow both non-delimited and delimited readings. For example, the expression in (27) can be clearly contrasted with those in (28), where the addition of a delimiting element excludes the non-delimited reading.

(27)	Anne Marie polished the countertop	for 15 minutes. in 15 minutes.
(28)	a. Anne Marie polished the countertop to a shine	*for 15 min. in 15 minutes.
	b. Anne Marie polished the countertop smooth	*for 15 minutes. in 15 minutes.
	c. Anne Marie polished up the countertop	*for 15 minutes.[14] in 15 minutes.

The effect of the addition of a delimiting element to an expression with a verb of consumption or creation is more difficult to highlight since, out of context, the delimited reading is already favoured. It might thus seem that the contribution of the delimiter is merely one of emphasis, as Tenny and Verkuyl propose. Recall, however, that an appropriate context can highlight the non-delimited reading of a verb of consumption or creation, as in (16a), repeated here as (29). But with an added delimiter, as in (30), even the additional context cannot make a non-delimited reading available. Similarly, the entity chosen as the object in (18), repeated here as (31), highlights the possibility of a non-delimited reading. However, with the added delimiter in (32), this reading is impossible. In other words, unlike a quantized direct object of a measuring verb, these elements are obligatorily delimiting.

(29) Kathleen ate an apple for a couple of minutes while talking on the phone.

(30) a. *Kathleen ate an apple to the core for a couple of minutes while talking on the phone.
b. *Kathleen ate up an apple for a couple of minutes while talking on the phone.

(31)	Steven built a Lego tower	for an hour. in an hour.

[14] Some speakers accept a non-delimited reading with an "intensive" interpretation, in which Anne-Marie scrubs with great force or energy.

(32) Steven built a Lego tower to the ceiling *for an hour.
in an hour.

Delimiting elements can be pictured as establishing an obligatory endpoint to the scale established by the direct object, as shown in the schema below. Here, in contrast to the schemata in Figures 1-4, the endpoint is represented by a solid line, indicating an explicit limit imposed by the delimiting element. (Note that whereas goal phrases and resultatives name the endpoint of the event, the particle *up* is a purely aspectual marker, indicating only that the event has an endpoint.)[15]

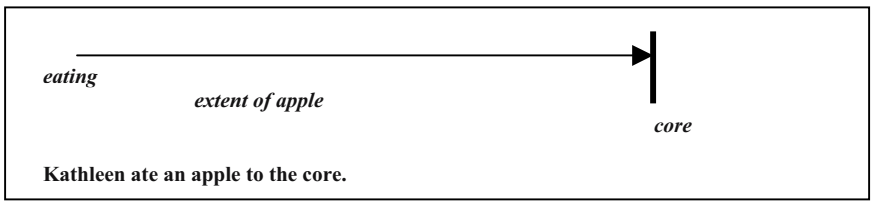

Figure 5. Measuring verb, quantized direct object, and delimiter

The obligatorily delimiting role of goal phrases, resultatives, and particles is further illustrated by the fact that these elements are incompatible with a non-quantized direct object, as in (33).[16] The lack of a quantized direct object in these expressions means that no scale is established and, without this scale, the delimiter cannot supply an endpoint.

(33) a.*Kathleen ate ice cream to the last spoonful. *(goal phrase)*
b.?*Anne Marie polished granite smooth. *(resultative)*[17]
c.*Kathleen ate up ice cream. *(particle)*

[15] Particles are actually obligatorily delimiting with measuring verbs only. With a non-measuring verb, they display the same ambiguity between the marking of a path or a goal as does a PP identifying a spatial path, as in example (9). For a discussion, see Smollett (2002, 2003).

[16] As was pointed out to me by an anonymous reviewer, an expression with a bare plural more readily allows the addition of a delimiter, as, for example, in: (i) *Sabah pushed toy cars to the wall*. However, the interpretation of expressions with a bare plural object is somewhat problematic since they might be most appropriately analyzed as an iterative event made up of a series of delimited events, as opposed to a single non-delimited event (see, for example, Leech 1969, 137 and Vanden Wyngaerd 2001, 77). In (i), I would argue that the expression is being interpreted as a series of delimited events, with the delimiter identifying the endpoint of each of these events, In other words, in (i), Sabah pushes one car after another to the wall. In the reading in which she is pushing a cluster of cars of an undetermined number to the wall at once, however, the expression is not acceptable.

[17] For reasons that remain unclear, a small number of speakers find this particular sentence acceptable. For some of these speakers, a habitual reading seems to be required.

The revised account of the aspectual role of quantized direct objects that I have argued for allows us to clearly distinguish the aspectual role of direct objects from that of true delimiters such as goal phrases, resultatives, and particles: whereas the direct object, by establishing a scale along which the event progresses, merely makes delimitation possible, a delimiter establishes an endpoint to that scale, obligatorily delimiting the event.[18]

7. CONCLUSION

One way or another, authors adhering to the standard claim about the aspectual role of quantized direct objects of measuring verbs end up confronting the problem of the murky judgments of these expressions. Whereas the standard account of aspectual composition predicts that only a delimited reading should be available for an expression with a measuring verb and quantized direct object, authors such as Tenny propose that this generalization, in effect, holds for only certain semantic subsets of the class. Moreover, most authors acknowledge that a non-delimited reading is available, at least marginally, for all measuring verbs. These judgments contrast with the judgments of expressions without a measuring verb or without a quantized direct object, in which the delimited reading is categorically excluded.

I have proposed here a revised account of aspectual composition. What the verbs I have called "measuring" verbs share is that, with a quantized direct object, they describe an event where some kind of change or progress takes place over time. The direct object "measures" the event by establishing the scale along which the event progresses; however, it does not enforce an endpoint to the event. Thus, a quantized direct object of one of these verbs makes delimitation possible, but does not itself delimit. Under this analysis, a non-delimited reading is expected rather than exceptional, and its availability is predicted to be subject to world knowledge and pragmatic context, thus accounting for the variable and non-categorical judgments typical of expressions with a measuring verb and quantized direct object. Where a delimited reading is favoured, we are led to it by world knowledge of the entities and processes referred to. The analysis offered here thus allows us to maintain a unified account of the aspectual properties of all measuring verbs. It also allows us to distinguish the aspectual role of the direct objects of these verbs from that of goal phrases, resultatives, and verb particles, elements that delimit obligatorily.

This analysis forces us to abandon the homomorphism usually thought to hold between the physical extent of an object and the delimitation of an event; it achieves, however, a consistent parallel between the aspectual composition of

[18] Here, the parallel to verbs of motion warrants further investigation. One might expect a "goal phrase" with the preposition *to* to be the natural spatial equivalent of the delimiters discussed here. However, for many speakers (i) *Pete drove to work* allows a non-delimited reading as well as a delimited one, as in (ii) *Pete drove to work for 15 minutes but he discovered he'd forgotten something and had to go back.* This suggests that the PP here can also serve as an open-ended path, which is supported by the fact that, unlike a delimiter with a measuring verb, a goal phrase in an expression like (i) is natural without the independent specification of a path.

expressions with measuring verbs and those with verbs of motion. This is simply one more example of the pervasiveness of the well-studied parallel between the conceptualization of events of motion through space and that of events of change in time (see Jackendoff, 1983, for one example among many). Brinton (1988, 197), describes this parallel as "iconic," based on "an analogous relation of parts between objects in space (or moving through space) and situations developing through time." Here, a quantized direct object of a measuring verb is conceived of as establishing a scale that is equivalent to a path with a verb of motion. While Jackendoff highlights this parallel for expressions with verbs of change of state, I have shown that it can be extended to all expressions with measuring verbs. What is intriguing is that it thus appears that the iconic relationship between the conceptualization of events of motion through space and of change over time is robust enough to allow us to conceive of a direct object as an open-ended scale even when it refers to a bounded object in the real world. In this case, our conceptualization of events, as expressed in the grammar, wins out over our knowledge of the physical reality of the world.

8. ACKNOWLEDGEMENTS

I would like to thank Robert Binnick for serving as a sounding board when I was first musing on these ideas, and Daniel Currie Hall for regular discussion as they developed. I am grateful to the participants in the Perspectives on Aspect conference for their feedback, as well to two anonymous reviewers whose challenging questions led me to significantly refocus the presentation of this material. Finally, a number of people have offered helpful suggestions for clarification on various drafts of this article, including: Elizabeth Cowper, Östen Dahl, Ari Epstein, Patricia Golubev, Daniel Currie Hall, and Keren Rice, and Eleanor Wenkart Smollett.

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QUANTIFICATION AND ASPECT

Abstract. This paper brings forward new data in support of the aspect feature structure defined in Di Sciullo (1997) on the basis of Romance languages. We show that prefixes encoding terminativity (internal [T]) impose a specific reading not only on determinerless DPs in languages like Russian, Czech and Polish, but also on overtly unspecified cardinality DPs as in Bulgarian. Furthermore, only a subset of Bulgarian prefixes are identified as capable of encoding the internal [T] feature. We argue against the traditional view that Slavic perfective prefixes are a homogeneous group. Outside the VP-level, specific readings of DPs provide evidence for another terminative (external [T]) feature taking asymmetric scope over arguments (subjects as well as objects). We propose that A-quantification, [T] calculus, and its effect on D-quantification, are obtained compositionally given the configurational asymmetry between external [T] and internal [T] in phrase structure. We refer to this hypothesis as the [T]/[T] asymmetry hypothesis. One desirable consequence of this hypothesis is that it allows for the elimination of AspP in the derivation of linguistic expressions.

Keywords. Aspect calculation, terminativity, quantification, nominal interpretation, definiteness.

1. INTRODUCTION

In this paper, we focus on the relations between structure and interpretation in natural languages and the contributions of morphological and syntactic feature structures to D- and A-quantification calculi.

Since the work of Lewis (1975), Heim (1982), and Kamp (1981), it has been accepted that natural languages express quantificational notions in two different ways: through determiners normally forming a constituent with a projection of N in the Determiner Phrase (DP) (e.g., *every* dog, *all* birds) and through adverbial-type words and morphemes forming a constituent with some projection of the verb. The terms A- and D-quantification were first introduced in Partee, Bach, and Kratzer (1987): " 'D' is mnemonic for Determiner, 'A' for the cluster of Adverbs, Auxiliaries, Affixes, and Argument-structure Adjustors, all of which can be thought of as alternative ways of introducing quantification in a more 'constructional' way (Carlson, 1983)." (Bach, Jelinek, Kratzer, and Partee, 1995: 8).

We focus on the expression of A-quantification through verbal means, i.e., the affixes and argument-structure adjustors of the quotation above. In languages such as English, the definite feature on a DP or a PP complement is related to the aspectual structure of the verbal projection it is a part of (Tenny, 1994, among other works). In Romance languages, functional features, e.g., the terminative feature, may have an effect on the aspectual properties of verbal projection (Di Sciullo 1997, 1999). In Slavic, perfective prefixes have been proposed to function as A-quantifiers contributing a specific reading to the whole VP (Filip 1992, 1993; Piñon 1995), (see

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 61 - 80.

examples in section 2 below). We bring forward new data from Slavic sentences and verbal forms in support of the claim that prefixes encoding telicity impose a specific reading not only on determinerless DPs in languages like Russian, Czech and Polish, but also on overtly unspecified cardinality DPs as in Bulgarian. We use the object-denotation of DPs as evidence for a terminative [T] feature taking asymmetric scope over arguments (subjects as well as objects). We propose that A-quantification, [T] calculus, and its effect on D-quantification, are obtained compositionally given the configurational asymmetry between external [T] and internal [T] in phrase structure. We refer to this hypothesis as the [T]/[T] asymmetry hypothesis.

We assume a model of grammar where morphological and syntactic structure are based on asymmetrical relations, but differ with respect to the realization of the asymmetry.[1] In tune with the Minimalist program (Chomsky 1995-2001), we take the derivation of words not to coincide with the derivation of phrases. Fully inflected lexical items are part of the numeration, and their formal features are checked in the syntactic derivation. We also assume Asymmetry Theory (Di Sciullo, in press), where morphological expressions and syntactic expressions are derived in different planes of the computational space. This theory is based on the hypothesis that asymmetry is the core relation of the language faculty. Asymmetry is central in the derivation of morphological objects, as the primitives of morphological derivations are minimal trees. Asymmetry is achieved as early as possible in the syntactic derivations. Thus, there is a core difference in the derivation of morphological and syntactic objects. The fact that the elements of a morphological object cannot be inverted, contrary to what can be observed in certain syntactic objects, e.g., predication structures, strongly supports the proposed divide. Relevant to this paper is the fact that derived morphological relations will not be able to be modified in the course of syntactic derivations. In particular, the effect of the adjunction of an aspectual affix to a verbal root cannot be altered by a temporal feature in the syntactic derivation of a proposition. Moreover and interestingly, in Slavic languages lacking overt determiners, the presence of an aspectual affix on a verbal root is sufficient to determine the terminativity of a verbal projection. No overt definite DP object is required. These facts point to the correctness of our theory, where morphological and syntactic derivations are parallel, as well as to the crucial importance of relating Aspect and asymmetry.

2. PERFECTIVITY AND SPECIFICITY

The parallel between perfectivity and object specificity has been widely discussed in the literature on English, Romance and Slavic aspect. In English, quantized nominal

[1] By asymmetric relations, we mean configurational asymmetries, that is, irreversible relations between two positions in a tree (word/phrase marker). In particular, we focus on the sister contain relation, as defined in Chomsky (2000), which is the core asymmetric relation in the derivation of linguistic expressions, be they morphological or syntactic. The sister contain relation is defined as follows. In a tree a node α sister-contains a node β iff β is included in the sister domain of α.

arguments linked to the Incremental Theme (Dowty, 1991) combined with dynamic verbs bring forward a telic interpretation as in (1); cumulative Incremental Theme objects contribute to an atelic interpretation as in (2) (Verkuyl, 1972; Krifka, 1998).

(1) Claire ate an apple/the apple/three apples/a bag of popcorn *telic*
(2) Claire ate apples/popcorn *atelic*

On the other hand, it has been noticed that in Slavic languages without articles, like Russian, Czech, and Polish, the verbal form carries the quantization information, while the objects are overtly unmarked in this respect. Wierzbicka (1967) suggests that the direct object of perfective verbs in Polish includes two elements in its semantic structure: "the number (one thing, or a 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). Forsyth (1970) also considers the object and the verb in an imperfective VP as a "coalesced unit, in which the object has no specific reference" whereas in the perfective VP the object is specific. More recently, Krifka (1998) and Filip (1993, 2001) argue that in Slavic languages without articles, the perfective aspect systematically induces strong specific readings on Incremental Theme arguments (see also Filip, this volume). The examples below are from Russian, but Czech and Polish exhibit the same phenomenon. The perfective prefixes are marked PV (standing for "preverb") in the glosses throughout the paper.

(3) ja yel gruši / tort *atelic*
I eat-PAST/1sg pears-ACC / cake-ACC
'I was eating (some) pears / cake.'
(4) ja s-yel gruši / tort *telic*
I PV-eat-PAST/1sg pears-ACC / cake-ACC
'I ate all the pears / the whole cake.'

Perfective aspect has the same effect in the Bulgarian example below. It is important to note that Bulgarian has overt articles, and, in parallel to the English nominal arguments in (1) and (2), the language is capable of signaling specified or unspecified cardinality. However, unlike English bare nouns,[2] when in the scope of the perfective prefix, Bulgarian mass and bare plurals take on a strong reading.

[2] When English bare plural and mass nouns are in the scope of an overt telicity marker, for example, a telic particle, they behave differently from the Bulgarian ones discussed in the text. They do not take on a strong reading.
(i) %Miranda ate up sandwiches. *atelic*
(ii) %Laura wrote up papers. *atelic*
These sentences do not sound acceptable to all native speakers. For the speakers who find them grammatical, they denote a series of iterative, finished events. Both sentences can be continued with

(5) xudožnikət na-risuva kartini i izleze da gi prodade
the painter PV-paint-AOR/3sg pictures and went out to them sell
na ulicata
on the street
'The painter painted some pictures and went out to sell them in the street.'

(6) Ivan z-gotvi jadene i go izjade dokato beše gorešto
Ivan PV-cook-AOR/3sg stew and it ate while was hot
'Ivan cooked some stew and ate it while it all was hot.'

In summary, perfective prefixes encoding telicity impose a specific reading not only on determinerless DPs in languages like Russian, Czech and Polish, but also on overtly unspecified cardinality DPs like the ones in Bulgarian. It is important to keep in mind, in the following sections, that we use bare plurals and mass nouns, grouped together under the label Bare Nouns, to show quantificational effects of verbal predicates over nominal arguments. Bulgarian bare nouns are particularly well suited for such a demonstration, since, parallel to Romance bare nouns and unlike English bare nouns, they behave as indefinites, à la Heim (1982), i.e., quantificational variables existentially or generically bound (Longobardi, 2001). Hence, they can only obtain their existential or generic interpretation through existential or generic quantifiers independently provided by the sentence logical form. As argued below, in our system, existential closure is provided by instances of the terminative feature [T].

3. LEFT PERIPHERY

The literature on Slavic aspect usually discusses verbal prefixes as a group of affixes that produce perfective verbs out of imperfective roots. But not all verbal prefixes traditionally classified as "perfective" prefixes have the same effect over argument DPs. In this section we will discuss a division in the traditionally considered as homogeneous group of verbal prefixes, proposed originally for French aspectual prefixes in Di Sciullo and Klipple, 1994; Di Sciullo, 1997, 1999 for French and Italian, see also Babko-Malaya, 1999 for a similar distinction between "lexical" and "superlexical" prefixes.

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the adverbial *one after the other*. This fact suggests that the object cardinality wins out in English telicity marking, and it has scope over the verbal telicity marker. Slabacova (2001a: 90) has used this fact to propose a lower phrase structure position for English particles and a higher position for Bulgarian prefixes. The natural question arises, then, if our proposal in this paper can be extended to English. We are leaving this intriguing question for further research.

3.1. French and Italian Prefixes

Di Sciullo (1997) shows that there is a configurational asymmetry between INTERNAL (directional and locational) and EXTERNAL (iterative and inverse) prefixes in morphological structure.

In Romance languages, the configurational asymmetries between internal and external prefixes determine their linear order and their effect on the verbal structure. Thus, an external prefix (temporal-sequential, iterative or inverse) modifies the full verbal projection but does not affect its argument structure or internal aspect. In contrast, an internal prefix (spatial) affects the internal aspect of the verbal projection, and in some cases, its argument structure as well. In denominal and deadjectival verbs, the argument and aspectual properties of the verbal complex are dependent on both the prepositional prefix and the verbal suffix.

The Internal/External Prefix Hypothesis correctly predicts the following properties of prefixed verbs in Romance. Some examples from French and Italian are provided below. See Di Sciullo (1997) for further discussion of the Romance facts, which we summarize as follows.

Firstly, when they are adjoined to verbs, external prefixes must precede internal prefixes, as illustrated in (7).

(7) a. apportare, riaportare, vs. *ariportare (Italian)
'to bring to', 'to bring again', 'to bring to again'
b. emporter, réemporter, vs. *enréporter (French)
'to bring with', 'to bring with again'

Secondly, in denominal and deadjectival verbs, the internal prefix must follow the external prefix, as illustrated in (8).

(8) a. imbarcare, riimbarcare, vs. *ribarcare, *imribarcare (Italian)
'to embark', 'to embark again'
b. embarquer, réembarquer, vs.*rebarquer,*emrebarquer (French)
'to embark', 'to embark again'

Thirdly, as they are part of the argument structure domain of the verb, internal prefixes may not be iterated and may not co-occur, external prefixes may sometimes be iterated and co-occur. This is illustrated in (9).

(9) a. (?)ririfare, ridisfare, vs. *aa/inimportare, *aim/inapportare (Italian)
'to repeat again', 'to reundo', 'to bring to to', 'to bring to from'
b. (?)rerefaire, redéfaire, vs.*aa/enemporter, *aem/emapporter
(French) 'to redo', 'to reundo', 'to bring to to', 'to bring to from'

Fourthly, internal prefixes may affect the aspectual class, and the argument structure of the projection they are adjoined to, external prefixes cannot, see (10). As is well-known, the difference in the appropriateness of a punctual or a durative adverbial modification indicates whether the event denoted by the verbal predicate has or does not have a natural end point or Terminus.

(10) a. Ha (ri)dormito (per ore/?in un ora). (Italian)
'He slept again (for hours/?in an hour).'
b. Ha addormentato Gianni (subbito/?per ore).
'(S/He) made Gianni sleep (right away/?for hours).'
c. Il a (re)dormi pendant des heures. (French)
'He slept again for hours.'
d. Il l'a (ré)endormi immédiatement.
'He made him sleep again immediately.'

Finally, as internal prefixes may change the telicity of the verbal predicate they are adjoined to, they may not adjoin to telic predicates, whereas external prefixes can; this is illustrated in (11).

(11) a. *anascere, *aeplodere, *avincere (Italian)
'to be born at', 'to explode at', 'to win at'
b. rinascere, riesplodere, rivingere
'to be born again', 'to explode again', 'to win again'
c. *anaître, *aexploser, *agagner (French)
'to be born at', 'to explode at', 'to win at'
d. renaître, réexploser, regagner
'to be born again', 'to explode again', 'to win again'

The configurational asymmetry between external and internal prefixes is depicted in (12).

(12) $[_V$ External prefixes $[_V$ Internal prefixes V]]

The configuration in (12) expresses correct semantic and syntactic properties of prepositional prefixation in a Romance verbal projection. Semantically, internal prefixes (spatial) may change the telicity of the verbal projection they are part of, whereas external prefixes (temporal-sequential) do not have this effect. The external/internal prefix hypothesis accounts for the linear order properties of prefixes: i) external prefixes must precede internal prefixes; ii) external prefixes may be iterated and co-occur, while internal prefixes, as they are in the argument-structure domain of a verbal projection cannot be iterated and cannot co-occur; iii) in denominal and deadjectival verbs, an internal prefix must follow an external one;

iv) internal prefixes are part of the argument-structure domain of a verbal projection, and thus they may affect the argument structure of the projection they are adjoined to, as well as the aspectual class of the verbal projection; v) finally, as internal prefixes may change the telicity of the verbal projection they are a part of, they cannot be adjoined to telic predicates, whereas, external prefixes are not subject to this restriction, as they do not affect the telicity of the event they are adjoined to.

3.2. Internal/External Prefixes in Bulgarian

In this section, we provide evidence that the Internal/External prefix hypothesis extends to other languages, by considering the properties of prefixes in Bulgarian verbs.

In Bulgarian, the prefixes *pre-* ('repeated action') and *po-* ('briefly') have adverbial properties in (13) and (14) in the sense that they provide adverbial-like modification to the eventuality denoted by the root. On the other hand, the prefix *na-* 'on' has prepositional properties. It does not contribute anything to the verbal root meaning except telicity, an inherent endpoint to the eventuality as in (15). It can be regarded as a pure telicity marker (not contributing any idiosyncratic lexical information to the root apart from an endpoint) as opposed to the adverbial prefixes *pre-* and *po-* in (13) and (14).

(13)	bojadisam 'paint'	pre-bojadisam 're-paint'
(14)	četa 'read'	po-četa 'read for a while'
(15)	piša 'write'	na-piša 'write out in full'

We analyze *pre-* and *po-*as external prefixes and *na-* as an internal one. Crucially, we will show that whenever the prefix has an effect on the verb's argument structure and/or lexical semantics, it must be an internal prefix. To anticipate the analysis in section 4, we will argue that only internal prefixes, but not external ones, can contribute telicity, or the [T] feature, to the composition of verbal aspect.

3.3. Predictions

The configurational difference between prefixes accounts for the linear order properties of prefixes in Bulgarian. The analysis correctly predicts that an external prefix must precede an internal one, the reverse order being ungrammatical, as illustrated below.

(16) a. pro-četa 'read in full'
b. pre-pro-četa 'read in full once again'
c. *pro-pre-četa 'read in full once again'

Furthermore, whenever prefixes are attached onto an adjectival root, e.g. *red*, *fat*, externals can attach to the root only after internals have already attached.

(17)	a. červja 'make red'	*atelic*
	b. na-červja 'redden'	*telic*
	c. *pre-červja 'redden again'	
	d. pre-na-červja 'redden again'	
	e. *na-pre-červja 'redden again'	
(18)	a. debeleja 'get fat'	*atelic*
	b. na-debeleja 'get fat'	*telic*
	c. *po-debeleja 'get a little fat'	
	d. po-na-debeleja 'get a little fat'	
	e. *na-po-debeleja 'get a little fat'	

A second prediction is that external prefixes can be iterated, while internal prefixes supplying the endpoint of the event cannot.

(19) a. pre-pre-iz-bra 're-re-elect'
b. *iz-iz-bra 'elect'
c. pre-pre-čerta 're-re-draw'
d. *na-na-čerta 'finish drawing'

Thirdly, when more than one prefix occur on a given stem, it is only one of them that supplies the endpoint of the event; the others offer additional meanings similar to adverbial manner modification. Take the examples in (20). The prefix *s-* in (20c) supplies the end point, the prefix *po-* in (20b,d) offers an attenuative meaning of doing something for a little while or to a small degree, and the prefix *iz-* encodes distributivity of the event over a lot of participants.[3] Both *karax se* and *po-karax se* in (20a,b) are grammatical with a durational adverbial like *for an hour*, while the telic verbs in (20c-e) are not. Note also that the adverbial-like prefix *po-* means 'for a while' when attached to the atelic root, but it changes its meaning to 'a little' when added onto an already telic stem (20 b,d).

(20)	a. karax se 'I quarrelled'	*atelic*
	b. po-karax se 'I quarrelled for a while'	*atelic*

[3] It is important to keep in mind that it is not prefixes themselves, but prefix senses, or meanings, that are external and internal. For example, the prefix *iz-* in (15) is an internal prefix, while it is an external prefix with a distributive meaning in (16). The verbal root lexically selects which prefixes it can combine with. The verb *četa* ''read' takes *pro-* as an internal prefix, while *piša* 'write' takes *na-* as an internal prefix. Almost all prefixes have one internal meaning (telicity marking) and more than one external senses. The challenge for learners of Bulgarian, then, is the lexical acquisition of all the meanings of the 19 perfective prefixes, together with the verbs' selectional properties.

c. s-karax se ‘I quarrelled’ *telic*
d. po-s-karax se ‘I quarrelled a little’ *telic*
e. iz-po-s-karax se ‘I quarrelled with everyone’ *telic*

Fourthly, and most importantly, the external iterative prefix does not alter the aspectual class of the verb, while internal prefixes do so, since they signal telicity. In order to illustrate that, compare the interpretations of (21) where the verb has an internal prefix and (22) where the verb has an external prefix:

(21) xudožnikət na-risuva kartini za pet časa/*pet časa
the painter PV-paint-AOR/3sg pictures in five hours/*for five hours
‘The painter painted some pictures in five hours/*for five hours.’

(22) xudožnikət pre-risuva kartini ?za pet časa/pet časa
the painter PV-paint-AOR/3sg pictures in five hours/for five hours
‘The painter re-painted (some) pictures ?in five hours/for five hours.’

In (21) the presence of the internal prefix brings forward a telic interpretation, although the direct object is a bare plural noun. In (22) both a telic and an atelic interpretation are available, as the time adverbial tests show. The actual interpretation of the sentence will be based on discourse context or temporal adverbials positioned higher in the structure.

Furthermore, as shown in (23), some internal prefixes can add a causer to the argument structure of intransitive verbs.

(23) a. decata se smjaxa na klouna
the children REFL laugh-AOR/3pl at the clown
‘The children laughed at the clown.’
b. klouna raz-smja decata
the clown PV-laugh-AOR/3sg the children
‘The clown made the children laugh.’

Thus, internal prefixes have an effect both on the lexical aspectual class and on the argument structure of the verbal root they attach to.

Some more evidence for the above analysis comes from biaspectual verbs in Bulgarian. There are some borrowed verbs in Bulgarian like *organiziram* ‘organize’, *arestuvam* ‘arrest’, *remontiram* ‘repair’. As late borrowings into the language, biaspectual verbs do not employ prefixes to become perfective (Kabakčiev, 1984). They do not follow the typical pattern of Bulgarian verbs:

(24) imperfective (activity) root = atelic verb
perfective prefix + imperfective (activity) root = telic verb

Crucially, those verbs behave very much like English eventive verbs: the cardinality of the DP object determines the interpretation. These verbs are ungrammatical with an endpoint of the event prefix like *na-*, as (26) indicates. Since these verbs use English-type telicity marking, they do not allow telicity to be marked redundantly twice, through the internal prefix. On the other hand, as is the case for Romance and English, the iterative prefix *pre-* can appear with these verbs without changing their aspectual class, cf. (27). Thus, the syntactic behavior of these biaspectual verbs confirms the status of internal prefixes as telicity markers and of external prefixes as adverbial modifiers.

(25) a. mexanicite remontiraxa koli *atelic*
the mechanics repair-PAST/3pl cars
'The mechanics repaired cars.'
b. mexanicite remontiraxa kolite *telic*
the mechanics repair- PAST/3pl the cars
'The mechanics repaired the cars.'

(26) a. *mexanicite na-remontiraxa koli
b. *mexanicite na-remontiraxa kolite

(27) a. mexanicite pre-remontiraxa koli *atelic*
the mechanics PV-repair- PAST/3pl cars
'The mechanics repaired cars again.'
b. mexanicite pre-remontiraxa kolite *telic*
the mechanics PV-repair- PAST/3pl the cars
'The mechanics repaired some cars again.'

To summarize this section, we have shown that certain verbal prefixes in Bulgarian may affect the internal aspectual properties and in particular the telicity of the VP they are adjoined to, as originally argued for in Di Sciullo (1997, 1999) on the basis of Romance verbs. In particular, we have provided evidence to show that it is only internal but not external prefixes in Slavic that act as A-quantifiers and change the interpretation of argument DPs. Thus we have qualified the traditional approach, which assumed that all perfective prefixes in Slavic bring forward a specified cardinality interpretation in nominal phrases.[4]

[4] Arguing for an essentially similar analysis, Filip (to appear) shows that Czech prefixed verbs differ in their quantizing properties depending on the spatial orientation of the prefixes they contain: Only Goal-oriented prefixes (e.g., *při-* 'to') but not Source-oriented ones (e.g., *od-* 'away, from') yield quantized verbs. In the examples in (i), we have a measure expression 'one meter' which acts as a quantizing modifier, applying to homogeneous predicates and turning them into quantized predicates. In the case of (i-b) this is impossible, because the predicate is already quantized. In the case of (ii-b), the attenuative prefix po- acts as the measure expression, demonstrating similar effects.
(i) a. Od-sedl si asi metr od okna.
away-sat.down refl about meter from window
'He sat down about a meter away from the window.'

4. [T] VERBS

Not only are some Slavic perfective prefixes exempt from A-quantifier status, but there are some roots that can be classified as such. We will show that the lexical sub-event feature Terminative [T] has a similar semantic effect in Slavic as overt perfective morphemes.

We assume the system of aspectual features proposed by Di Sciullo (1997), according to which eventuality types, first proposed by Vendler (1967), can be defined in terms of two features: Terminative [T] and Subinterval [S]. Thus we have: states:[,]; achievements: [,T]; activities:[S,]; accomplishments:[S, T]. As discussed in Di Sciullo (1997) on the basis of Romance, the bivalent aspect features system allows one to identify natural classes of categories with respect to aspect. Thus some verbs and prepositions form a natural class with respect to the [T] feature, other elements do not. Moreover, given the Adjunct Identification Condition (Di Sciullo 1997: 57), according to which an adjunct identifies an unspecified feature of the category it adjoins to, it follows that a [T] prepositional prefix cannot be adjoined to a [T] verb. See the examples in (11a) and (11c) repeated here in (28) for convenience.

(28) a. *anascere, *aeplodere, *avincere (Italian)
'to be born at', 'to explode at', 'to win at'
b. *anaître, *aexploser, *agagner (French)
'to be born at', 'to explode at', 'to win at'

This prediction derived from the behavior of Romance verbs and prefixes, turns out to hold for Slavic as well. An internal [T] prefix may not be adjoined to an achievement, as this predicate is lexically, or inherently, a [T] verb.[5]

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b.*Při-sedl si asi metr k oknu.
to-sat.down refl about meter to window
'He sat down about a meter away from the window.'

(ii) a. Po-vy-táhl káru z příkopu.
att-out-pull cart from ditch
'He pulled the cart partly out of the/a ditch.'
b. *Po-do-táhl káru k/do příkopu.
att-to-pull cart (in)to ditch
'He pulled the cart partly into the/a ditch.'

Since examples (i-b) and (ii-b), ungrammatical in Czech, are perfectly fine in Bulgarian, we conclude that differences may exist among Slavic languages in the exact form the quantizing contribution of perfective prefixes takes, and we leave the matter to further research on perfectivity and cross-linguistic variation. It is important to notice, however, that much evidence converges against the traditional view that Slavic perfective prefixes are a homogeneous group.

[5] A reviewer asks about verbs like *pod-kupit*' 'bribe', *ot-kupit*' 'compensate', *ot-dat*' 'return', *iz-dat*' 'publish', which are composed of the achievement roots *kupit*' 'buy' and *dat*' 'give' with internal prefixes. It is true that some of the prefixes in the examples above may function as internal when attached to other, activity roots, but note that in the above verbs, they change the lexical meaning of the root quite considerably. Russian, and all Slavic, perfective prefixation is a derivational process, so the creation of these telic verbs based on telic roots is not surprising: it is lexically driven. In our

(29)	a. kupja 'buy'	*telic*
	b. iz-kupja 'buy all the available goods'	*adverbial meaning*
	c. na-kupja 'buy in big quantities'	*adverbial meaning*
	d.*na-kupja 'finish buying'	*double telic*

The following examples from Russian (30) and Polish (31) contain the achievement verbs *buy* and *give*, which are perfective roots, lexically marked [T] roots, and do not need a perfective prefix to denote a telic event (with the same lexical meaning, see footnote 4) (Slabakova, 2001a). Note that the DP object reading is of a specific quantity of material.

(30) ja kupila material (šit' plat'ye) (Russian)
I buy-PAST material-ACC (to make a dress)
'I bought all the necessary material (for a dress).'

(31) (ja) dałam chłopcu pieniądze (Polish)
I give-PAST boy-DAT money-ACC
'I gave the boy the money.'

Bulgarian exhibits a similar phenomenon that we observed in section 2 with perfective prefixes. Although the object is a mass noun, marked indefinite by the lack of determiner on it, it is still interpreted as a specific quantity of money, as the pronoun indicates. This is due to the [T] feature of the verbal root.[6]

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system, the prefixes *pod-, o-, ot-* and *iz-* in the above examples do not function as internal, telicizing, prefixes but just as derivational morphemes.

Furthermore, Slabakova (2001b) demonstrates experimentally that the restriction that telic verbs cannot be further telicized, reflecting the same prediction (cf. also Tenny, 1994), is part of the mental grammar of Bulgarian native speakers.

[6] An anonymous reviewer suggests that, given our analysis, every object of the lexical root *da-* 'give' will have a specific reading, in other words, no object of Bulgarian *give* can ever appear with an unspecified cardinality interpretation. This is, of course, contrary to fact, since the language has to be able to express this particular meaning. The verbal form that supports the unspecified cardinality interpretation is the secondary imperfective form *da-va-m*, as in (i) below:

(i) nie da-va-me podarəci na decata za nova godina
we give-PRES/1pl presents to the children for new year
'We give presents to the children for the New Year.'

It seems to be the case that (only) the secondary imperfective morpheme *-va-* is capable of overcoming the lexical telicity feature of the root *da-*. This happens at the level of the VP, lower than the second instantiation of the [T] feature. Thus, the main thrust of the asymmetric [T]/[T] hypothesis we argue for in this paper is not diminished. We are grateful to the reviewer for bringing this point up, and will take up this issue in further research.

(32) Ivan dade pari na Marija i tja gi po-xarči
Ivan give-AOR/3sg money to Maria and she it PV-spend-AOR/3sg
za den
in a day
'Ivan gave Maria a quantity of money and she spent it in a day.'

The facts discussed in this section extends to Bulgarian the empirical coverage of the feature analysis of aspect as well as the restrictions on the adjunction of internal [T] prefixes to [T] verbal predicates proposed in Di Sciullo (1997). As a result, within the verbal projection, only one [T] feature can be active, supplied either by a lexically telic root, or a perfective prefix, or an object of specified cardinality.

5. ASPECTUAL TENSES AND TERMINATIVITY

Depraetere (1995), following Declerck (1989), argues for the necessity of a new distinction in evaluating the aspectuality of sentences. Vendler's (1967) four aspectual classes, states, activities, accomplishments and achievements, are partially based on the distinction of telicity, the availability or unavailability of potential inherent endpoints in the events. Thus, states are outside (tangential to) this distinction pertaining to the dynamic aspectual classes only, and of the latter, activities are atelic, while accomplishments and achievements are telic. Dowty's (1979) Imperfective Paradox shows the effect of the progressive on telic events: the progressive form seemingly "takes away" the built-in endpoint in accomplishment sentences as *John was drawing a circle*. Such sentences clearly demonstrate the need for two aspectual distinctions: one based on potential endpoints (telicity) and the other based on actual endpoints, which is labeled boundedness. The two distinctions are exemplified below with sentences from Bulgarian which vary in the presence or absence of perfective prefix, and in the two aspectual tenses: aorist and imperfect.

(33) (PREFIX + AORIST = *telic, bounded*)
Ivan pro-čete Vulšebnata planina ot Tomas Man.
Ivan PV-read-AOR/3sg the magic mountain by Thomas Mann
'Ivan read 'The Magic Mountain' by Thomas Mann.'

(34) (NO PREFIX + AORIST = *atelic, bounded*)
Ivan čete Vulšebnata planina ot Tomas Man.
Ivan read- AOR/3sg the magic mountain by Thomas Mann
''Ivan read from 'The Magic Mountain' by Thomas Mann.'

(35) (PREFIX + IMPERFECT = *telic, unbounded*)
Ivan pro-čita-še Vulšebnata planina vsyaka godina.
Ivan PV-read-IMP/3sg the magic mountain every year
'Ivan read 'The Magic Mountain' completely every year.'

(36) (NO PREFIX + IMPERFECT = *atelic, unbounded*)
Ivan čete-še Vulšebnata planina kogato go vidyax.
Ivan read-IMP/3sg the magic mountain when him (I) saw
'Ivan was reading 'The Magic Mountain' when I saw him.'

As the examples in (33-36) indicate, there is a clear parallel between telicity and perfective [T] prefixes, the aorist/imperfect tenses and boundedness in Bulgarian. A situation is bounded in time if it has reached a temporal boundary, irrespective of whether the situation has an inherent endpoint or not (Depraetere, 1995). The aorist can be assumed, we propose, to encode the feature [T] externally to the *v*P while the imperfect does not. Thus, we relate telicity to the internal [T] feature and boundedness to the external [T] feature. This claim is supported with the fact that, in parallel with the other instance of [T], the aorist aspectual tense also gives rise to strong readings of weak DPs.

The sentence in (37) illustrates the specificity effect of the aorist in Bulgarian. Note that the verb is an activity (imperfective *eat*), the object is a bare plural (*sandwiches*), consequently the VP is atelic. It is only the Aorist tense morpheme that imparts the meaning of specificity to the whole sentence. Compare the sentences in (37) and (38). They differ only in their expression of boundedness through the imperfect and aorist morphemes, but their object interpretation is radically different. In (37), the weak object on its strong reading functions as a real argument, and can be referred back to with a pronoun. In (38), the weak object feels like part of the predicate, referring to the activity of "sandwich-eating" (de Hoop, 1995).

(37) External [T]
Ivan jade sandviči zaštoto gi xaresa mnogo
Ivan eat-AOR/3sg sandwiches because them liked a lot
'Ivan ate a number of sandwiches because he liked them.'

(38) No External [T]
Ivan jadeše sandviči kogato go vidjax včera
Ivan eat-IMP/3sg sandwiches when him I-saw yesterday
'Ivan was eating sandwiches when I saw him yesterday.'

6. THE CONFIGURATIONAL [T]/[T] HYPOTHESIS

We propose that within TP both internal [T] (telicity) and external [T] (boundedness) provide A-quantification, external [T] sister-containing internal [T], as schematized in (39). As they are in an asymmetrical relation, external [T] sister contains, in the sense of Chomsky (2000), internal [T]. Internal and external [T] take asymmetric scope over the *v*P and its arguments.

(39) $[_{TP}$ External [T] $[\ _{vP}$ Internal [T]]]

Given 'bottom-up' derivations the configurational [T]/[T] asymmetry hypothesis in (40) has several empirical consequences.

(40) [T]/[T] asymmetry hypothesis
A-quantification and its effect on D-quantification are derived compositionally, given the configurational asymmetry between external [T] and internal [T].

An argument is interpreted as specific in the syntactic derivation i) by feature checking in *v*P, given the lexical [T] feature (in achievements) or morphological [T] feature of *v* (in accomplishments), or ii) by feature checking in TP, given temporal [T] features. One consequence is that if internal [T] is obtained at some point of the derivation, it remains constant throughout the derivation. This follows from the monotonic bottom-up derivation we are assuming for the derivation of phrasal syntax. For example, in Bulgarian, the imperfect tense cannot reverse the specific interpretation of an object that is due to a telicity feature as in (41), even if the whole event becomes durative, comprising an unbounded series of telic sub-events. The chart in (42) includes the four possible combinations and indicates the effect on the object interpretation, specific quantity [SQ].

(41) štom napišeše pisma, Marina otivaše da gi pusne na
when PV-write-IMP/3sg letters Marina go-IMP/3sg to them mail at
poštata
the post office
'Every time she wrote (specific a number of) letters, Marina went out to mail them at the post office.'

(42)

Example	Features	Object Interpretation
Marina kupi kafe Marina buy-AOR/3sg coffee	[External T, Internal T]	[+SQ]
Ivan jade sandviči Ivan eat-AOR/3sg sandwiches	[External T]	[+SQ]
Marina kupuvaše kafe Marina buy-IMP/3sg coffee	[Internal T]	[+SQ]
Ivan jadeše sandviči Ivan eat-IMP/3sg sandwiches	[no T]	[- SQ]

So, the External [T] feature can only be seen to have a quantificational effect on the object interpretation if Internal [T] is not present. Given a bottom-up derivation, the lower feature applies first. If Internal [T] is present, external [T] applies vacuously.

Furthermore, there are parallel effects of verbal A-quantification on nominal phrases in subject position. Consider the effect of perfective prefixes and lexical

perfective predicates in Russian. Note that the sentence in (43) has a stative predicate (*love*) and the sentence in (44) has an activity predicate (*sing*). The interpretation of the subject NP *soldaty* 'soldiers' in these examples can go both ways depending on the context. Three different informants stated that the existential indefinite reading is dispreferred but not unavailable when the right context is evoked.

(43) soldaty lyubili gruši [+/-SQ] (Russian)
soldiers-NOM love-PAST/3pl pears-ACC
'(The) soldiers loved pears.'

(44) soldaty peli pesni [+/-SQ]
soldiers-NOM sing-PAST/3pl songs-ACC
'The soldiers sang songs.'/'There were some soldiers who sang songs.'

This is not the case in (45) and (46), however.

(45) soldaty s-yeli gruši [+SQ] (Russian)
soldiers-NOM PV-eat-PAST/3pl pears-ACC
'The soldiers ate the pears.'

(46) soldaty našli den'gi [+SQ]
soldiers-NOM find-PAST/3sg money-ACC
'The soldiers found the money.'

The sentence in (45) has an overt perfective prefix, while the one in (46) is an achievement, a lexical telic predicate. The only interpretation available for the subjects in both sentences is 'a specified by the context set of soldiers'.

Examples from Bulgarian allow us to distinguish between two instances of [T] and indicate that each one of them has the same effect. Recall (cf. Section 2) that Bulgarian bare nouns are variables and obtain their existential or generic interpretation (object vs. kind denotation) through existential or generic operators independently supplied by the sentence logical form (Longobardi, 2001).

(47) *telic*
vojnitzi iz-jadoxa krušite na lozeto (Bulgarian)
soldiers PV-eat-AOR/3pl pears-DET in the vineyard
'(Some subset of the) soldiers ate the pears in the vineyard.'

(48) *telic iterative*
vojnitzi iz-jaždaxa krušite na lozeto vsjaka godina
soldiers PV-eat-IMP/3pl pears-DET in the vineyard every year
'(Some subset of the) soldiers ate up the pears in the vineyard every year.'

Thus, the presence of the perfective prefix (Internal [T]) contributes to the specific interpretation of the subject, independent of presence or absence of External [T]. On the other hand, in order to tease apart the contribution of External [T], the following Bulgarian examples are relevant.

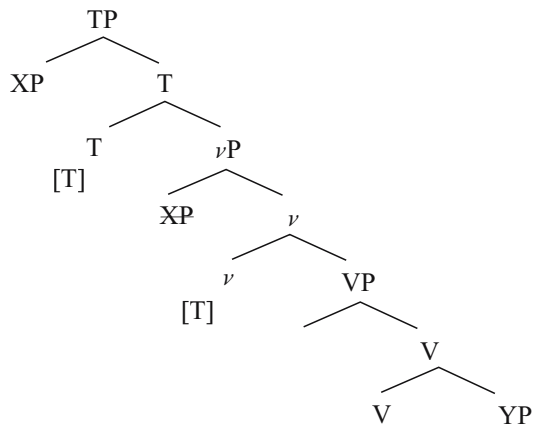
(49) vojnitzi pjaxa patriotični pesni i vsički gi slušaxa
soldiers sing-AOR/3pl patriotic songs and everyone them listened
'Soldiers sang patriotic songs and everyone listened to them.'

(50) #vojnitzi peexa patriotični pesni i vsički gi slušaxa
soldiers sing-IMP/3pl patriotic songs and everyone them listened
'Soldiers were singing patriotic songs and everyone listened to them.'

The verbs in the examples above are imperfective, i.e., lacking Internal [T]. The verbal form exhibiting External [T] as in (49), however, can make the subject specific, while the one lacking External [T] as in (50) cannot.

The facts presented above show that in Bulgarian a bare noun subject interpretation ranges over a continuum of meanings from 'generic' to 'specific', depending on the value of the internal or external [T] feature of the verbal predicate. Together the two sources of A-quantification are argued to take scope over the external and the internal arguments. Thus, the subject also falls under the scope of boundedness and telicity marking. This follows from our analysis, as internal [T] is part of the *v*P domain, which includes the lexical subject (Spec, *v*P) and External [T] is part of the TP domain, which includes the functional subject (Spec, TP). This is illustrated below.

(51)



The syntactic representation in (51) is a minimalist representation, in the sense of Chomsky (2001), of the [T]/[T] hypothesis. The configurational [T]/[T] hypothesis follows from Asymmetry Theory, where both syntactic and morphological planes deploy non-isomorphic asymmetric relations, as discussed in Di Sciullo (in press).

Thus, in the syntactic derivation there is no Aspect projection, either in the lexical or in the functional domain. Rather, we assume that internal aspectual features are part of the *v* projection, while external aspectual features are part of the Tense projection. The aspectual [T] feature is part of the feature specification of the functional heads small *v* and Tense. The features are part of the maximal projections *v*P and TP including the object, YP, and the subject, XP. Thus the [T]/[T] hypothesis ensures the relation between A-quantification and D-quantification, as the [T] features of *v* and the [T] features of Tense compositionally derive the aspectual feature structure of TP and has consequences for the specificity feature of the DPs, both object and subject.

7. SUMMARY

D-quantification forms a constituent with a projection of N, while A-quantification forms a constituent with some projection of V. We proposed that the differences and the relations between the structure and interpretation of D- and A-quantification in Romance and Slavic and languages followed from the geometry of the structural descriptions derived by the grammar. We proposed that A-quantification and its effect on D-quantification are obtained compositionally given the configurational asymmetry between external [T] and internal [T].

Our proposal has consequences for the specificity and the interaction of morphological and syntactic derivation. The external/internal configurational asymmetry holds in the derivation of [T] features in morphology and in syntax. We have shown that while the internal prefixes and inflectional heads determine the [T] features in a verbal predicate, and its A-quantification, the checking of internal functional features of *v* and external functional features of Tense, determines D-quantification in phrasal syntax. The specific interpretation of a DP, even in languages such as Slavic where the D is covert, and the telicity of a predicate are determined compositionally given the configurational Internal/External asymmetry.

Previous analyses of the facts have used a syntactic projection AspP, for which there is really no independent evidence. We proposed a system based on a minimal set of features and projections, the [T] features and the configurational asymmetry between external and Internal [T]. We have shown that AspP can be dispensed with and a much more insightful account of telicity, boundedness and specificity can be provided.

8. AKNOWLEDGEMENTS

This work is supported in part by the Social Sciences and Humanities Research Council of Canada to the Major Collaborative Research Project on Asymmetries in Natural Languages and their Treatment by the Performance Systems (Grant no. 412-97-0016). Previous versions of the [T]/[T] hypothesis were presented by the first author at the Third Mediterranean Conference on Morphology in Barcelona, in

September 2001, at the 11th Colloquium on Generative Grammar at the University of Zaragoza in April 2001, at the XXVII Incontro di Grammatica Generativa in Trieste in March 2001, at the ESSLLI Conference in Birmingham in August 2000. Many thanks to the audiences for their comments. During the writing and revisions of the manuscript, the second author was hosted by the Utrecht institute of Linguistics OTS. Both the UiL hospitality and the Netherlands Organization for Scientific Research (NWO) visiting grant are gratefully acknowledged. Last but not least, we are grateful to an anonymous reviewer and the editors for insightful suggestions and expert editorial work.

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RAFFAELLA FOLLI & GILLIAN RAMCHAND

PREPOSITIONS AND RESULTS IN ITALIAN AND ENGLISH: AN ANALYSIS FROM EVENT DECOMPOSITION

Abstract. In this paper, we analyse the formation of goal of motion interpretation in English and Italian. We argue that contrary to what has been argued, both languages do form goal of motion interpretations although in a manner constrained by the principles of event structure composition. Parametric variation among the two languages will be driven by: (i) the nature of lexical prepositions available; (ii) the methods of syntactically licensing resultative projections. We extend the account to explain the absence of AP resultatives in Italian.

Keywords. Resultatives, goal, motion, event structure, selection, cause, process, telos.

1. INTRODUCTION

In this paper we analyse the formation of two particular kinds of 'complex' events, one in which a motion event (process) is followed by the indication of the endpoint of such motion and one where a non-motion process is followed by the endpoint of that activity. The first kind of construction is generally referred to as a *goal of motion* construction and the second one as a *resultative* construction.

Languages employ different strategies to express goal of motion (Talmy 1985, *inter alia*). Just to consider a few examples, we know that in some languages (e.g., Latin, Russian, German) when a verb indicating motion combines with a prepositional phrase we get either located motion or directed motion depending on the choice of case of the complement of the PP. In other languages (e.g., English), the combination of a manner of motion verb and a preposition can, in the majority of cases[1] indicate both located and directed motion, therefore giving rise to cases of ambiguity. In certain Romance languages (e.g., Spanish), only located motion is expressed by the combination of a manner of motion verb and a PP, while the strategy used to express directed motion is completely different, requiring the use of an adjunct to express the manner of motion together with an inherently telic verb to express the end point of motion.

With regard to resultatives, some languages (e.g., English, German, Chinese, etc.) allow the combination of an activity verb and a secondary predicate (typically a

[1] Most prepositions (e.g., *over, under, through, around*, etc.) do give rise to ambiguity, but as we will discuss later in greater detail there are some non ambiguous prepositions, *into* and *onto* being only directed motion prepositions and *underneath* and *beneath* being only locative prepositions.

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 81 - 105.

PP or AP) to express a process followed by an endpoint state. In the literature it is argued that not all languages are able to form resultative constructions, and that in particular, Romance languages do not allow complex predicational structures where a secondary predicate furnishes the 'telos' of the process event given by the primary predicate (Levin and Rappaport Hovav 1995).

The aim of this paper is to go beyond this (undeniably useful) descriptive typology to make some sense of the crosslinguistic variation in terms of some simple parameters of lexical semantic decomposition, together with the specification of the formal properties of verbal, prepositional and adjectival lexical items in languages. In particular, we will look at the contrast between English on the one hand and Italian on the other. While Italian looks, on the face of it, to be of the Spanish/Romance type, a closer examination of the data reveals a much more complicated picture. Similarly, English will prove to be somewhat less liberal than expected in certain domains than has been acknowledged in the literature. Nevertheless, there are clear differences between the two languages which we will argue are due to the different formal features typically associated with verbs and prepositions in each language.

As we remarked above, the difference between Spanish and English with respect to the formation of goal of motion constructions resides in the inability of the first language to encode telic motion by means of the combination of a manner of motion verb and point locating preposition (Talmy 1985). Such constructions in Spanish are only locative, while goal of motion interpretations are formed with verbs of inherently directed motion. Looking at Italian and English, the same contrast can be demonstrated for certain verb pairs, as shown in (1)-(3) below:

(1) The boat floated under the bridge. (Ambiguous)
(2) La barca galleggiò sotto il ponte.
'The boat floated under the bridge.' (Only 'located motion' reading)
(3) La barca passò sotto il ponte galleggiando.
'The boat passed under the bridge floating.' (Only goal of motion reading)

However, the contrast depends on the particular choice of Italian verb, because in (4) below the goal of motion interpretation that was not available in (2) becomes possible:

(4) La palla rotolò sotto il tavolo. (Ambiguous)
'The ball rolled under the table.'

Conversely, taking the English construction and substituting a different preposition reverses the judgment on the sentence: with a locative preposition, only the located motion reading is possible and the goal of motion reading disappears (5).

(5) The boy walked on the beach. (Only 'located motion' reading)

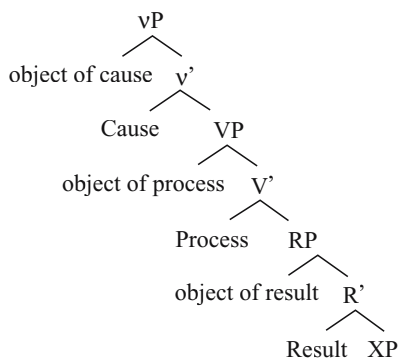
We believe that this is an unsurprising (for speakers of English) but underappreciated fact, especially in view of the data from Italian that we will present. This will show that goal of motion in Italian is not dependent on the choice of preposition (and in particular occurs with purely locative PPs) but on the choice of verb. In English, on the other hand, the variation seems to be blind to the particular motion verb chosen, but depends on the type of PP it combines with.

In the next section, we present a particular view of event decomposition that will allow us to articulate the components in the 'result augmentation' of process verbs (cf. Levin and Rappaport Hovav 1998). In section 3, we apply this framework to the case of English motion verbs and the prepositions they occur with, concluding with an analysis of the surprising productivity of adjectival resultatives in this language. In section 4, we turn to the Italian data and provide an account of when goal of motion is possible in this language. It is crucial to our analysis that the possibility of goal of motion will not necessarily predict adjectival resultatives. In fact, an independent understanding of the properties of APs will allow us to account for why Italian disallows them as resultatives so systematically.

2. THE FRAMEWORK

Many related proposals exist which seek to correlate the morphosyntax and the semantics of event structure in an intimate way (see Travis 1994, Borer 1998, Ritter and Rosen 1998 among others). The common idea behind these proposals is that the syntactic projection of arguments is based on event structure. We make a specific proposal here, following Butt and Ramchand (2002) and Ramchand (2003), in proposing the event structure in (6) where three event projections are necessary to represent all the possible components of the event structure building processes of natural languages:

(6)



As we see in (6), the verb phrase contains three different projections and each projection is an instantiation of a (possible) sub-part of the whole event. In particular, we argue that:

- vP introduces the causation event and licenses different types of external argument,
- VP specifies the nature of the change or process and licenses the object of change or process,
- RP gives the 'telos' of the event and licenses the object of result[2].

With respect to the particulars of the first phase syntax proposed, the elements of the ontology are those which have proved over the years to be minimally necessary to express the linguistically relevant argument structure and aspectual distinctions found in natural language. Thus, causation has been shown to be a relevant parameter in verbal differences and shows up very often as overt morphology within the verbal inventory of human languages (cf. Baker 1988, Hale and Keyser 1993, Ritter and Rosen 1998, Rappaport Hovav and Levin 2000). 'Telos' or resultativity is also a component that has been shown to be isolable as a parameter in verbal meanings, and which has associated morphology and case marking reflexes in various languages (see for example Tenny 1987, van Hout 1996, Borer 1998, Kiparsky 1998, Ritter and Rosen 1998). The decomposition proposed here takes those generalisations seriously, and explicitly encodes subevents to represent each isolable component, each correlated with a functional projection in the 'first phase syntax'. The projection VP, corresponding to the process component is the only one that we consider to be obligatory for all (non-stative) verbs since it represents the concept of change which is a crucial component of any non-stative, and a presupposed condition for the concepts both of initiation and 'telos'.

As pointed out at the beginning of this section, there have been many (subtly) different attempts in the literature to motivate a syntactic basis for event composition. We do not intend for our proposals in this paper to depend on this specific implementation of the idea. In particular, while many researchers have posited the existence of a causing projection (Hale and Keyser 1993, Ritter and Rosen 1998), and many others the existence of a phrase corresponding to 'telos' (Ritter and Rosen 1998, Borer 1998, among others), our view is unusual in proposing all three within a (maximal) event decomposition. Especially unusual perhaps is the requirement that all dynamic predicates contain a VP (process projection), since one standard understanding of Achievements, for example, is that they embody a pure transition with no process portion at all. For all we know this may be right. However, in the decomposition proposed here, the VP is correlate of dynamicity or change, not of 'activity' or extended 'process' *per se*. Thus, even a minimal transition such as that standardly assumed to be part of an achievement will

[2] See *opera citata* for a justification of the three projections.

have a VP in our implementation. The important point for our purposes is that the R in the syntactic tree above heads a small clause which simply describes a (non-dynamic) *state*. The R head itself performs the function of semantically integrating that state as the *result* of the previous transition.

The two event composition rules that we need are phrased as in (7) and (8) below.

(7) Event Composition Rule I
$e = e_1 \rightarrow e_2$: e consists of two sub-events, e_1, e_2 such that e_1 leads to or causes e_2.
(See Pustejovsky 1991 and Hale and Keyser 1993)

(8) Event Composition Rule II
$e = < e_1, e_2 >$: e consists of two sub-events, e_1, e_2, such that e_1 and e_2 form a telic event structure where e_1 is the process/transition portion and e_2 is a state interpreted as the result state of the transition.
(See Parsons 1990, Higginbotham 2000).[3]

The component we will be focusing on in the rest of the paper is the 'telos', or RP. Resultatives and goal of motion constructions are alike in that they add a 'telos' to an otherwise unbounded verbal predicate. We do not think it is an accident that 'template augmentation' of this type (cf. Rappaport Hovav and Levin 1998) is incredibly common crosslinguistically. The interesting fact about these augmentations is that the complex predications so formed have an effect on the argument structure, case marking and auxiliary selection properties of the verb. We see this as a result of the fact that RP is one of the three projections in the event structure decomposition of first phase syntax and that it can be built and licensed both lexically and (as we will see) constructionally.

Given the semantics of these various heads, if the heads are not built up in the correct order, the derivation will at best converge as gibberish. Even within this broad constraint, it is clear that there are a number of different structures that can be built using this basic inventory of functional heads. In particular, not all the functional heads will appear with every lexical item.

To relate lexical items to the types of event structures they can appear with, we need to implement some version of c-selection. In the framework of Ramchand (2003), a particular view of the relation between lexical information and lexical insertion and syntactic category features is proposed. A similar framework, also constructionalist in spirit is implemented in Folli (2002). The details of the systems involved are not crucial to our purpose here. In particular, it is not clear whether

[3] In Ramchand (2003) an explicit semantics of the phrase structural heads is given, that builds up the complex event in a systematic way. We abstract away from the lambda technology here, and merely note that the abstract event semantics is read off pure structure under this view, and only gets a fleshed out interpretation by virtue of a semantic unification of the event structure with the lexical encyclopaedic information associated with lexical items.

purely selectional features are needed to implement traditional c-selection within the Minimalist Program (Chomsky 1995, 1998, 1999), or whether we can make do with the independently required category features coming in interpretable and uninterpretable pairs (as in e.g. Svenonius 1994). We take for granted that there is some degree of syntactic information encoded in lexical roots, and that this determines the correct contexts for 'insertion'/'merge'. Explaining the details of how to implement this is beyond the scope of this paper (see Ramchand 2003), but notice that while we are in fundamental agreement with constructionalist positions regarding the derivation of alternations and the relevance of event structure for the interpretations of arguments, we disagree with those radical constructional positions (Marantz 1997 and Borer 2002) that deprive lexical items of any kind of selectional information. The system developed in Ramchand (2003) and adopted in this paper derives selectional information from the categorial information attached to lexical items.

2.1. Lexical Specification of Event Structures

In this system, it is the syntactic event-structure decomposition that is matched to the various lexical items. The nominal positions associated with the first phase syntax projections are always notionally present, and have the event-participant interpretations labelled below:

(9) (i) Specifier of Causal Projection (vP): *Initiator*.
(ii) Specifier of Change/Process Projection (VP): *Undergoer*.
(iii) Specifier of Result Projection (RP): *Resultee*.

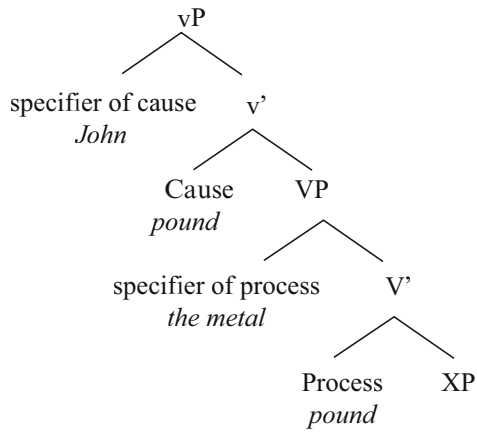
The traditional notion of 'argument structure' is then largely replaced by some kind of event categorial specification (cf. Van Hout 1996), but in most cases has the same effect. The main difference between this system and an argument structure specification lies in the abstractness of the role types proposed and also the fact that a single DP can appear in more than one specifier position. In particular, there is no contradiction in a single DP being associated by movement with both the *Undergoer* and *Initiator* positions, or both the *Resultee* and *Undergoer* positions, or even all three, if the lexical encyclopedic information does not thereby lead to incompatibilities (none accrue from the semantics of the event participanthood per se, as conceived of here). This is basically an abandonment of the Theta Criterion (cf. Hornstein 2000), but we find this unproblematic within the context of the MP. We assume however, that some locality condition will rule out the *Initiator* and the *Resultee* being identical.

We represent the specification of lexical items as bundles of syntactic features representing the category nodes in the first phase syntax decomposition proposed: v, V and R. A lexical item possessing a certain category feature will be able to license that structure in the syntax; also, a lexical item can be complex in having more than

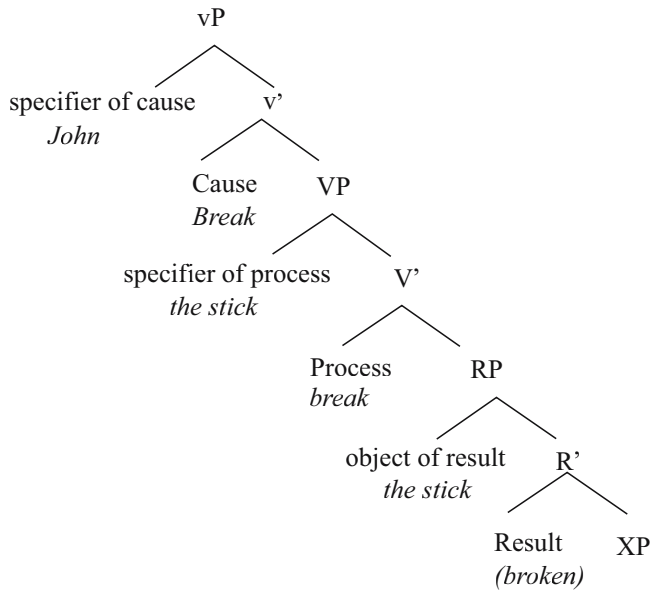
one such feature. Head movement is often plausibly the natural result of a lexical item bearing more than one category feature. If structure fails to be licensed by the presence of some lexical item with the requisite category feature, then the derivation is ill formed. We assume that this derives from conceptual necessity, since the eventive content of each phrase in the first phase syntax needs to be semantically identified or specified in order to be interpretable at the interface.

To give a few examples for the cases of two simple lexical items which differ in their telicity, a verb can be specified as [+v, +V] (10); or as [+v, +V, +R] (11).

(10) John pounded the metal.



(11) John broke the stick.



The system here prevents the building of events with more than one causational element (12), or events with more than one result (13), or events where a resultative involves the identity of the *Resultee* and *Initiator* (14). It also prevents the building of resultatives based on stative (non dynamic i.e. non VP licensing) verbs (15).

(12) (a) *John sneezed Mary (cf. 'made Mary sneeze').
(b) *John ate Mary the dinner (cf. 'made Mary eat the dinner').

(13) (a) *John wiped the table clean shiny.
(b) *John ran to the store to exhaustion.

(14) (a) *John wiped the table sweaty (where John becomes sweaty as a result of wiping).
(b) *John pushed the glass to the edge of the table (not necessary that *John* gets to the edge of the table, but *the glass* must.)

(15) *John relaxes Mary contented.

Given this basic decomposition of the event structure of different predicates, we now turn in more detail to cases of telic augmentation, to evaluate the conditions under which such augmentations are possible in the two languages.

3. ADDING A RESULT: CONSTRUCTIONAL STRATEGIES IN ENGLISH

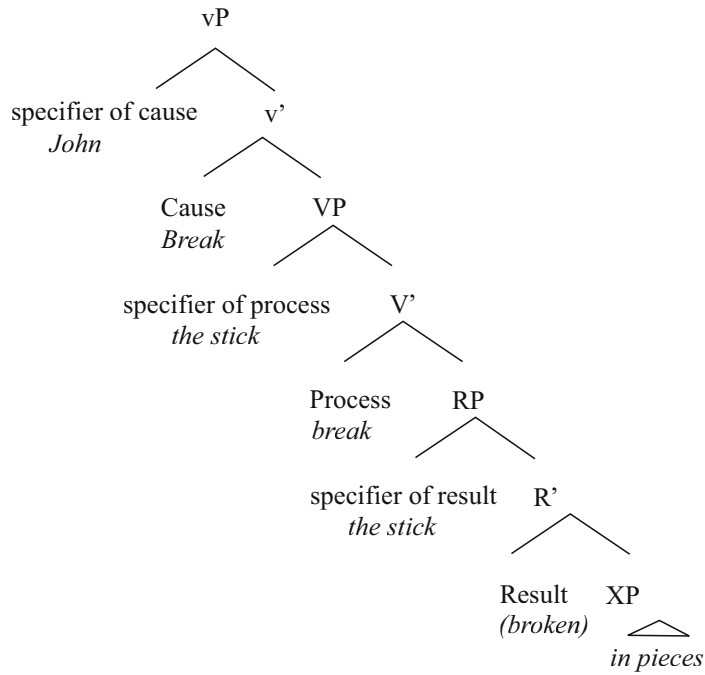
We do not assume that all telic verbal projections contain an RP in our sense. The literature on aspectual composition is full of examples of aspectual specification (both 'telos' adding and removing) by means of adjuncts. We subscribe to the general distinction proposed in the literature between inner aspect and outer aspect (cf. Verkuyl 1989). However, we believe that there are certain cases of telic augmentation which are special because they affect the argument taking properties of the predicate, can unpredictably affect lexical meaning, and (in the case of Italian) affect such things as auxiliary selection. There are many cases in English where telic augmentation goes along with argument structure changes, and in particular 'unselected objects'. It is these constructions that are most interesting to us, because they imply the existence of an RP in the eventuality description.

With respect to the specification of a 'telos' by a pure stative preposition, we assume that such a state description would have to be in the small clause complement of the RP in order to be interpreted as result. This could only happen if the RP were licensed by the verb. Thus, we find that with an atelic verb like *pound,* the stative PP *in pieces* cannot describe a result, because there is no result specified by the verb to describe (16).

(16) *John pounded the metal in pieces.

On the other hand, the R-specified verb, *break*, should be able to license a pure locative in this position, since it selects for an RP. This prediction is borne out in (17) and the structure we assume for this case is given below.

(17) John broke the stick in pieces.



This, however, does not seem to be a case of genuine RP augmentation (since the RP is already given by the verb's lexical information) but of PP *specification* of a result. The case of adjectival resultatives and particles is more interesting because they more clearly introduce unselected objects.

We turn to adjectival resultatives in 3.2, but first let us examine the behaviour of PPs with motion verbs in English in what has been called the 'goal of motion' construction.

3.1. Goal of Motion Constructions

Let us consider once again some cases of 'goal of motion' construction cited in the literature for English:

(18) a. John ran to the store.

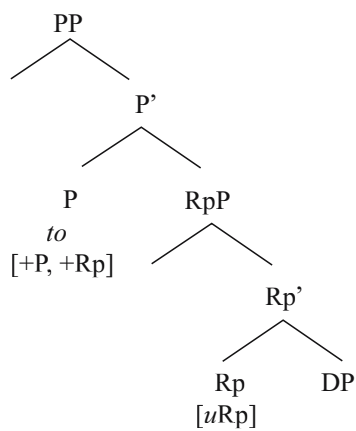
b. The ball rolled into the water.
c. The boat floated under the bridge.

As we hinted in the introduction, the conditions of possibility for this construction seem to rest on the preposition chosen. It is clear for the (a) and (b) examples that the prepositions are obligatorily dynamic in force, and in particular, can never appear as PP complements to simple stative predications (19). We return to (19)c below.

(19) a. *John was to the store.
b. *The ball was into the water.
c. The boat was under the bridge.

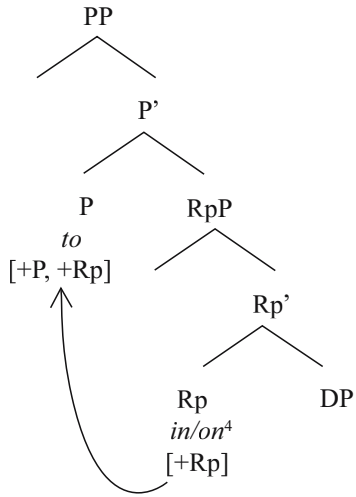
The properties of these prepositions in English has led Higginbotham (1995, 2000) to propose that the preposition itself can be subeventally complex, containing both a direction (the process) and a final location (the result). Similar articulations of the PP into 'path' and 'place' have been proposed by Koopman (2000), Tungseth (in press) and Svenonius (2003).
These prepositions have effectively the status of accomplishment predicates (see also Pustejovsky 1991) as they encode both the path and the end point of motion. Accordingly, they are formed by our *Event Composition Rule II* and have the following event structure: $<e_1, e_2>$. Their complex semantic structure translates into a complex functional structure and accordingly we argue that these prepositions, termed with Higginbotham (*op.cit.*) *accomplishment prepositions*, enter syntactic derivations with two event projections. In our system, we label the 'path' projection simply as P, and the final location, or 'place' projection as Rp, on analogy with the verbal RP (although we assume they are actually categorially different). Accordingly, the feature specification of accomplishment prepositions is [+P, +Rp], and they give rise to a complex structure as shown in (20) below.

(20)



Furthermore, *to* is the only one that is morphologically simple, the other two prepositions in English which are unambiguously complex actually show their complexity morphologically as well. We assume that they are formed by incorporation of *in* and *on* respectively into the preposition *to*, as is shown in (21):

(21)



This complex telic structure is what is responsible for the goal of motion interpretation, and attaching a preposition of this complex type in adjunct position, could identify with the macro event of the verb to create a telic structure at the level of outer aspect. Notice that the complex prepositions here have no co-occurrence restrictions on them--- they can be added to any verb of motion in English.

What then of the form in (18c), where the preposition is less obviously dynamic, and where the stative predication in (19c) is perfectly grammatical? Surely something different must be going on here. One obvious thought might be that many prepositions in English are systematically ambiguous, and that *under* in particular has both complex dynamic and stative interpretations. This hypothesis seems pretty unfalsifiable given the data at hand, but we do have one important set of data left to consider. There is a small class of prepositions in English which appear happily in stative contexts, but which resist appearing in the 'goal of motion' construction. It was the stative preposition *on* that we used above to highlight the difference

4 Another possibility would be to say that incorporated preposition here is the head of the predicational phrase generated in the complement position of Rp. Under this view, the head would incorporate into the Rp first, and then move on further to incorporate into P. However, it seems that if that was the case, we should expect more prepositions to be formed this way. In other words, it should be possible to have the same kind of process giving rise to accomplishment prepositions such as *overto, alongto, behindto*, ect. Since this is not the case, we argue that into and onto are formed with in and on being the only lexical items in English that are directly mergable in Rp. We assume that the other strategy simply does not exist in English.

between atelic *pound* and telic *break.* Using one of these 'locative' PPs as a complement to a motion verb does **not** produce a result interpretation.

(22) a. ?John ran in the store.
b. *John ran on the beach.
c. *the boat floated underneath/beneath the bridge.

We take this to mean that motion verbs in English simply do not license RP as part of their lexical specification, and that the possibility of the 'goal of motion' reading is due to the complex prepositional forms that independently encode both path and 'telos'. We thus analyse prepositions like *under* as being ambiguous:

(23) [+P, (+Rp)]: under, over, below, behind, etc…

The only difference here is that [+Rp] feature is optional and when the preposition does not carry it, it gives rise to a locative version of the preposition, which in turn gives rise to a locative interpretation.

We emphasise that these 'goal of motion' readings are not necessarily a product of RP augmentation, or even specification, at all – they can get these effects at the level of outer aspect[5] and we predict they would be able to apply to all motion verbs (as indeed they do)[6].

As for prepositions like *in, underneath, beneath*, we argue they are only locative and therefore specified in the lexicon as simply [+P].

3.2. Adjectival Resultatives

Turning now to adjectival resultatives, we find a different kind of situation altogether. Both the atelic *pound* and the telic *break* can appear with adjectival resultative phrases.

(24) a. John pounded the metal flat.
b. John broke the safe open.

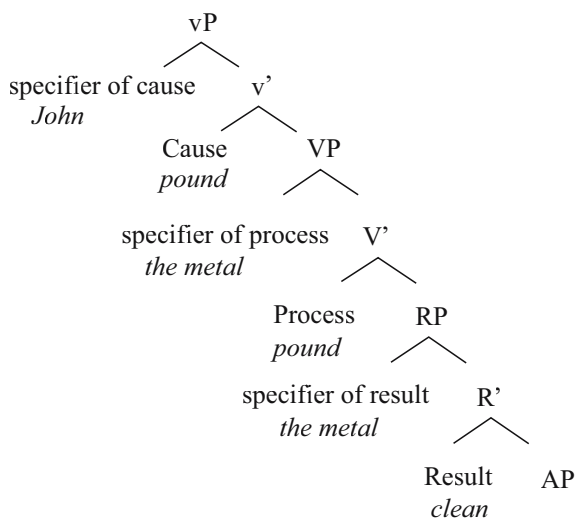
---

[5] We leave open the possibility that some RP licensing verbs could also take these complex, or ambiguous prepositions as complements to the independently licensed RP.

[6] There are some instances of dynamic prepositions in English introducing 'unselected' objects, as in:
(i) John ran Mary to the store.
In these cases, we would have to say that the PPs are not added at the level of outer aspect, but are part of the RP structure of the first phase syntax. The limits of this construction are presently not clear to us, but we believe that these cases give evidence of dynamic Rp-containing prepositions being able to license the verbal R via their own features. As predicted, these constructions are never possible with purely locative prepositions, and to many speakers they are even marginal with ambiguous prepositions such as under:
(ii) ??John ran Mary under the mango tree.

In each case, the argument structure properties are obligatorily affected – resultative constructions require an object (Tenny 1987). Sometimes this is an unselected one, and sometimes it merely alters the nature of the object taken by the verb, but these effects are well known in the literature (Simpson 1983, Stowell 1983, Hoekstra 1984, Carrier and Randall 1992, Rappaport Hovav and Levin 1999, Wechsler 2001, among others). We take this to be evidence that in the case of (24a) we are seeing a true case of 'result augmentation'. The presence of the AP correlates with a structure in which an RP is present, and where the verb on its own would not license it. We represent this case as in (25) below.

(25)



The question is what licenses the R head here, since the *pound* verb previously could not license it[7]. We also need to take account of the fact that adjectival resultatives are extremely pervasive and productive in English. Another point about APs is that, as has been independently argued in the literature (Hale and Keyser 1998, Baker in press), they are incapable of licensing a specifier. When APs appear in predicative position, they are predicated of something through the mediating offices of an independent functional head (Baker (*ibid*) calls this simply Pred). In the resultatives shown in (24) above, the metal is the DP that the property *flat* is predicated of. We argue that here too, the predicational relationship of the metal to the AP needs to be mediated by a functional head. Since, in addition, the state so described is conceptualised as the endpoint of the activity, we assume that this head is some species of R. Since this R cannot have been introduced by the verb *pound* itself, we

[7] There is no problem with break in the resultative construction, since the R head is independently licensed by the verb.

make the minimal assumption that English is special because it possesses a special lexical item R-poss, which is null, but which systematically relates a property to the holder of that property[8].

This, we believe, is not unmotivated in the structure of English more generally. Specifically, many researchers have argued that there is a null P head with generalized possessional semantics, sometimes called P-have (see Freeze 1992, Kayne 1993, Guéron 1995, Pesetsky 1995, Harley to appear). This null head is responsible in those analyses for the existence of the double object construction where it mediates the relation between the DP benefactor and the DP entity it possesses in the double object version of these verbs. We represent this intuitively and schematically in (26) below.

(26) John gave [Mary *P-have* book].

Our proposal is in line with these others in the literature, with the difference that we assume that the head in question is actually R-poss and that it also encodes the semantics of 'result'. The existence of adjectival resultatives and double object construction are therefore due to the same lexical item present in English, but not in other European languages such as Italian (as we will see in the succeeding sections).

To summarise the proposal made in this section, we analyse adjectival resultatives as true cases of result augmentation. It is possible with verbs that do not themselves license an RP, because of the existence of a null lexical item R-poss which (i) licenses the R head in the first phase syntax and (ii) establishes a possessional relationship between a DP in the argument structure and the AP state that is in the complement position of R.

4. ADDING A RESULT: CONSTRUCTIONAL STRATEGIES IN ITALIAN

In this section of the paper, we turn our attention to Italian, which is interestingly different from English in the scope of its goal of motion constructions, the nature of its prepositions, and in the inability to license adjectival resultatives.

4.1. Goal of motion constructions

As we have seen, there are two possible interpretations for a motion verb which appears with a prepositional phrase. The first one is a locative interpretation, while the second one is what we have termed as a goal of motion interpretation. The fundamental difference between these two interpretations lies in the aspectual nature

[8] This null R is not available for the locative prepositions with motion verbs in English because it relates a DP and a property, not a DP and a location. However, we speculate that the null R would be available to mediate the relationship between unselected objects in the Verb-particle construction, where the relationship is not strictly locational but more abstract and property-like (see Ramchand and Svenonius 2002 for an account along these lines).

of the event described by the verbal predicate, because while the first one is an atelic event of floating on a given body of water, the second one is a telic event of floating in a specific direction and with a specific end point. The verb expresses both 'manner' and 'motion', while the preposition gives the path and the 'telos' of motion, in the telic interpretation.

In Italian, some verbs express 'manner' but only 'undirected motion', because when they combine with the prepositional phrase the atelic/locative interpretation is the only interpretation available. For these verbs, to get a goal of motion interpretation, it is necessary to express the manner on an adjunct and employ a verb of directed motion, as we saw in (3), which we repeat below in (27) for sake of clarity:

(27) La barca passò sotto il ponte galleggiando.
'The boat passed under the bridge floating.'

From these first examples, it would seem that the two languages divide neatly the way suggested by Talmy (1985) according to which English lexicalises the path and the goal of motion on the prepositional phrase, while Italian expresses the goal of motion on the verb.

However, there are cases where the ambiguity identified for the English example becomes available in Italian as well. Consider the examples below:

(28) a. La palla è rotolata sotto il tavolo in un secondo/*per un secondo.
The ball IS rollPAST under the table in one second/*for one second.
'The ball rolled under the table in one second/*for one second.'
b. Gianni è corso in spiaggia in un secondo/*per un secondo.
John IS runPAST in beach in one second/*for one second.
'John ran to the beach in a second/*for one second.'
c. La palla è rimbalzata dietro il tavolo in un secondo/*per un secondo.
The ball IS bouncePAST behind the table in a second/*for one second.
'The ball bounced behind the table in a second/*for one second.'

The sentences are now unambiguously telic as shown by their occurring only with *in X* adverbials, while of course also a locative version is available if the auxiliary selected is *AVERE* (HAVE) rather than *ESSERE* (BE):

(29) a. La palla ha rotolato sotto il tavolo per un secondo/*in un secondo.
The ball HAS rollPAST under the table for one second/*in one second.
'The ball rolled under the table for one second/ *in one second.'

b. Gianni ha corso in spiaggia per un secondo/*in un secondo.
John HAS runPAST in beach for one second/*in one second.
'John ran in the beach for one second/ *in one second.'
c. La palla ha rimbalzato dietro il tavolo per un secondo/*in un secondo.
The ball IS bouncePAST behind the table for a second/*in one second.
'The ball bounced behind the table for one second/* in one second.'

To establish what is going on here, we need to understand the properties of the prepositions we are dealing with. All simple prepositions in Italian can give rise to locative interpretations, as shown by their uniform ability to occur as the complement of a stative verb as in (30) below.

(30) a. Gianni è a casa di Maria.
John is to house of Mary.
'John is at Mary's house.'
b. La palla è nel cestino.
'The ball is in the basket.'
c. La palla è sopra il tavolo.
'the ball is onto the table.'

There seem to be no simple prepositions in Italian that have the obligatory non-stative interpretations that we found for *to* and its cohorts. However, these prepositions that occur in the locative constructions above are the same ones which occur in goal of motion constructions, when these can be formed:

(31) a. Gianni è corso in spiaggia.
John IS runPAST in beach.
'John ran to the beach.'
b. La palla è rimbalzata sopra il tavolo.
The ball IS bouncPAST onto the table.
'The ball bounced onto the table.'
c. Il bambino di Gianni è gattonato a casa.
The child of John IS crawlPAST to home.
'John's child crawled home.'

Of course, it could simply be that the simple prepositions shown in Italian here are of the *under* type, and are ambiguous between dynamic and stative interpretations. But there are reasons to be suspicious of this analysis. While the English dynamic prepositions create 'goal of motion' interpretations regardless of the motion verb

they attach to, the interpretation in Italian is strongly constrained by the choice of verb. The examples below show that these verbs (like *run* in English) never license a goal of motion interpretation with these simple (locative) prepositions.

(32) a. *Gianni è camminato in spiaggia.
John IS walkPAST in beach.
'John walked to the beach.'
b. *La barca è galleggiata sotto il ponte.
The boat IS floatPAST under the bridge.
'The boat floated under the bridge.'

Moreover, we have good evidence to suggest that when the 'goal of motion' interpretation is possible in cases like (32) above, we really are seeing the existence of an RP since this interpretation coincides with a change in auxiliary selection.

However, since not all verbs are able to participate in this construction, something independent, namely the verb's specification in this case, must license the existence of RP. Thus, not all verbs in Italian are able to combine with a point locating prepositions and allow *Event Composition Rule* II, i.e. a process that we term **accomplishment creation**. We argue that verbs of motion in Italian divide into two classes, one licensing the projection of RP and one not[9]:

Table 1

[+V, (+R)] verbs	[+v, +V] verbs
Correre (run)	Galleggiare (float)
Rotolare (roll)	Camminare (walk)
Rimbalzare (bounce)	Galoppare (gallop)
Scivolare (glide, slide)	Danzare (dance)
Gattonare (crawl)	Nuotare (swim)
Saltare (jump)	Sciare (ski)
Volare (fly)	Passeggiare (walk around)
Saltellare (hop)	Vagabondare (wander)

When the verb's categorial features allows the projection of an RP, the point locating preposition can fill the complement position of the R head and specify the content of the result event predicated of its specifier.

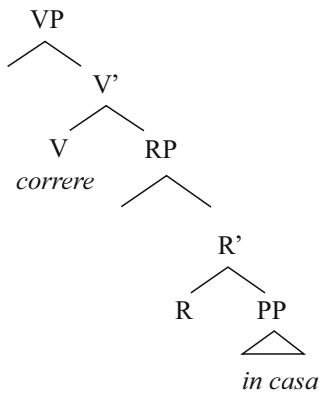
The PP indicating the end point of motion is not an adjunct of the verb, as is proved by the well-known impossibility for the PP to be dropped when the interpretation is telic:

[9] See Folli (2002) for details.

(33) *Gianni è corso.
John IS runPAST.
"John ran".

This provides evidence that the PP in this case is generated as the complement of R in the first phase syntax[10], and that it semantically specifies the Result state licensed by the verb.

(34) Gianni è corso in casa
'John ran home.'



Note that this derivation contrasts crucially with the English cases above. In English, all the verbs were [–R] as was shown by the impossibility to get a 'goal of motion' interpretation if we combine the verb with a locative point-locating preposition (see examples (22) above). On the other hand, they could all combine with dynamic prepositions to create telic interpretations. In Italian, the prepositions themselves do not furnish a complex directional/telic structure (as witnessed by their inability to attach to all motion verbs) but a certain class of verbs is optionally specified as [+R].

It appears also that it is possible to license the RP by the addition of some higher predicate with the right specification, and then the 'goal of motion' interpretation with locative prepositions becomes available again. Such a case can be found with causative *fare*:

(35) Gianni ha fatto galleggiare la barca sotto il ponte. (ambiguous).
John has made float the boat under the bridge.
'John made the boat float under the bridge.'

[10] See Hoekstra and Mulder (1990) for a similar proposal.

A detailed examination of the syntactic contexts in which this is possible is beyond the scope of this paper (but see Folli 2002 for further discussion). We merely note here that it is not the preposition itself that contains the complex subevental structure, but a certain class of verbs that optionally license R.

We have seen that all simple prepositions in Italian are locative and that the language does not contain lexical accomplishment prepositions like the English *to*, *around*, *into*, etc. for which a locative interpretation is impossible. Nevertheless Italian (and French) contains prepositions that are morphologically complex in that they are formed by two (or more) prepositions, one of which has the semantic function of measuring out the distance involved in the event of motion and the other of giving the final location of the event. These prepositions do allow the formation of a goal of motion interpretation, but, differently from the simple prepositions analysed in the previous section, they do so irrespective of the ability of the verb selected to license the projection of an RP:

(36) a. La barca ha galleggiato attraverso la grotta in un secondo.
The boat HAS floatPAST through the cave in one second.
'The boat floated through the cave in one second.'
b. Gianni ha camminato fino a casa in un secondo.
John HAS walkPAST until at home in one second.
'John walked up until (he was) home in one second.

Remember that in the previous section we saw that these two verbs *galleggiare* (float) and *camminare* (walk) do not allow the goal of motion interpretation with simple locatives.

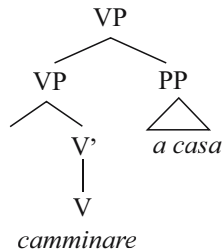
Other prepositions of this kind are *dietro a* (behind+to)*, al di lá* (to the other side), and the French *jusque à* (up to) and *de…en* (from…to). The hypothesis is that, in these cases, it is not necessary to have an RP licensing verb because these accomplishment prepositions[11] are adjoined and have their own complex structure. As we would predict from the analysis of these PPs as adjuncts and *not* complement to R, the complex prepositions can attach to any of the motion verbs (much like in the English case), and they do not force auxiliary selection to change[12]:

(37) a. *La barca è galleggiata attraverso la grotta in un secondo.
The boat IS floatPAST through the cave in one second.
'The boat floated through the cave in one second.'
b. *Gianni è camminato fino a casa in un secondo.
John IS walkPAST up until at home in one second.
'John walked up until (he was) home in one second.'

[11] For a discussion of accomplishment prepositions see Van Hout (1996) and Higginbotham (2000).
[12] See Folli (2002) for details on this point.

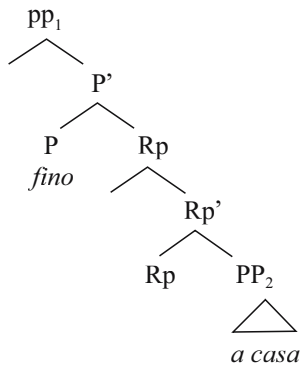
In these cases, the prepositions do not furnish the complement of R, but they both measure out the location of the change event and provide the result event independently. For this reason they can combine with any verb and are assigned the complex event structure introducing the R_pP[13]:

(38) Gianni ha camminato fino a casa.
'John walked up until (he was) home.'



In these cases, the complex prepositions transparently reflect their complex structure in their morphology, corresponding to the two heads of the semantic/syntactic decomposition proposed.

(39)



4.2. Adjectival Resultatives

We have seen that in Italian, goal of motion interpretations are allowed if the verb licenses the projection of an RP, and a 'telos' locating preposition is available in the

[13] This is in line with current proposals in the literature concerning complex internal structure of PPs, cf. Koopman (2000) who divides the PP into a Path Phrase and a Place Phrase, analogous to our PP and R_pP here.

numeration to identify the semantic content of the result sub-event. What about adjectival resultatives?

Greatly simplifying the various kinds of classifications of resultatives that have been presented in the literature, we can say that there are two kinds of resultative constructions, one formed with a PP and one with an AP. Italian is able to form PP resultatives, as shown in (40) below:

(40) a. Gianni ha picchiato a morte il cane.
'John beat the dog to death.'
b. Gianni ha tirato a lucido il pavimento.
John brought to shiny the floor.'
'John highly polished the floor.
c. Gianni ha ridotto Maria in lacrime/ al silenzio.
'John reduced Mary to tears/ to silence.'
d. Gianni ha rotto il vaso in mille pezzi
'John broke the vase in a thousand pieces.'
e. Gianni ha sciolto il cioccolato a cubetti
'John melted the chocolate in cubes.'

However, in Italian adjectives cannot semantically identify a result state, even when the RP should be independently licensed by the verb itself, as in (41) below.

(41) a. *Gianni ha rotto il vaso aperto.
'John broke the vase open.'
b. *Gianni ha sciolto il cioccolato liquido/
'John melted the chocolate liquid.'

Clearly the problem here has not got to do with the licensing of the R head, since the existence of PP resultatives is possible with these very same verbs. However, we think that the answer lies in the specific R head that would be required. Recall that we are assuming that adjectives do not independently license a specifier position for the 'holder' the property. This means that not only must an R head be present, but there must be a *specific* R head that licenses the predicational relationship between the DP that will be in the specifier and the property denoted by the AP. In the case of PP resultatives, we assume that the PP projects a full small clause structure and the 'figure' position of the PP (Spec, PP) moves to Spec RP and the relationship is established by movement.[14] In the case of adjectives, no such strategy is available. English possesses a null R-poss head that has precisely these predicational

[14] More accurately, the semantics of 'figure' gets unified with the event semantics of 'resultee', and this connects the predicational properties of the PP with the event participanthood relation. Unlike APs, we are assuming that the PP does introduce a specifier position for its 'figure', but that it never shows up in ordinary PP adjuncts because of a lack of Case licensing for that position.

properties, in addition to the result semantics. The hypothesis would be that Italian simply does not possess this lexical item.

Notice however that Italian allows the formation of deadjectival verbs, confirming that while in principle adjectival predicates could semantically identify a result head that has been syntactically licensed, what the language lacks is the specific type of R-poss typical of double object constructions and resultatives.

Interestingly, AP resultatives become possible if the adjectival predicate which has to identify the result event is complex:

(42) a. Gianni ha martellato il metallo *piatto/ piatto piatto.
'John hammered the metal *flat/ flat flat.'
b. Gianni ha cucito la camicia *stretta/troppo stretta.
'John sewed the dress *tight/too tight[15].'
c. Gianni ha sciolto il cioccolato *liquido/troppo liquido.
'John melted the chocolate too liquid.'

At present we have no firm answer for this puzzle, but if our story is on the right track, we would expect that these morphologically complex adjectival phrases are actually syntactically complex as well, and contain different functional/categorial information from simplex adjectives. On analogy with the complex prepositions, we speculate that the doubling of an adjective such as '*piatto piatto'* (flat flat) corresponds to functional structure consisting of a head corresponding to a 'flattening' process as well as a head corresponding to a 'flat' state, to give an 'accomplishment' or dynamic adjective. In this case a telic interpretation could be achieved at the level of outer aspect.

5. CROSSLINGUISTIC VARIATION: CONCLUSIONS AND SPECULATIONS

We have seen that what has been called the 'goal of motion' interpretation in the literature is actually a cover term for two distinct processes: one at the level of inner aspect involving the specification of an RP in our first phase syntax; and the other at the level of outer aspect, involving the adjunction of a PP that independently has an accomplishment interpretation. In this respect, English and Italian do indeed seem to pattern slightly differently in terms of whether they prefer to locate their result category specifications on their verbs or on their prepositions.

In the case of English, we found that motion verbs in particular had no ability to independently license an R projection in the first phase syntax. On the other hand, some morphologically simple prepositions in English have the property of being *accomplishment prepositions* and create goal of motion constructions even with

[15] We also speculate that that this is also responsible for the fact that in Italian denominal and deadjectival verbs always contain overt morphology.

these telicly impoverished verbs. Having a large complement of telicly impoverished verbs might be related to the availability of a systematic compositional strategy in the case of adjectival resultatives. We have argued that English must possess a null R-poss head that has the semantics necessary to make the predicational link between an AP and a DP holder of that property. We speculate that this is the very same head that is responsible for the predicational semantics of the small clause present in the double object construction (under the hypothesis that it can combine with NPs as well).

In Italian, on the other hand, we found that while the simple prepositions were telicly impaired in only having locative interpretations, there were quite a few verbs that optionally carried an R feature themselves for licensing a PP result. This gave us the impression of a lack of 'goal of motion' reading for a certain class of verbs, but showed true RP specification in the case of others (as witnessed by auxiliary selection shift). Italian, however, showed a systematic inability to form simple adjectival resultatives, indicating the lack of an independent R-poss head of the English type.

Throughout this whole investigation we have seen a tantalising (though not perfect) correlation between overt bimorphemism and the existence of complex event interpretations. In the case of Italian, it was only the morphologically complex prepositions that had this accomplishment structure. Doubling the adjective also seemed to produce aspectually complex possibilities where none previously existed. In English too, it is striking that many of the truly obligatorily telic verbs are from the latinate stock and have clear bimorphemic structure. (For example, it was noted as early as Fraser 1976 that complex Latin roots fail to participate in the telic verb-particle construction. See also Levin 1993 for data). It has also been argued more recently by Keyser and Roeper (1992) and Svenonius (2003) that bimorphemic roots can be decomposed into their separate event contributions. We do nothing but note this tendency here, since we are not in a position to make any strong claims about the relationship between morphology and syntax as a typological property. Nevertheless, the existence of morphemic separability seems to us to be good suggestive evidence for the kinds of complex decompositions we have been proposing in this paper.

More generally, we think that the existence of such processes as telic augmentation provide support for decomposing the meanings traditionally associated with single lexical items into systematically related subevents. We have proposed one particular implementation of that idea in our elaboration of first phase syntax. We hope to have shown that the variation exhibited by English and Italian in this domain can be captured in this system with a minimal set of category features and featural differences among lexical items, with no global parameters invoked.

6. ACKNOWLEDGEMENTS

For discussions on many of these issues we would like to thank Peter Svenonius, James Higginbotham, Heidi Harley and the participants of the Conference

'Perspectives on Aspect' held at the Utrecht Institute of Linguistics, December 11-14 2001. Folli's research was carried out under a British Academy Postdoctoral Fellowship.

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VEERLE VAN GEENHOVEN

ATELICITY, PLURACTIONALITY, AND ADVERBIAL QUANTIFICATION

Abstract. By interpreting atelicity as unbounded pluractionality, we can treat uniformly the atelic nature of (silent) frequentative, continuative and gradual aspect, of activities and states, of imperfective aspect, and of frequency adverbs. This provides a novel way of distinguishing the latter from cardinal adverbs and from adverbs of quantification.

Keywords. Adverb of quantification, atelic, cumulative, frequency adverb, imperfective, lexical aspect, pluractional, singulactional.

1. INTRODUCTION

A common way of distinguishing verbal predicates aspectually is by capturing them in terms of whether they are telic or atelic, that is, whether they describe a temporally bounded or a temporally unbounded situation. According to Comrie (1976, p. 45), "a telic situation is one that involves a process that leads up to a well-defined terminal point, beyond which the process cannot continue". Whereas the predicate *make a chair* has a built-in terminal point, i.e., the point at which the chair is ready, *sing* does not. *Make a chair* is therefore a telic predicate, *sing* an atelic one. Moreover, atelicity in the domain of verbal predicates is often regarded as the direct semantic correspondent of cumulativity in the nominal domain (see Bach 1986 for an overview). Actually, some authors interpret the cumulativity of a nominal complement as the true source of atelicity. On their view, for example, the cumulative NP *chairs* makes the predicate *make chairs* atelic (Verkuyl 1972, Krifka 1989).

The goal of this chapter is to capture atelicity in a positive and independent way, namely, in a sense that is unrelated to telicity and that does not result from nominal cumulativity. Atelicity does not only arise as an element of the lexical content of verbs like *sing*, or as the (apparent) result of the influence of a nominal complement, as in *make chairs*. In my view, atelicity also arises with predicates that express a nonstop continuity (e.g., *keep dancing*), a nonending repetition (e.g., *dance regularly*), or an increase (e.g., *get sicker and sicker*), irrespective of whether they contain an atelic verb (e.g., *dance*) or a telic one (e.g., *get sick*). I propose that atelicity is a matter of unbounded pluractionality, which is plurality in the domain of verbs and their event time (see Cusic 1981, Lasersohn 1995). Empirical evidence for my proposal is drawn from West Greenlandic Eskimo (WG), a polysynthetic language that has overt continuative, frequentative, and gradual aspect markers on

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 107 - 124.

the verb. Specifically, I interpret these markers as ways of creating unbounded pluralities of subevent times. Moreover, I show how the inherent atelicity of the lexical aspects or *Aktionsarten* 'activity' and 'state' as well as the atelic nature of the grammatical aspect 'imperfective' can be regarded as instances of unbounded pluractionality. Finally, I show how my pluractional analysis of frequentative aspect can be extended to the interpretation of frequency adverbs (e.g., *again and again*, *occassionally*, *frequently*). This allows us to distinguish frequency adverbs from 'genuine' expressions of adverbial quantification (e.g., *always*, *usually*). Whereas frequency adverbs are event time operators that make an aspectual contribution, adverbs of quantification are reference time (or topic time) operators (see Van Geenhoven 1999) and as such the latter do not make any aspectual contribution. My notion of adverbial quantification is not identical to Bach et al.'s (1995, p. 8) notion of A-quantification, where the 'A' stands for "the cluster of Adverbs, Auxiliaries, Affixes, and Argument-structure Adjusters, all of which can be thought of as alternative ways of introducing quantification". Bach et al. suspect that the class of A-quantification structures is not homogeneous and I confirm this suspicion in this chapter.

The chapter is organized as follows. In the next section, I present WG and English examples that contain aspectual markers expressing continuity, frequentativity, and graduality. In section 3, I give a semantic account of these data which is based on the notion of unbounded pluractionality. In section 4, I discuss how frequency adverbs can be understood as pluractional operators. I contrast them with other temporal adverbs, namely, with cardinal adverbs and adverbs of quantification. Section 5 concludes the chapter.

2. CONTINUATIVE, FREQUENTATIVE, AND GRADUAL ASPECT MARKING

WG is particularly interesting for illustrating continuative, frequentative, and gradual aspect because it makes use of verbal affixes to express them. In parallel, I will show that English also has a number of markers that express these aspects (see Bennett and Partee 1978, Cusic 1981).

2.1. Continuative aspect

Consider first the WG examples (1) and (2), in which the same activity verb *irinarsur-* ('sing') is used:[1]

[1] The abbreviations I use are ABS for 'absolutive', ERG for 'ergative', IND for 'indicative', INS for 'instrumental', PL for 'plural', SG for 'singular', and [±tr] for ' (in)transitive'.

(1) Unnuaq tamaat **erinarsor**poq.
unnuaq tama-at **irinarsur**-puq
night.ABS all-3SG **sing**-IND.[-tr].3SG
'He sang all night long (with or without breaks).'

(2) Unnuaq tamaat erinarsor**tuar**poq.
unnuaq tama-at irinarsur-**tuar**-puq
night.ABS all-3SG sing-**continuously**-IND.[-tr].3SG
'He sang continuously all night long (without a break, nonstop).'

The meaning difference between (1) and (2) lies in the explicit use of the continuity marker *-tuar-* in (2). This marker indicates that the singing described in (2) is a nonstop eventuality. In (1), however, the singing could have been interrupted and the sentence would still be true. In English, we also find explicit markers of continuity, for example, the periphrastic form *keep V-ing* in (3), the use of *V-and-V* coordination in (4), and the use of temporal adverbials like *continuously* or *nonstop* in (5):

(3) He *kept* danc*ing*.
(4) He danced *and* danced.
(5) He danced *continuously*/*nonstop*.

2.2. Frequentative aspect

The WG examples (6) and (7) illustrate the affixal aspect marker *-tar-* (or *-sar-* after a vowel), which expresses frequentative (iterative) aspect:[2]

(6) Nuka ullaap tungaa tamaat sanioqqut**tar**poq.
Nuka ullaa-p tunga-a tama-at saniuqqut-**tar-**puq
N.ABS morning-ERG direction-3SG.SG.ABS all-3SG go.by-**repeatedly**-IND.[-tr].3SG
'Nuka went by repeatedly the whole morning.'

[2] *-tar-* can also give rise to habitual readings. In addition to receiving a purely frequentative interpretation (see (ia)), (i) can express that Aggu has the habit of smoking (see (ib)):
(i) Aggu pujortar**tar**poq.
Aggu pujurtar-**tar**-puq
A.ABS smoke-**repeatedly**-IND.[-tr].3SG
a. 'Aggu smoked repeatedly (e.g., this morning).'
b.'Aggu smokes/has the habit of smoking.'
Unlike what is often assumed (see Dahl 1985), *-tar-* is not a genericity marker. For example, WG generic sentences like *Horses have long tails* do not contain *-tar-* on the verb (see also Fortescue 1984 on genericity in WG). In Van Geenhoven (2003), I argue that habitual aspect is a special case of frequentative aspect.

(7) Anna ullaap tungaa tamaat ani**sar**poq.
Anna ullaa-p tunga-a tama-at ani-**tar**-puq
A.ABS morning-ERG direction-3SG.SG.ABS all-3SG leave-**repeatedly**-IND.[-tr].3SG
'Anna left (and returned) repeatedly the whole morning.'

If you leave out the marker *-tar-*, the resulting sentence becomes semantically anomalous. Sentence (8) can only get the odd interpretation that Nuka is making one very slow move that lasts the whole morning:

(8) ? Nuka ullaap tungaa tamaat **sanioq**quppoq.
Nuka ullaa-p tunga-a tama-at **saniuqqut**-puq
N.ABS morning-ERG direction-3SG.SG.ABS all-3SG **go.by**-IND.[-tr].3SG
'Nuka went the whole morning to pass once, very slowly.'

Unlike what this example illustrates for WG, frequency marking on English accomplishment verbs in durative contexts is optional. For instance, even though we can easily understand (9) as a repetition of passings by John, this need not be overtly marked. Yet, English expresses frequentativity overtly, for example, by means of temporal adverbs, as shown in (10):

(9) John *went by* for an hour.
(10) John went by *once in a while*/*occasionally*/*again and again*.

The adverbs in (10) express both low and high frequencies. This also holds for WG frequentative markers. Whereas *-tar-* in (6) and (7) is vague about the number of repeated events, the morpheme *-qattaar-* on the accomplishment *-saniuqqut-* ('go by') in (11) and on the achievement *-qaar-* ('explode') in (12) expresses that the number of repeated events is large. That is, we get a large number of passings in (11) and of explosions in (12):

(11) Nuka ullaap tungaa tamaat sanioqqute**qattaar**poq.
Nuka ullaa-p tunga-a tama-at saniuqqut(i)-**qattaar**-puq
N.ABS morning-ERG direction-3SG.SG.ABS all-3SG go.by-**again&again**-IND.[-tr].3SG
'Nuka went by again and again the whole morning.'
(12) Qaartartut sivisuumik qaa**qattaar**put.
qaartartu-t sivisuu-mik qaar-**qattaar**-put
bomb-ABS.PL lengthy-INS explode-**again&again**-IND.[-tr].3PL
'Bombs exploded again and again for a long time.'

In contrast to (12), which has the plural subject *qaartartut* ('bombs'), sentence (13) is semantically anomalous. It is anomalous because it can only be understood as if the same bomb exploded again and again:

(13) ? Qaartartoq sivisuumik qaa**qattaar**poq.
qaartartoq sivisuu-mik qaar-**qattaar**-puq
bomb.ABS lengthy-INS explode-**again&again**-IND.[-tr].3SG
'A/the same bomb exploded again and again for a long time.'

Interestingly, we find a similar contrast between the English examples (14) and (15). In line with Van Geenhoven (2004), I would like to claim that this contrast is the same as the one between (12) and (13), even though in the English examples there is no overt marker of frequentativity:[3]

(14) *Bombs* exploded for a long time.
(15) ? *A bomb* exploded for a long time.

Note that WG aspect markers can combine with each other. Fortescue (1984, p. 286) points out that frequentative *-tar-* and continuative *-tuar-* can combine as *-sartuar-* or as *-juartar-*. However, an analysis of these double aspect markers will not be undertaken in this chapter.

2.3. Gradual aspect

The last temporal aspect that I discuss is gradual or incremental aspect, which expresses increase or decrease. The following examples show that in WG gradual aspect is also realized as a morpheme on the verb:

(16) Alli**galuttuinnar**poq. (Fortescue 1984, p. 282)
alli-**galuttuinnar**-puq
get.big-**more&more**-IND.[-tr].3SG
'He is getting bigger and bigger.'

(17) Upern**ariartuaar**poq. (Fortescue 1984, p. 282)
upirna-**riartuaar**-puq
be.spring-**gradually**-IND.[-tr].3SG
'It is gradually getting to be spring.'

In English, we have other means of expressing temporal increase, for instance, by means of coordinated comparison, as *ADJ-er and ADJ-er* in (18), and by means of adverbials as in (19) and (20):

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[3] This lack of overt frequentativity marking is probably one of the reasons why in the literature on *for*-adverbials contrasts like (14)-(15) have never been systematically treated as a direct consequence of the interaction of frequentative aspect with bare plurals vs. indefinites (but see Dowty 1979 for suggestions). The literature focuses on the absence of an atelic — which is synonymous with nonfrequentative — interpretation of odd examples like (15) and does not address the frequentative nature of examples like (14).

(18) John got bigg*er and* bigg*er*.
(19) Mary ate the cake *bit by bit.*
(20) The kitchen was *gradually* becoming (more and more of) a mess.

3. ASPECTS AS PLURACTIONAL OPERATORS

In this section, I present a semantic analysis of the above aspect markers in which they are interpreted as pluractional operators, or what Lasersohn (1995) calls 'pluractional markers'. This means that I regard the above WG and English aspect markers as markers of plurality in the domain of verbs and event times (see Cusic 1981). Whereas in English a morpheme (e.g., *-s* in *dogs*) identifies the presence of a plurality of individuals, some languages have morphemes that indicate that we are dealing with a plurality of events or event times. In semantics, it has become standard practice to interpret plural *-s* in terms of Link's (1983) distributive star operator *****, which turns a predicate **P** that holds of individuals into a corresponding predicate ***P** that holds of sums of individuals. What is most crucial about this operator is that it meets the principle of cumulative reference: If a predicate ***P** holds of two plural individuals *x* and *y*, then ***P** holds of their sum $x \oplus y$ as well. I propose that we can think of pluractional morphemes on the verb as star operators, each expressing a way of distributing subevent times over the overall event time of an utterance and each meeting the principle of cumulative reference. Unbounded pluractionality is thus the true source of atelicity. This provides a new perspective on the well-known correspondence between the cumulative nature of particular nominal expressions (e.g., mass nouns), on the one hand, and the cumulative nature of atelic verbal expressions, on the other (see Bach 1986, Krifka 1989, 1992).

3.1. Frequentative aspect

In Van Geenhoven (2004), I show how the WG frequentative aspect marker *-tar-* ('repeatedly') (see (6) and (7)) can be interpreted as a pluractional marker. *-tar-* contributes three meaning components, namely, a distributive one, a repetitive one, and a component of unboundedness or cumulativity. In (6'), the meaning description of (6), I have underlined the distributive and the repetitive component:

(6') 'There was a time t that lasts the whole morning and <u>for every time t' that is part of t</u> and at which Nuka went by <u>there was a time t"</u> that is also part of t and at which he went by and t" > t' and <u>there is a time t"' between t' and t" at which he did not go by</u>.'

The repetitive component is captured in the sense that between each two passings of Nuka there is a hiatus at which he does not go by. Following Stump's (1981) views on frequency operators, I suggest in Van Geenhoven (2004) that the marker *-tar-* contributes a distributive operator that I call 'crystal' star ❋. The translation of *-tar-*

in (21) entails that by applying *-tar-* to a verb there will be a hiatus between each subevent expressed by the *tar*-ed verb. (22) then shows the translation of the verb *saniuqqut-tar-* in (6):

(21) -tar- $\Rightarrow \lambda V \lambda t \lambda x (\divideontimes^{t} V(x) \text{ at } t)$ where $\divideontimes^{t} V(x)$ at t = 1 iff
$\exists t'(t' \subseteq t \wedge V(x) \text{ at } t' \wedge \textit{number}(t') > 1 \wedge \forall t'(t' \subseteq t \wedge V(x) \text{ at } t' \rightarrow \exists t''(t'' \subseteq t \wedge (t'' > t' \vee t'' < t') \wedge V(x) \text{ at } t'' \wedge \exists t'''(t' < t''' < t'' \vee t'' < t''' < t' \wedge \neg V(x) \text{ at } t''))))$

(22) saniuqqut-tar- $\Rightarrow \lambda t\, \lambda x\, (\divideontimes^{t}$ **go by**(x) at $t)$

My translation of the *tar*-ed verb in (22) is very similar to what Lasersohn (1995) calls the 'separate in time' reading of a pluractional verb. Yet, his analysis does not allow for the possibility that different frequentative markers bring in different frequency operators. The meaning variety among frequentative markers requires that for each such marker we must have a corresponding distributive operator. For example, *-qattaar-*, which expresses high frequency in WG (see (12)), corresponds to what I call the 'flower' star operator $\circledast$. Basically, flower star is different from crystal star in that it specifies that the number of repeated subevent times is high:

(23) -qattaar- $\Rightarrow \lambda V \lambda t \lambda x (\circledast^{t} V(x) \text{ at } t)$ where $\circledast^{t} V(x)$ at t = 1 iff
$\exists t'(t' \subseteq t \wedge V(x) \text{ at } t' \wedge \textit{number}(t') > 1 \wedge \textit{number}(t') \text{ is high} \wedge \forall t'(t' \subseteq t \wedge V(x) \text{ at } t' \rightarrow \exists t''(t'' \subseteq t \wedge (t'' > t' \vee t'' < t') \wedge V(x) \text{ at } t'' \wedge \exists t'''(t' < t''' < t'' \vee t'' < t''' < t' \wedge \neg V(x) \text{ at } t'''))))$

With (21) and (23), we have a characterization of frequentative aspect in terms of distribution and repetition. Its third meaning component is one of unboundedness or atelicity. I capture this by describing (6) as a nonending coordination of repeated subevent times, namely, as *and ... and ... and ...*:

(6") 'There is a time t at which Nuka went by *and* there is a time t' at which he went by and t' > t and there is a time t" between t and t' at which he did not go by, *and* he went by at a time t"' and t"' > t' and there is a time"" between t"' and t' at which he did not go by, *and …*'

The unboundedness described in (6") results from the fact that the star operator triggered by *-tar-* meets the principle of cumulative reference:

(24) $\forall x \forall V \forall t \forall t' (\divideontimes^{t} V(x) \text{ at } t \wedge \divideontimes^{t'} V(x) \text{ at } t' \rightarrow \divideontimes^{t \oplus t'} V(x) \text{ at } t \oplus t')$

Now that I have defined frequentative aspect marking in terms of unbounded pluractionality, I briefly argue that it has several advantages. First, to account for the frequentative reading of the English example (9) I propose in Van Geenhoven (2004) that in the semantic representation of this sentence a silent frequency marker *FREQ* is sitting directly on the verb *went by*. *FREQ* is translated as the pluractional

operator ❋, as shown in (25), and this makes *FREQ* responsible for the atelicity required by the *for*-adverbial in (9):[4]

(25) $[_V$ went by FREQ] $\Rightarrow \lambda t \lambda x(\text{❋}^t$ **go.by**(x) at t)

Second, by adopting silent frequentative pluractional markers we get a device with which subevent times and subevent participants can be distributed simultaneously over the time span of a repeated event. Consider again (14) and (15), each of which I interpret as a plurality of explosions:

(14) *Bombs* exploded for a long time.
(15) ? *A bomb* exploded for a long time.

(14) describes a situation in which a bomb exploded and another one exploded and another one exploded and so on, while (15) describes a situation in which the same bomb exploded and exploded and so on. To interpret (14), I adjoin a silent frequency adverb *FREQP* to *explode* which I then translate as a semantically incorporating verb that takes *bombs* as its property-type argument (see Van Geenhoven 1998). In this translation, crystal star operates on the event time variable *t* and on the subject variable *x*:

(26) $[_V$ explode FREQP] $\Rightarrow \lambda P \lambda t \exists x(\text{❋}^{t,x}$ **explode**(x) at t $\wedge$ P(x)) / x is distributable
where ❋^{t,x} **explode**(x) at t = 1 iff
$\exists t' \exists x'(t' \subseteq t \wedge x' \subseteq_I x \wedge$ **explode**(x') at t' $\wedge$ *number*(t') > 1 $\wedge$ *number*(x') > 1 $\wedge \forall t' \forall x'(t' \subseteq t \wedge x' \subseteq_I x \wedge$ **explode**(x') at t' $\rightarrow \exists t'' \exists x''(t'' \subseteq t \wedge x'' \subseteq_I x$ $\wedge$ (t'' > t' $\vee$ t'' < t') $\wedge$ **explode**(x'') at t'' $\wedge \exists t'''(t' < t''' < t'' \vee t'' < t''' < t' \wedge$ $\neg \exists x'''(x''' \subseteq_I x \wedge$ **explode**(x''') at t''')))))

Crystal star distributes atomic parts of the object that stands for *x* over *t*. An important requirement of course is that this object be distributable over time. Being distributable entails having cumulative reference and being able to stand for an atomic individual. In English, only bare plurals have this capacity, which explains why (14) receives a frequentative interpretation in which different bombs are exploding. Singular indefinites are not distributable over time, not even on their property interpretation, because they are never cumulative.

We said that (15) sounds as if the same bomb exploded again and again. For this weaker reading of *explode*, we need the translation in (27), where ❋ does not operate on the subject argument:

[4] For the atelicity requirement of *for*-adverbials see Krifka (1989), Van Geenhoven (2004).

(27) $[_V$ explode FREQ] $\Rightarrow \lambda P \lambda t \exists x(*^t$ **explode**(x) at t $\wedge$ P(x))
where $*^t$ **explode**(x) at t = 1 iff
$\exists t'(t' \subseteq t \wedge$ **explode**(x) at t' $\wedge$ *number*(t') > 1 $\wedge \forall t'(t' \subseteq t \wedge$ **explode**(x) at t' $\rightarrow \exists t''(t'' \subseteq t \wedge (t'' > t' \vee t'' < t') \wedge$ **explode**(x) at t'' $\wedge \exists t'''(t' < t''' < t'' \vee t'' < t''' < t' \wedge \neg$ **explode**(x) at t''))))

(15) sounds odd because an object can explode only once. The meaning of *explode* is thus incompatible with the way crystal star operates on it in (27). Interestingly, in the translations of *explode* in (26) and (27) the existential quantifier binding the subject argument is not in the scope of the crystal star operator. Hence, the bare plural/indefinite contrast between (14) and (15) is not treated as a narrow/wide scope contrast but as a contrast of distributability versus nondistributability. Moreover, the cumulative, atelic nature of (14) is not a direct consequence of the cumulative nature of the subject *bombs* but rather of the presence of the pluractional operator. This provides a novel view on the contrast with bare plurals vs. indefinites that we find in *for*-adverbial sentences. Frequentativity, which was always treated as a side issue in the discussions of these contrasts (see Verkuyl 1972, Dowty 1979, Krifka 1989, Zucchi and White 2001), now becomes a central issue. Note that Lasersohn's (1995) semantics of pluractional verbs cannot capture the idea of simultaneously distributing subevent times and subevent participants. This is because in his view subevent times and subevent participants come out as values of one and the same parameter.

Finally, a pluractional frequentativity marker makes an event 'grow into the future', that is, it triggers a forward perspective (captured in (6") as *and ... and ... and ...*). Frequentative aspect also has a singular counterpart, for which I introduce the term 'singulactional' marker. An example is the WG morpheme *-qqip-*, which means *again*:

(28) Ape**qqip**poq. (Fortescue 1984, p. 284)
api-**qqip**-puq
snow-**again**-IND.[-tr].3SG
'It snowed again.'

(28') 'It snowed at t and there was a time t' < t at which it snowed and there is a hiatus between t and t' at which it did not snow.'

As indicated in (28'), *-qipp-* also contributes a hiatus component but, unlike *-tar-*, *-qipp-* takes a backward perspective because it relates an event time to a similar one in the past rather than to a similar one in the future. In other words, *-qipp-* is presupposing while *-tar-* is asserting.

3.2. Continuative aspect

The second aspect that I define in terms of pluractionality is continuative aspect as expressed in WG by *-tuar-* (see (2)). I call the pluractional operator corresponding to

this aspect marker 'white' star ✪. ✪ can apply directly to a verb and the combination *V-tuar-* is then translated as follows:

(29) V-tuar- ⇒ λtλx(✪^{t} **V**(x) at t) where ✪^{t} **V**(x) at t = 1 iff
∃t'(t' ⊆ t ∧ V(x) at t' ∧ *number*(t') > 1 ∧ ∀t'(t' ⊆ t ∧ V(x) at t' → ∃t"(t" ⊆ t ∧ (t" > t' ∨ t" < t') ∧ V(x) at t" ∧ ¬∃t"'(t' < t"'< t" ∨ t" < t"'< t' ∧ ¬V(x) at t"'))))

Note that my translation of *V-tuar-* is reminiscent of Lasersohn's (1995) 'continuous in time' reading of a pluractional verb. What is essential in (29) is that it says explicitly that no hiatus is present between the actions described by the verb to which *-tuar-* applies. In addition, ✪ meets the principle of cumulative reference:

(30) ∀x∀V∀t∀t'(✪^{t} V(x) at t ∧ ✪$^{t'}$ V(x) at t' → ✪$^{t⊕t'}$ V(x) at t⊕t')

Continuative aspect is also expressed overtly in English and I propose that in (3), (4) and (5) above we are dealing with the pluractional operator ✪. Moreover, as with frequentative aspect, we have singulactional continuity, which in English is expressed by the adverb *still*. Like singulactional *again*, *still* is presuppositional, as shown in (31'), the meaning description of (31):

(31) John was *still* dancing.
(31') 'John danced at t' and there is a time t" < t' at which John danced and there is no hiatus between t' and t" during which John did not dance.'

3.3. Gradual aspect

The last aspect that I want to treat here in terms of pluractionality is gradual (or incremental) aspect. (16) and (17) above illustrated that in WG gradual aspect is also marked by a verbal affix. What is essential is that gradual aspect is a continuative aspect that contains a size or degree element. This becomes clear in (16'), an approximation of what (16) means:

(16') 'He had a size d at a time t *and* he had a size d' at a time t' and d' > d and t' > t *and* he had a size d" at a time t" and d" > d' and t" > t' *and* ...'

Gradual aspect thus creates an unbounded plurality of subevent times, captured as *and ... and ... and ....* For reasons of space, I cannot give a detailed semantics of the operators that correspond to gradual markers. What is important is that they meet the principle of cumulative reference and that their formalization captures how big the degree of change is or whether the change must be consistent or not.

Carlson's (1977) examples (32) and (33) show that with gradual aspect we also have cases where bare plurals are fine but indefinites are not:

(32) Wolves get bigger as you go north of here.
(33) ? A wolf gets bigger as you go north of here.

In line with my explanation of the interaction of nominal complements and frequentative aspect, I would explain the contrast between (32) and (33) in terms of the fact that the semantic object described by *wolves* can be distributed over time and space (*as you go north of here*), while the one described by *a wolf* cannot. This does not mean that in general singular indefinites are illicit in gradual contexts, as shown in (34):

(34) A wolf gets bigger as it eats more.

Interestingly, gradual aspect also has a singulactional representative. This is illustrated in (35) and its meaning description is (35'):

(35) The balloon *got* bigg*er*.
(35') 'The balloon has a size d' at a time t' and there was a time t'' < t' at which the balloon had a size d'' and d'' < d'.'

Again, as opposed to pluractional gradual aspect, which is asserting, singulactional gradual aspect is presupposing.

3.4. Atelicity in lexical and grammatical aspect

The basic idea that I explored was that if we define atelicity in terms of pluractionality any pluractional operator that meets the principle of cumulative reference will yield an atelic predicate. So far, we examined how atelicity is associated with frequentative, continuative, and gradual aspect. Standardly, atelicity is associated with the unboundedness expressed in the lexical content of activity and state verbs. Extending my basic idea to lexical aspect, it seems possible to define lexicalized atelicity in terms of pluractionality as well. This step only requires that we regard activity and state verbs as inherently pluractional expressions. For example, the activity verb *irinarsur-* ('sing') in (1) translates as a pluractional verb as follows:

(36) irinarsur- $\Rightarrow \lambda t \lambda x(\bigstar^{t}$ **sing**(x) at t) where $\bigstar^{t}$ **sing**(x) at t = 1 iff
$\exists t'(t' \subseteq t \wedge$ **sing**(x) at t' $\wedge$ *number*(t') > 1 $\wedge \forall t'(t' \subseteq t \wedge$ **sing**(x) at t' $\rightarrow$
$\exists t''(t'' \subseteq t \wedge (t'' > t' \vee t'' < t') \wedge$ **sing**(x) at t'')))

The source of the atelic nature of a verb like *sing* lies in the presence of what I call the 'black' star operator ★. Like ✪, ★ expresses continuity, the difference being that black star is silent about the absence of hiatuses while white star is not. What ★

basically captures is the idea that an activity verb like *sing* has the subinterval property (see Dowty 1979). Similarly, state verbs can be defined as inherently cumulative pluractional expressions.

I suggest to extend my basic idea to grammatical aspect as well, in particular, to the imperfective. Building on Reichenbach (1947), Klein (1994) defines the grammatical aspects (imperfective, perfective, perfect, prospective) as temporal relations between an utterance's event time (*et*), which is the time of the event or situation talked about, and the reference time (*rt*) of an utterance, which is the time talked about. Specifically, imperfective aspect expresses the situation where *et* properly includes *rt* ($et \supset rt$), and perfective aspect the one where *et* is included in *rt* ($et \subseteq rt$).[5] Klein thus provides an explicit characterization of what it means to say that a situation described by imperfective aspect is seen from the inside and a situation described by perfective aspect as completed (see Comrie 1976). Yet, Klein focuses only on the relational meaning of imperfective aspect. I believe that the English imperfective also has a pluractional meaning component. For example, if the achievement predicate *kick the door* comes in the imperfective, it automatically gets a frequentative interpretation, as shown in (37). In the perfective, it gets a frequentative interpretation if an adverbial triggers it, as shown in (38) versus (39):

(37) John was kicking the door.
'John kicked the door again and again.'

(38) John kicked the door.
≠ 'John kicked the door again and again.'

(39) John kicked the door for an hour/until Mary opened it.
'John kicked the door again and again.'

Moreover, if an accomplishment predicate comes in the imperfective, it gets a particular continuative interpretation. For example, *John was eating a fish* is understood as 'John ate of a fish and ate of a fish and ...'. Here, the pluractional operator corresponding to imperfective aspect creates a plurality of eatings which each involve a part of an object. Imperfective aspect thus triggers a partitive interpretation of the accomplishment's complement.[6] Although a full investigation of the English imperfective cannot be integrated into this chapter, note finally that a pluractional analysis of the imperfective, on the one hand, and of habitual aspect (fn. 2 and Van Geenhoven 2003), on the other, could lead to an explanation of why some languages use an imperfective form to express habituality (see Comrie 1976).

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5 Perfect aspect is used in situations where *et* precedes *rt* ($et < rt$), and prospective aspect where *et* follows *rt* ($et > rt$). The advantage of this relational approach is that grammatical aspect gets closer in meaning to tense, which is standardly regarded as a temporal relation. Klein himself defines the three tenses as temporal relations between *rt* and *st*, the speech time, that is, present tense as $rt \supseteq st$, past tense as $rt < st$, and future tense as $rt > st$.

6 See Krifka (1992) for a related proposal.

4. ATELICITY AND TEMPORAL ADVERBIALS

We saw in section 1 that one of the means of expressing frequentative, continuative, and gradual aspect in English is adverbial modification. Focusing on frequency adverbs, I compare their pluractional interpretation with silent *FREQ* and *FREQP*, cardinal adverbs, and adverbs of quantification.

4.1. Overt vs. silent frequency

I proposed that in English the silent V-level frequency markers *FREQ* and *FREQP* can operate on the event time of an utterance (see (25), (26), (27)). In line with this, I propose that frequency adverbs are pluractional operators that operate on the event time and that meet the principle of cumulative reference.[7] Frequency adverbs are thus frequentative aspect markers. A crucial distinction between overt frequency adverbs and their implicit V-level counterparts is that the former have more scope options. This is because they do not apply to the verb directly. Consider (40) and (41):

(40) Jim hit a golf ball into the lake for an hour. (Zucchi p.c.)
   i. 'There is a golf ball and Jim hit it into the lake repeatedly for an hour.'
   ii. # 'For an hour, Jim hit each time another golf ball into the lake.'

(41) Jim hit a golf ball into the lake *every five minutes* for an hour.
   i. 'There is a golf ball and for an hour Jim hit it into the lake every five minutes.'
   ii. 'For an hour, Jim hit every five minutes another ball into the lake.'

In (40), a silent marker *FREQ* triggers the frequentative reading of this sentence. Since *FREQ* translates as an operator that applies to the verb, and since the semantic object described by the indefinite *a golf ball* cannot be distributed over time, the only reading we get for (40) is the one in which the same golf ball is hit again and again, namely (40i). In (41), the adverb *every five minutes* is responsible for the frequentative reading of this sentence. Depending on whether the pluractional operator contributed by this adverb applies to the verb *hit* or to the VP *hit a golf ball*, we get the wide reading of *a golf ball* in (41i) or the narrow one in (41ii).

Why do silent markers necessarily operate on the verb and not on some higher level in a verbal projection? I take it to be a universal interpretive principle that silent operators that are not linguistically realized, operate only on the level of a lexical category.[8] If one allowed these silent operators to occur freely, we would

[7] See Zimmermann (2000), who analyzes infrequency adjectives as pluractional markers.

[8] Another example of a silent operator that applies at the level of a lexical category is Carlson's (1977) existential quantifier that binds the internal argument of a stage-level verb and therefore receives narrow scope automatically.

theoretically be confronted with lots of scope ambiguities in natural language that we could hardly master in practice.

4.2. Frequency vs. cardinal temporal adverbs

How do pluractional adverbs relate to cardinal temporal adverbs? That is, how do we semantically distinguish the frequency adverbs in (42) from the cardinal adverbs in (43)?

(42) Bill sang the anthem once in a while/frequently/every now and then.
(43) Bill sang the anthem twice/several times/many times.

That there is a need for distinguishing them from one another is, among other things, related to the fact that only the former but not the latter can occur in the scope of a *for*-adverbial. This is shown in (44) and (45):

(44) Joe discovered a flea on his dog *every now and then* for a month.
(45) Joe discovered a flea on his dog **twice*/**several times* for a month.

De Swart (1991) distinguishes cardinal adverbs, which she calls 'iterative adverbs' (e.g., *twice*, *several times*), from frequency adverbs, which she calls 'cardinal adverbs in a cyclic perspective' (e.g., *regularly*, *every now and then*). The former express a bounded, the latter an unbounded plurality of events. I think this is an adequate first way towards capturing the distinction between the cardinal adverbs in (43) and the frequency adverbs in (42). Basically, I regard the distinction between predicates modified by a frequency adverb and those modified by a cardinal adverb as the one we find in English between bare plurals and other weak NPs, which I regard as a distinction between unbounded and bounded property-denoting expressions in the nominal domain. However, De Swart (1991, p. 296) argues that the boundedness distinction "cannot be captured within standard GQ theory, the reason being the static evaluation procedure in GQ theory". I do not think that for this distinction we need to resort to dynamic semantics. What distinguishes true frequency adverbs from those temporal adverbs that express a (vague) cardinality is their cumulativity effect, which enables them to occur in the scope of a *for*-adverbial (see (44) vs. (45); Zucchi and White 2001). In line with my treatment of frequentative markers in WG, I propose that frequency adverbs in English contribute pluractional star operators, that is, cumulative operators like crystal star ❋, flower star ✿, and others to be defined. That frequency adverbs can have something cardinal about them is captured in terms of whether the number of distributed subevent times involved is small or large. Hence, they express only an indirect

notion of cardinality. They are not cardinal in the sense that they only contribute a (vague) number of subevent times.[9]

4.3. Pluractional adverbs vs. adverbs of quantification

Having said this much about the distinction between frequency and cardinal adverbs, how does the pluractional interpretation of frequency adverbs fit in the picture of adverbial quantification? That is, how do they relate to other adverbs that are — in my view inappropriately — often called 'frequency adverbs', as for example *always* in (46) and *usually* in (47)?

(46) Mary *always* wrote a letter.
(47) John *usually* finishes a painting.

(48) shows that like cardinal adverbs (see (45)), adverbs of quantification cannot be in the scope of a *for*-adverbial. This indicates that they cannot make a predicate atelic or cumulative:

(48) Mary *always/*usually discovered a flea on her dog for a month.

According to de Swart (1991), the adverbs of quantification *always* and *usually* trigger a tripartite structure. Frequency adverbs, in her view, are the adverbial counterparts of non-quantificational expressions that express vague cardinality in the nominal domain. De Swart's distinction between frequency adverbs and adverbs of quantification corresponds to the distinction between weak and strong NPs. I have two comments on this. First, as I said before, within the class of weak expressions we can distinguish bounded from unbounded expressions. In my view, frequency adverbs are the adverbial counterparts of non-quantificational (or weak) expressions in the nominal domain that express unboundedness or cumulativity rather than vague cardinality. Second, a weak/strong correspondence in itself does not explain why frequency and quantificational adverbs can cooccur, as in (49) and (50):

(49) Mary *always* wrote a letter *regularly*.
(50) John *usually* finishes a painting *every other month*.

What I think does explain this cooccurrence is that frequency adverbs operate on a domain that differs from the domain of adverbs of quantification. The distinction between weak and strong nominal expressions is often thought of as a distinction

[9] Bennett and Partee (1978, p. 24-25) also recognize the distributive and cumulative nature of frequency adverbs. *John frequently smokes* is interpreted as 'John smokes many times each α', where α is an unspecified unit of time. Their use of *each* captures the fact that frequency adverbs are distributors. They recognize the cumulative nature of predicates modified by frequency adverbs in that they call them 'subinterval predicates'.

between asserting (nonpresupposing) and presupposing expressions (see Zucchi 1995). I suggest that we can think of the meaning distinction between frequency and quantificational adverbs in this way. For example, whereas the frequency adverbs *regularly* in (49) and *every other month* in (50) operate on the asserted event time, the 'genuine' adverbs of quantification *always* in (49) and *usually* in (50) operate on the presupposed reference time (or topic time; see Van Geenhoven 1999). Hence, frequency and quantificational adverbs can cooccur in one sentence.

Following de Swart, I take it that genuine quantificational adverbs trigger a tripartite structure in which they take the reference time as their domain. Frequency adverbs do not trigger tripartite structures; they take the event time as their domain. The interaction of quantificational and pluractional adverbs is illustrated in (51'), the tripartite structure of (51):

(51) When she was abroad, Mary *always* wrote a letter *regularly*.

(51') $\forall rt$ [[when M. was abroad(rt)] $\exists et[\text{❋}^{et}$ (M. write a letter) at $et \wedge et \subseteq rt \wedge rt < st]]$

In (51'), the topicalized *when*-clause specifies the reference time *rt* of (51), which is bound by the universal quantifier contributed by *always*. This adverb of quantification thus makes no aspectual contribution. The adverb *regularly* translates as ❋ and operates on the event time *et* described by *write a letter*. *Regularly* is responsible for the frequentative aspect expressed by (51). A frequency adverb does not bind the event time in any strict logical sense. Rather, it binds subevent times by distributing them over the overall event time in an unbounded way. Note that *wrote* contributes perfective aspect, captured as $et \subseteq rt$. Grammatical aspect thus relates the temporal parameter in the restrictor of *always*, *rt*, to *et*, the parameter in its scope (see Van Geenhoven 1999). Note also that *wrote* contributes past tense (i.e., $rt < st$, where *st*, the speech time, is interpreted as a deictic element).

5. CONCLUSION

I have provided an interval-based treatment of atelicity as unbounded pluractionality. I first interpreted frequentative, continuative, and gradual aspect as cumulative operators that distribute subevent times over the event time of an utterance, thereby yielding an atelic predicate. I then extended my pluractional treatment of atelicity to lexical aspect (i.e., activities and states), to grammatical aspect (i.e., imperfective), and to frequency adverbs.

Based on the above comparison of the pluractional interpretation of frequency adverbs with the interpretation of cardinal adverbs and that of adverbs of quantification, we can confirm Bach et al.'s (1995) suspicion that the class of A-quantifiers is not homogeneous. First, while frequency adverbs are unbounded, cardinal adverbials are bounded in meaning. Hence, only frequency adverbs create atelic predicates. Second, while frequency adverbs operate on the asserted event

time of an utterance, adverbs of quantification operate on the presupposed reference time. The domain of frequency adverbs is thus different from the domain of adverbs of quantification.

6. ACKNOWLEDGEMENTS

For their helpful comments, I wish to thank Ariel Cohen, Bart Geurts, Louise McNally, Pieter Muysken, Sandro Zucchi, and an anonymous reviewer. My research was supported by a fellowship from the Royal Netherlands Academy of Arts and Sciences.

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HANA FILIP

ON ACCUMULATING AND HAVING IT ALL

Perfectivity, Prefixes and Bare Arguments

Abstract. The main hypothesis to be investigated is that the distinction between grammatical aspect and the semantic classification of verbal predicates into eventuality types (events, processes and states) is encoded by distinct parts of verbal morphology in Slavic languages. The key empirical evidence is drawn from the influence of verbal morphology on the interpretation of certain bare plural and mass arguments.

Keywords. Grammatical aspect, eventuality types, bare nominal arguments, event semantics.

1. INTRODUCTION

Eventuality types (in the sense of Bach 1981, 1986), or Aktionsarten, cover the telic-atelic distinction and its subcategories (events, processes and states). They are lexicalized by verbs, encoded by derivational morphology, or by a variety of elements at the syntactic level. The categories of 'perfective' and 'imperfective' aspect are here understood in the standard sense, namely with reference to the main formal categories of the grammatical aspect, which may be expressed by inflectional verbal morphology (as in Romance languages). In Slavic languages, the majority of verb forms, finite and non-finite (i.e., imperative, infinitive and certain participial forms), are either perfective or imperfective. Perfective and imperfective verb forms are related by a variety of derivational processes, many of which are formally and semantically idiosyncratic. The perfective and imperfective status of a verb cannot often be determined by its form, but is manifested in its syntactic behavior. Given that a single verb form can encode both the grammatical aspect and the eventuality type, the question arises whether these two categories can be distinguished from each other, and if so, how exactly the distinction should be drawn. Some dispute that the distinction is necessary, and propose to characterize Slavic perfectives as expressing telic predicates, and imperfectives atelic predicates. This is the view I will reject in this paper and argue that the grammatical aspect and eventuality types are formally and semantically distinct categories.

In order to establish this point I will show that the semantics of a verbal prefix is clearly set apart from the aspectual semantics of a whole prefixed verb, because the two have distinct semantic effects on the interpretation of bare mass and bare plural nominal arguments linked to the Incremental Theme relation (Krifka 1986, 1992a and Dowty 1991). Verbal prefixes have uses in which they impart weak quantificational force to such arguments. In contrast, bare mass and bare plural

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arguments of a subclass of perfective (prefixed) verbs systematically refer to totalities of specific portions of stuff and totalities of specific plural individuals, i.e., they behave like referential definites. While the first type of data has remained largely unexplored, the second type of data belongs to some of the best known in Slavic linguistics, although it is still not well understood.

I propose that the two different modes of interpretation of bare arguments are each governed by different types of compositional and interpretive mechanism, which can be motivated by the independent proposal of Carlson (2003a, b) for the interpretation of nominal arguments, Diesing's (1992) Mapping Hypothesis, and cross-linguistic research in quantification (Partee et al. 1987, Bach et al. 1995). This proposal in turn is understandable, if we also assume that verbal prefixes (with indefinite effects on bare arguments) have their domain of application restricted to a level which is 'below' the level of context-sensitive propositional operators like aspectual operators. That is, such verbal prefixes are modifiers of eventuality types at the level of context-free event semantics (in the narrow sense of Carlson 2003 a, b), and they *cannot* be exponents of a function (or functions) posited for the interpretation of the perfective aspect. A basic eventuality description (event, process or state) is expressed by a verbal predicate whose morphological exponent is an aspectless verb stem. It serves as a base to which eventuality type modifiers (like prefixes) as well as aspectual, genericity and temporal operators can be applied. On this approach, the categories of the grammatical aspect are interpreted by higher level compositional operators that take eventuality descriptions as their input. In Slavic languages, the grammatical aspect, perfective and imperfective, is a property of the sum total of the morphological parts of a fully formed verb, excluding its generic and temporal suffixes.

2. BASIC DATA AND OBSERVATIONS

2.1. Perfectivity and definiteness

Polish examples in (1) and (2), taken from Wierzbicka (1967), illustrate the influence of the aspect of a verb on the interpretation of bare mass and plural arguments:

(1) On **z.**jadł^{P} kaszę / oliwki. Polish
he.NOM **PREF**.ate porridge.SG.ACC / olives.PL.ACC
'He ate (up) (all) the porridge / olives.'
(i.e., the whole quantity of porridge/olives)

(2) On jadł^{I} kaszę / oliwki.
he.NOM ate porridge.SG.ACC / olives.PL.ACC
(i) 'He was eating (sm/∅/the) porridge / olives.'
'He was eating some of the porridge / olives.'
(ii) 'He ate (sm/∅/the) porridge / olives.'

(The superscripts 'I' and 'P' stand for the imperfective and perfective aspect of a verb.) Formally, (1) and (2) only differ in the presence of the prefix *z-* in the perfective verb in (1). Semantically, it only differs from the simple imperfective verb in (2) in aspectual semantics, because the prefix *z-* does not contribute any distinct idiosyncratic meaning of its own to the perfective verb. (Therefore, it is glossed with 'PREF'.) The perfective verb *zjadł* is interpreted as 'he ate up', 'he finished eating', that is, it has completed events in its denotation. In contrast, the imperfective verb *jadł* in (2) entails nothing about the event completion. This aspectual difference is correlated with a clear difference in the referential properties of bare direct object arguments in (1) and (2).

In (1), the reference is to "one object (a certain, definite, group of objects – the olives)" (Wierzbicka 1967, p.2238), and it is also entailed that the totality of this object was subjected to the event of eating (see also Wierzbicka 1967). Hence, the interpretation of 'olives' and 'porridge' here comes close to the interpretation of English NPs with the definite article *the* understood as referential definites, in combination with the universal quantifier *all* or some totality expression like *whole, entire* or *total*. Continuing (1) with something like "… and he did not finish eating them (= olives) all", or " … there are still some olives left" would result in a contradiction. That bare direct objects in (1) behave like prototypical referential definites can be shown with respect to anaphora, for example: (1) can be felicitously continued with "… they [= 'olives'] had a bitter taste" and "… it [= 'porridge'] was very sweet", whereby the referential identity is required between the pronoun and the bare direct object serving as its antecedent.

In the corresponding imperfective sentence (2), neither the definite nor the totality interpretation of bare nominals is enforced. Setting iterative and generic interpretations aside, 'porridge' and 'olives' may have the weak existential (*sm* or zero article), the definite referential or the partitive interpretation approximately amounting to *some of the porridge/olives*. Which interpretation will be chosen will depend on the linguistic and extra-linguistic context as well as the contextually determined interpretation of the imperfective sentence.

Examples like (1) and (2) are well-known, but what is often not accounted for is the fact that the perfective aspect does not always require that bare nominal arguments in its scope refer to one whole and specific individual (a single atomic individual, or an individual made up of some stuff or a plurality of individuals). First, the contrast between (1) and (3) shows that bare singular count nouns (here 'pear') and quantified DP's (here 'two olives') need not have a specific referent, although they do necessarily refer to totalities of individuals in question: i.e., two whole olives, a whole pear. Second, the contrast between (1) and (4) shows that the lexical semantics of the perfective verb matters. Specifically what matters is the thematic relation in which the direct object argument stands to the perfective verb. Intuitively, while the extent of a consumed object is directly related to the extent of an eating event, and vice versa (see (1)), the extent of a moved object does not (on its own) define what it means to complete the event of moving it to some location

(see (4)). Rather, the completion of the motion event in (4) is correlated with Jan's having covered the whole implicit path. Hence, the bare direct objects in (4) have no totality entailment and are not enforced to have a referentially specific interpretation.

(3) On **z.**jadł[P] dwie oliwki / gruszkę. Polish
he.NOM **PREF**.ate two olives.PL.ACC / pear.SG.ACC
'He ate (up) two whole olives / a/the whole pear.'

(4) Jan **przy.**niósł[P] kaszę / oliwki.
John **DIR.**carried porridge.SG.ACC / olives.PL.ACC
'John brought (some/the) porridge / olives.'

Third, the contrast between (1) and (4) also indicates that the totality entailment constitutes a necessary condition for the definite referential interpretation of bare nominal arguments. However, it is not a sufficient condition, given the possibility of the indefinite interpretation of the bare singular count argument in (3).

To summarize, there is a systematic variability in the referential properties of bare nominal arguments that depends on their count/mass properties and morphologically encoded number as well as on the aspectual and lexical properties of their governing verb.

2.2. Prefixes and weak indefinite interpretations

Each verbal prefix in Slavic languages is associated with a range of contextually determined meanings, or Aktionsarten. (The German term 'Aktionsart', which was coined by Agrell 1908, literally means 'mode/manner of action'. In Russian linguistics, the corresponding term 'sposoby dejstvija' is used. For an overview of Russian Aktionsarten, see Forsyth 1970, Comrie 1976 and reference therein, for example.) Slavic verbal prefixes are famously homonymous and polysemous. One prefix can be applied to different (im)perfective classes of verbs with different semantic effects. Most prefixes have at least one use in which they express some weak indefinite quantificational notion, and closely related measurement notions. In Czech, such uses are attributed to sixteen verbal prefixes, out of the total nineteen listed in Petr et al. (1986, p.395ff.), a reference grammar published by the Czech Academy of Sciences. They concern some quantifiable dimension of the described eventuality, a dimension related to participants, time, and/or space, and also affective connotations regarding intensity, persistency, conation, and the like. Paradigm examples are the prefix *po-* and its converse *na-* in Czech, Polish and Russian. *Po-* in its attenuative use may be used with an effect close to a vague downward entailing cardinal quantifier like *a few* or *a little (of)* or a vague measure expression like *a (sufficiently/exceedingly) small quantity (of)*. In contrast, the prefix *na-* in its accumulative use has effects that are similar to a vague upward entailing cardinal quantifier like *a lot (of)*, or a vague measure expression like *a (sufficiently/exceedingly) large quantity (of)*. Which eventuality dimension is

quantified by a given use of a prefix depends on the lexical semantics of a verb to which the prefix is attached, and on the linguistic and extra-linguistic context.

To illustrate the referential and quantificational effects of verbal prefixes on bare nominal arguments, let us consider the Czech prefix *na-* in (5b):

(5) a. Dělal^{I} chyby. Czech
do.PAST mistake.PL.ACC
'He made / was making mistakes.'
b. **Na.**dělal^{P} chyby.
ACM.do.PAST mistake.PL.ACC
'He made a lot of mistakes.'

The prefix *na-* is here glossed with 'ACM' following the traditional 'accumulative' Aktionsart classification. (5b) minimally differs from (5a) in the presence of the prefix *na-*, and only (5b), but not (5a), is semantically close to (5b'), which contains the weak determiner quantifier *mnoho* 'a lot (of)'.

(5) b'. **U.**dělal^{P} mnoho chyb. Czech
PREF.do.PAST a.lot.of mistake.PL.GEN
'He made a lot of mistakes.'

Given that the prefix *u-* in (5b') contributes no (clearly detectable) idiosyncratic meaning of its own to the perfective verb *udělal*, we may conclude that there is a semantic similarity between *na-* in (5b) and *mnoho* 'a lot (of)' in (5b'). However, unlike *mnoho* 'a lot (of)', *na-* is also associated with an adverbial, temporal, meaning of 'graduality'. (5b) strongly suggests that the mistakes were 'accumulated' in a gradual manner.

Although (1) and (5b) are superficially alike in so far as both contain a perfective verb formed with a prefix and a bare argument, there are substantial differences between them that stem from the difference in the semantic contribution of their prefixes. The prefix *z-* in (1) has no (clearly detectable) idiosyncratic meaning of its own, and the interpretation of bare nominal arguments is here determined by the lexical and perfective semantics of the prefixed verb. In contrast, in (5b), it is just the semantics of the prefix *na-* that crucially determines the interpretation of the bare nominal argument. Neither does (5b) entail that the described event reached some necessary end, beyond which it could not continue. Instead, (5b) is most naturally understood as meaning that the event simply terminated, and when it did, there were a lot of mistakes 'accumulated'.

The accumulative use of the prefix *na-* enforces an existential (weak indefinite) interpretation of a nominal argument introducing the individual variable that it targets. This is clearly manifested in the observation that *na-* (and its restrictive argument) cannot take scope over any other scope taking elements in a sentence. This is shown with negation in the Czech example (6):

(6) Ne.**na.**sbíral[P] vzácné známky, ale jen laciné kopie.
NEG.**ACM.**collect.PAST valuable stamps but only cheap copies
'He did *not* collect *a (large) quantity of* valuable stamps, but only cheap copies.'
NOT: 'There was *a (relatively large) quantity of* valuable stamps that he did *not* collect, …'

This behavior is similar to that of incorporated nouns, which also take narrow scope with respect to other scope taking operators. For example, with respect to West Greenlandic, Bittner (1994) observes that "neither the incorporated noun nor its instrumental residue can take scope over any operator which c-commands the host verb at S-structure" (p. 118). Moreover, the restrictive argument of the prefix *na-* that functions as the subject can freely occur post-verbally in the inversion construction, but it is odd in the pre-verbal position, as the Czech example (7) shows.

(7) a. **Na.**přijížděli[P] tam anarchisté z Prahy.
ACM.arrive.PAST.3PL there anarchist.PL.NOM from Prague
'There arrived a lot of anarchists from Prague.'
b. #Anarchisté z Prahy tam **na.**přijížděli[P].
anarchist.PL.NOM from Prague there **ACM**.arrive.PAST.3PL
'A lot of anarchists from Prague arrived there.'

In *pro*-drop languages like Slavic languages, this behavior of post-verbal subjects is somewhat similar to the behavior of NPs in *there*-sentences (*there be NP (XP)*) in English, where the subject inversion often has the effect of detopicalizing the subject. The postposed NP is taken to be associated with the novelty condition, which Prince (1992) characterizes in terms of the 'Hearer-new' informational status.

2.3. Main questions

The data and observations in Sections 2.1 and 2.2 raise the following questions, which will be addressed in the rest of this paper:

i. How do bare nominal arguments compose with perfective verbs?
ii. What are the constraints for assigning the definite referential interpretation to bare mass and bare plural nominal arguments in the scope of the perfective aspect?
iii. What are the constraints for associating a prefix with a given argument of a verb and its semantic effect on that argument?

3. INTERPRETATIONS OF BARE NOMINAL ARGUMENTS

3.1. Background assumptions

I assume a semantic framework of event semantics that presupposes an ontology with individuals, times and eventualities as basic entities ('eventualities' in the sense of Bach 1981, 1986). All the three ontological domains have a semi-lattice structure that is (partially) ordered by the part relation '≤': '≤': $\forall x,y \in U[x \leq y \leftrightarrow x \oplus y = y]$. (For more details, see also Krifka this volume.) Following Bach (1981, 1986) and Parsons (1990), the domain of eventualities $\boldsymbol{E}$ is a union of the set S of states, the set P of processes and the set E of events: $\boldsymbol{E} = S \cup P \cup E$. Examples of event predicates are *recover, grow up*, process predicates are *run*, *sleep*, and state predicates are *know, love*.

The lattice-theoretic framework allows us to capture direct structural analogies and interactions between the denotations of verbal and nominal predicates (see Taylor 1977, Mourelatos 1978/81, Bach 1981, 1986, Krifka 1986, 1992a and others). Bare mass and bare plural nominal predicates pattern with state and process predicates in so far as they are homogeneous, i.e., cumulative and divisive. Singular count nominal predicates pattern with (singular) event predicates in so far as they are quantized. The properties 'homogeneity' and 'quantization' are defined in (8a) and (8b). For the purposes of this paper, they can be taken as overlapping with the traditional distinction between atelic and telic predicates (which goes back to Garey 1957).

(8) a. $HOM(P) \leftrightarrow DIV(P) \wedge CM(P)$
$CM(P) \leftrightarrow \forall x,y[P(x) \wedge P(y) \rightarrow P(x \oplus y)] \wedge \exists x,y[P(x) \wedge P(y) \wedge \neg x = y]$
$DIV(P) \leftrightarrow \forall x,y[P(x) \wedge y<x \rightarrow P(y)]$

b. $QUA(P) \leftrightarrow \forall x,y[P(x) \wedge P(y) \rightarrow \neg y<x]$
'<': proper part relation: $\forall x,y \in U\ [x<y \leftrightarrow x \leq y \wedge x \neq y]$
'⊕': binary sum operation, a function from UxU to U.

(8a) is based on proposals in Krifka (1992a), Moltmann (1991) and Kiparsky (1998), (8b) on Krifka (1998). P is a variable over nominal predicates x and y are variables that range over individuals. With small modifications, (8a-b) are straightforwardly applicable to verbal predicates, with P standing for a variable over verbal predicates, and using e and e' for variables ranging over eventualities. The properties of 'quantization' and 'homogeneity' are thus properties of predicates of eventualities, i.e., properties of second order.

Given that bare nominal arguments in Slavic languages can function as definites or indefinites, as we have seen in Sections 2.1 and 2.2, it might be proposed that they are ambiguous or indeterminate with respect to (in)definiteness. Following arguments made for Czech by Filip (1993/99, 1997) and for Russian by Dayal

(2004), I reject both the ambiguity and indeterminacy proposals. Instead, I adopt a version of the Neo-Carlsonian kinds approach in Chierchia (1998) and assume that common nouns in Slavic languages uniformly denote properties in their basic lexical meaning: namely, they are of the predicative type $<e,t>$ (and <s, <e,t>>). Their phrasal projections can shift through available type shifting operators, although not (entirely) freely despite the fact that there are no overt articles (as proposed by Dayal 2004 for Russian and Hindi, contrary to Chierchia's 1998 original claim). There is one type shift to the generalized quantifier by $\exists$, and three type shifts to the argumental type *e*: namely, the nominalization *nom* (Chierchia 1998), the iota operator ι, and the sigma operator σ. The four type-shifters can be introduced as a lexical operation on predicates (cf. Carlson (1977)) or they can apply on demand as a local adjustment triggered by an argument type mismatch.

Nom differs from ι and σ in intensionality. *Nom* derives kind terms from (predicative) common nouns: $<s,<e,t>>\Rightarrow<s,e>$, whereby $P \Rightarrow \lambda w \iota P(w)$. *Nom* is a function from properties to functions from situations to the maximal entity that satisfies that property in a given situation. The value of *nom* thus varies from situation to situation. In contrast, ι and σ are constant functions to a contextually anchored maximal entity: $<e,t>\Rightarrow e$. Traditionally, ι is used for singular count definite descriptions, hence $\iota x \phi[x]$, if $\phi[x]$ is true of exactly one *x*. The operator σ is here used for plural definite descriptions, as in Link (1998), and also for mass definite descriptions, so that $\sigma x \phi[x]$ translates 'the individuals that ϕ' and 'the stuff that ϕ', where *x* is true of pluralities and masses, respectively. Proper plural predicates are defined in (9a) and mass terms in (9b), following Link (1998, p.135ff. and 345ff.):

(9) a. $^{*}\mathrm{Pa} \leftrightarrow {}^{*}\mathrm{Pa} \wedge \neg \mathbf{At}a$ (proper plural predicate of P)
b. $^{m}\mathrm{Pa} \leftrightarrow \exists y({}^{*}\mathrm{Py} \wedge a\ \mathbf{T}\ \iota z(z \rhd y)$ (mass term correspondent to P)

In (9a-b), *a* stands for an individual term, *y* and *z* for variables, **P* for a plural predicate, ***At****a* for 'a is an atom', **T** for 'is a material part of', and '$\rhd$' for 'constitutes or makes up'. The sigma operator is insensitive to atomicity and the sigma term refers to the maximal or largest individual in the extension of a given predicate, which is unique in the domain of universe. Hence, the sigma term is of the individual type *e*. The sigma operator is taken to interpret the definite article like *the* in English, for example, which implies that *the* is not an expression of quantification. This is motivated by the observation that *the* does not entail universality or anything about a particular quantity, as Krifka (1992b) and Partee (1995, p.581, and 1999) propose.

3.2. The missing link: 'Incremental Theme' thematic property

3.2.1. Perfectivity and definiteness

In Slavic languages, interactions between verbal predicates and nominal arguments are tied to only a certain class of predicate-argument relations. The same holds for Germanic languages. For example, the quantized nominal argument *an apple* determines the quantized (or telic) interpretation of the VP in *John ate an apple*, but not in *John carried an apple*. For Germanic languages, there have been a number of proposals to characterize the nature of the relevant class of predicate-argument relations. Verkuyl (1972) was the first to identify it as the 'ADD-TO' relation (see also Verkuyl 1993, 1999 for further elaborations and new proposals). Tenny (1987, 1994) describes it as the 'measuring out' relation, and Jackendoff (1996) refers to it as the 'structure-preserving' relation, for example. Here, I build on Krifka's (1986, 1992a) and Dowty's (1991) lattice-theoretic proposal, which locates the source of the interactions in the lexical semantics of verbs that have meanings involving a homomorphism between (the part structure of) their Incremental Theme argument and (the part structure of) their event argument. (The term 'Incremental Theme' was coined by Dowty (ibid.) and its mereological underpinnings defined by Krifka (ibid.). Krifka also provides an account of the definite interpretation of bare Incremental Theme arguments in the scope of the perfective aspect in Czech.) For example, in *ate an apple*, every part of eating of an apple corresponds to a part of an apple, and vice versa. Since *an apple* is quantized, *ate an apple* will be quantized (or telic). Such a one-to-one mapping does not obtain between the denotation of *an apple* and *carried an apple*, and consequently the quantized argument *an apple* does not enforce the quantized (or telic) interpretation of *carried an apple*.

Assuming the Incremental Theme property, the following pattern emerges in our initial Polish examples (1)-(4): (i) *All and only* the direct object arguments that are linked to the Incremental Theme of a perfective verb denote totalities of individuals or stuff (see (1) and (3) vs. (2) and (4)); (ii) *all and only* bare mass and bare plural Incremental Theme arguments must *also* receive the definite interpretation (see (1) vs. (3)): they refer to *totalities* of *specific* portions of stuff and *totalities* of *specific* plural individuals. Neither the totality nor the definite interpretation is enforced for the bare direct object argument of the perfective verb that is not linked to the Incremental Theme in (4).

I propose to represent the semantics of perfective verbs (simple or prefixed) by means of the *TOT* predicate modifier, standing for 'totality of the event', or *celostnost' dejstvija* in traditional Russian linguistics: *PERF: (P)(e)* $\rightarrow$ *TOT(P)(e)*. The mereologically based definition, based on Krifka's (1997) notion of a 'maximally separated entity', is given in (10):

(10) *TOT(P)(e), e* is a total (atomic) event of type *P* if *P(e),* and for all *e'* with *P(e')* and $e<e'$, it holds that every *e''* with $e''<e'$ and $\neg e \otimes e''$ is not adjacent to *e*.

a. TOT#(P)(e) = 1 if TOT(P)(e),
where '#' is the atomic number function:
If At(e), then #(e) = 1; if ¬e⊗e', then #(e⊕e') = #(e) + #(e')
b. ∀e,e'[¬e⊗e' → TOT#(P)(e⊕e') = TOT#(P)(e) + TOT#(P)(e')]

In (10), *P* is a variable over predicates of eventualities and *TOT* is a second order property of predicates of eventualities. The effect of *TOT(P)* is to individuate atomic events in the denotation of a perfective verb, given that it is required that no two events in the denotation set of a given predicate *P* overlap. Intuitively, *TOT(P)* denotes events each of which is conceived as "a single whole without distinction of the various phases that make up that situation" (Comrie 1976, p.16). Thus, (10) is related to traditional characterizations of the semantics of perfectivity going back to Černý (1877), Razmusen (1891), Saussure (1916 [1978]), Maslov (1959), Sørensen (1949), Dostál (1954), Isačenko (1962), among others. This also means that perfective verbs that denote completed, culminated events, or events with result states and goals of various kinds are just a special case in the class of perfective verbs as a whole. The same holds for perfective verbs that take the Incremental Theme argument (see also Filip 1993/99). Of course, *TOT(P)* is also a part of the logical structure of perfective verbs denoting transitions into and out of processes and states. Take, for example, the Czech perfective verb *zamilovat se* 'to fall in love', derived from the imperfective individual-level verb *milovat* 'to love'. The perfective verb has an inchoative meaning and asserts that the transition into the state of loving is viewed in its entirety. Generally, if a given state of affairs is represented by a verbal predicate in its entirety, there must be some limits imposed on its (temporal or spatial) extent, and consequently, it must be quantized. The perfective verb z*amilovat se* 'to fall in love', for example, is quantized, since no proper part of the transition into the state of loving can count as that (whole) transition: If it took Bill two weeks to fall in love with Mary, he did not fall in love with her in the first two days. *Zamilovat se* 'to fall in love' is not cumulative, since two distinct events of falling in love amount to a sum event of falling in love twice. *TOT* is taken to be the property of predicates expressed by perfective verbs, i.e., by fully formed perfective verbs (finite and non-finite). As was argued elsewhere (see Filip 2000 and 2004, for example), the formal category of 'perfectivity' in Slavic languages cannot be consistently associated with a clearly identifiable set of aspectual affixes, *solely* dedicated to marking of the perfectivity of a verb in *all* of their occurrences.

As has been observed, the totality entailment is a necessary condition for the referentially definite interpretation of bare mass and plural Incremental Theme arguments of perfective verbs, as in our initial examples (1) and (3). The totality entailment associated with the Incremental Theme argument here straightforwardly follows from the *TOT* modifier in the logical structure of the main perfective verb and the object-event homomorphic mappings that define the Incremental Theme relation. Given that the perfective verb has total events in its denotation, the mappings dictate that the Incremental Theme argument must refer to totalities of

objects falling under its description. Crucially, the interpretation of the bare Incremental Theme argument is here just affected by the *TOT* modifier, given that the morphological structure of the perfective verb contains no morphemes contributing quantificational or modal components that could also have effects on its interpretation. Hence, I propose that bare mass and bare plural nominal argument can serve as Incremental Theme arguments of a perfective verb of this type only after a type-shift by means of the sigma operator. Totalities of stuff or pluralities in the denotation of nominal predicates are standardly represented by means of the *σ*-operator, introduced in Section 3.1. It shifts a common noun like the Polish *oliwki* 'olives' from its basic meaning **olives'**, which is of the predicative type $\langle e,t\rangle$, to the maximal, and hence definite, interpretation **σ*x.olives'**(x) '(all) the olives' of the individual type *e*, the appropriate argumental type. (1) with the bare plural noun 'olives' will contain (11) as part of its logical representation:

(11) $[\![$*On zjadł oliwki*$]\!]$ =
$\exists e \exists y[y=\sigma^*x(\textbf{olives'}(x)) \wedge \text{IncTheme}(e)=x \wedge \text{Agent}(e)=\textbf{he'} \wedge \text{TOT}(\textbf{eat'})(e)]$

The *σ*-operator is here directly introduced into a logical representation of the perfective predicate *zjadł* as a local operator over the variable introduced by an Incremental Theme argument. This makes sense given that the maximal, and hence definite, interpretation of the Incremental Theme argument directly follows from the lexical and aspectual properties of its governing perfective predicate, and nothing else.

Now, in (3), we have seen that bare singular count predicates may have an indefinite interpretation, even when they serve as Incremental Theme arguments of perfective verbs that require that they have a totality entailment. However, the definite interpretation is here also possible. How do we derive the right argument interpretation for singular count predicates of perfective verbs, as in (3)? The *σ*-operator is excluded as a possible covert type-shifter, because it is here undefined for singular count predicates (see also Bittner and Hale 1995 and Filip 1996), *nom* is also excluded, because it derives kind terms, but the perfective sentences discussed here express episodic statements about *instances* of a kind, and their Incremental Theme argument is object-level. This means that we have two covert type-shifts available, $\exists$ and *ι*.

Ignoring details that are not relevant for the current purposes, (3) may be interpreted as in (12b), where the singular count noun 'pear' has a definite interpretation, or as in (12c), where it has an indefinite interpretation:

(12) a. *On z,jadł*^{P} *gruszkę*. - 'He ate (up) a/the whole pear.' [= 3]
b. $\exists e \exists y[y=\iota x(\textbf{pear'}(x)) \wedge \text{IncTheme}(e)=x \wedge \text{Agent}(e)=\textbf{he'} \wedge \text{TOT}(\textbf{pear'})(x) \wedge \text{TOT}(\textbf{eat'})(e)]$
c. $\exists e \exists x[\text{IncTheme}(e)=x \wedge \text{Agent}(e)=\textbf{he'} \wedge \text{TOT}(\textbf{pear'})(x) \wedge \text{TOT}(\textbf{eat'})(e)]$

In (12b,c), *TOT(pear')(x)* is defined, because *TOT(eat')(e)* is, and because 'pear' stands in the Incremental Theme relation to the verb 'eat'. This also presupposes that we define the total atomic individual *TOT(P)(x)*, in analogy to the total atomic event in (10).

Why must bare mass/plural nouns, but not bare singular count nouns, have the definite referential interpretation when they function as Incremental Themes of perfective verbs that impose the totality interpretive requirement on them? Making an assertion about some individual in its entirety presupposes that the individual is well-demarcated. However, bare plurals and bare mass terms take their denotation from a non-atomic lattice structure. An assertion about their totality is felicitous to the extent that a suitable maximal individual can be identified in the domain of discourse: the maximal individual sum in the extension of a bare plural predicate and the maximal fusion of all quantities that fall under the bare mass predicate. Such maximal objects are unique, therefore, anchoring bare plurals and bare mass terms to such maximal objects in the domain of discourse amounts to their having the definite referential interpretation. In the case of singular count nouns, the totality interpretation can be directly assigned with respect to the canonical boundaries inherent in their atomic unit-structure (at least if we disregard singular count nouns like *sequence* or *ribbon*, whose unit-structure is contextually determined). Since no contextual anchoring is required, the definite interpretation is not mandatory either.

3.2.2. Prefixes as expressions of vague measure functions

We have seen that Slavic verbal prefixes have uses in which they function as verb-internal operators that have direct effects on the phrasal syntax and semantics of nominal arguments. In so far as they have meanings that are related to measure and cardinality, but also to quantification and distributivity, they belong to a subtype of A(dverbial)-quantifiers, namely, lexical A-quantifiers in the sense of Partee (1991, 1995). As the most general hypothesis, Filip (2001) proposes (13):

(13) Slavic verb-internal operators do *not* express *essentially quantificational* notions, i.e., notions that *require* tripartite structures corresponding to generalized quantifiers at any level of representation.

Slavic verbal prefixes share four properties with lexical A-quantifiers. First, they are directly applied to a predicate at a lexical level, and they often have no compositional semantics.

Second, they have morphological, syntactic, and semantic effects on the argument structure of a derived predicate. (Such effects can be characterized by lexical rules in the sense of Dowty 1979.)

Third, their semantic value typically combines some quantificational force with adverbial meanings: namely, temporal, spatial, and manner, for example.

Fourth, their effects are strictly local, limited to a verb and its arguments, excluding optional adjuncts, and they exhibit striking preferences with regard to the selection of the predicate's argument they target for their semantic effect. We can illustrate this point with the Czech example (5b): Here, the prefix *na-* selectively targets only the individual variable introduced by the bare plural nominal argument 'mistakes', that is, 'He made *a lot of mistakes*' is the only meaning that (5b) can have. Other logically possible meanings are impossible or not enforced here. For example, (5b) would not seem to be necessarily/readily understood as 'There were *many/frequent occasions* on which he made mistakes', which means that *na-*, does not here function as an adverb of quantification that would bind the event variable introduced by the main episodic predicate to which it is attached. Neither does (5b) necessarily mean 'He made mistakes *for a long time*', 'He spent *a lot of time* making mistakes', etc., hence *na-* does not necessarily function as a vague temporal measure over the temporal variable associated with the temporal trace of the described eventuality.

These four properties of the relevant uses of Slavic prefixes can be taken as motivating their analysis in the general context of the cross-linguistic research on quantification and closely related notions like measure and distributivity in natural languages. In the research framework proposed by Partee et al. (1987) and Bach et al. (1995, and references therein) two main types are distinguished: D-quantification expressed by determiner quantifiers and A-quantification which subsumes a large and heterogeneous class of expressions that are external to a DP. A-quantifiers syntactically form a constituent with some projection of the lexical category Verb and include adverbs of quantification, such as *usually, always* (see Lewis 1975), auxiliaries, various argument-structure adjusters and verbal affixes.

Let us now turn to the measurement uses of Slavic prefixes, as exemplified by the Czech accumulative prefix *–na* in (5b), (6) and (7). First, measure prefixes derive nominal meanings that are weak indefinite, as was illustrated with the Czech *na-* in (7).

Second, just as other measure expressions, measure prefixes welcome homogeneous predicates as their input: i.e., the nominal argument they target for their semantic effects is a bare mass or a bare plural predicate, at least in the default case. (See also below for further constraints.) They exclude bare singular count nouns as well as most quantified nominal arguments. For example, the Czech prefix *na-* excludes singular count NPs/DPs as ungrammatical: cp. ***na**dělal*^{P} *chybu* (mistake.SG.ACC) – *'he made a lot of a mistake'. It also excludes arguments that are quantified with the universal determiner quantifiers *všechen* 'all' and *každý* 'each'.

Third, the constraints for associating a verbal prefix (used with a vague measure or cardinality meaning) and the appropriate nominal argument can be stated over the thematic argument structure of a verb to which the prefix is attached: namely, the prefix is 'linked' (in the sense of Aissen 1984, p.5) to the variable introduced by the (Incremental) Theme argument. Given the length limits on this paper, the Czech

examples in (5b) and (7) will have to suffice to illustrate the (Incremental) Theme restriction here.

One way of capturing the input-output constraints of verbal prefixes used as lexical A-quantifiers is to treat them as expressing non-standard extensive measure functions. That is, their contribution is on a par with measure expressions like *a large/small quantity of, a large/small piece of.* (See also Filip 1992 and 2000 for a previous related analysis, and a similar proposal by Piñón 1994 for the accumulative Polish prefix *na-*.) The general definition of an extensive measure function is given in (14), following suggestions in Krifka (1998). (15) represents the measurement part of the meaning of the prefix *na-*, as used in (5b). (16) illustrates the application of *na-* to *chyby* 'mistakes', given here in the nominative citation form:

(14) MEAS is an extensive measure function iff:
(i) MEAS is additive:
if $\neg x \otimes y$, then $MEAS(x \oplus y) = MEAS(x) + MEAS(y)$;
(ii) MEAS has the property of commensurability:
if $MEAS(x) > 0$ and $y < x$, then $MEAS(y) > 0$.

(15) $[\![na\text{-}]\!] = \lambda P \lambda x[P(x) \wedge MEAS(x) = n_c \wedge n_c \geq r_c]$

(16) $[\![na]\!] ([\![chyby]\!]) = \lambda P \lambda x[P(x) \wedge MEAS(x) = n_c \wedge n_c \geq r_c] (\lambda x[\textbf{mistakes'}(x)])$
$= \lambda x[\textbf{mistakes'}(x) \wedge MEAS(x) = n_c \wedge n_c \geq r_c]$

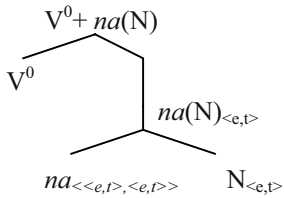
In (15), MEAS is some indeterminate measure function, *x* is the object measured, *P* is true of *x*, whereby *P* is homogeneous (a plural or a mass property, see also (8a) above). What counts as 'a (relatively) large quantity' or 'a lot' differs from context to context, hence n_C (a positive integer) is the contextually determined amount of *x*, and r_C stands for a contextually determined expectation value related to the quantity measured. The amount n_C of *x* is equal or greater than the contextually determined expectation value r_C. Given that (15) presupposes that the intended amount of measured objects is fully recoverable from a given context, and specifiable in terms of some natural number, the prefix will yield nominal arguments that behave like quantized arguments, in compliance with the definition of quantization given in (8b). (For discussions of the quantization property in connection with NP's formed with non-standard measure expressions like *a quantity (of)* and vague cardinal quantifiers like *a lot (of)* see Zucchi and White 1996, Krifka 1998, Filip 2000 and Rothstein 2004.) While in the default case, measure prefixes select for homogeneous nominal arguments, they can also be combined with measured and quantified nominal arguments, just in case the quantity specification of the prefix and the nominal argument match. For example, the accumulative *na-* in Slavic languages is compatible with any expression of quantity or measure that 'matches' its meaning of a relatively large measure or quantity: e.g., in Czech, weak adverbial quantifiers like *mnoho* 'a lot of', *hodně* 'a lot of', nominal quantifiers like *hromada* (fem. sg. nom) 'a pile of, a heap of'. It is also compatible with cardinal numerals that indicate a

quantity that is considered to be large in a given context, as in the Russian example: *Za étot sezón Ivan nabégal*^{P} *trechsót kilométrov* 'During this season he ran up three hundred kilometers' (cf. Isačenko 1960, p.248). (For more examples see Filip 1992 and Filip 1993/1999, Chapter 5.)

In (16), ⟦*na*⟧ (⟦*chyby*⟧) identifies all those quantities that are mistakes that have a (relatively) large quantity of members, which amounts to *na-* being treated as an intersective modifier of nominal meanings (= a predicate of the intersection of sets). In this respect, the accumulative *na-*, and other verb-internal operators with uses that fall under lexical A-quantification in Slavic languages, behaves like weak indefinite quantifiers, such as *a lot (of)*, *some, several, five, many* (in its cardinal reading). They are of the type $<<e,t>,<e,t>>$, i.e., functions mapping nominal predicates (type $<e,t>$) that have plural individuals or stuff in their denotation into nominal predicates (type $<e,t>$) that identify quantities of individuals or stuff of a certain size.

After the prefix has been composed with a bare homogeneous argument, the result is merged with (the meaning and argument structure of) an aspectless verb base, as is schematically shown in (17):

(17) semantic composition



We get a complex verbal predicate with a denotation that is within the denotation type of a verb, which implies that the bare nominal argument together with *na-* restricts the denotation of the aspectless verb base. In this respect their joint semantic effect on the meaning of the aspectless verb base resembles the predicate restricting function of incorporated nominals. The individual variable introduced by the nominal argument is subject to the obligatory existential closure in the nuclear scope of a DRT-type tripartite structure. Independently, Carlson (2003a, b) argues that all weak indefinites can be treated as nominals in incorporation(-like) structures (see below). Hence, the weak indefinite (existential) interpretation of bare nominal arguments linked to verbal prefixes used as vague measures over their denotations falls out from the semantic mode of composition by which a prefix, nominal argument and an aspectless verb stem are put together. The contribution of the prefix *na-* is represented by means of the measure function *MEAS* as defined in (15), whereby its measure value exceeds a certain threshold. The 'perfectivizing' or quantizing effect of the perfective verb it forms does not come from the threshold value entailed by the prefix, because we would still have problems with cumulativity or divisivity, following the definitions in (8a). (The problems are described in detail

and dubbed 'the quantization puzzle' in Filip 2000.) Rather, it is due to the fact that we refer to non-overlapping atomic and hence clearly separated events, following the definition of the perfective operator *TOT* in (10). Consequently, via the homomorphic object-event mappings, the Incremental Theme argument must also refer to some clearly separated totality of a relatively large quantity of mistakes. Given the above observations, (5b) will have a logical structure including (18):

(18) $\exists e \exists x[\text{IncTheme}(e)=x \wedge \text{TOT}\mathbf{(mistakes')}(x) \wedge \text{MEAS}(x)=n_C \wedge n_C \geq r_C \wedge \text{TOT}(\mathbf{do'})(e) \wedge \text{Agent}(e)=\mathbf{he'}]$

Implicit in the semantic mode of composition proposed here is the claim that the semantics of a prefix is clearly set apart from the aspectual semantics of a whole prefixed verb. The perfective semantics of a prefixed verb does not enter into the computation of the meaning of a bare (Incremental) Theme argument at the level at which it is composed with the prefix and the verb stem. At the level of semantic composition, the prefix, such as *na-* in (5b), is first composed with the nominal argument, such as *mistakes* in (5b), and the result is then composed with the aspectless verb stem following the same rules of standard aspectual composition that apply to familiar English examples like *make a large quantity of mistakes* (see Krifka 1989, 1992a and Dowty 1991). This is best supported by additional data in which the idiosyncratic semantics of a prefix and the aspectual semantics of a prefixed verb are clearly distinct: namely, when a measure prefix occurs within an imperfective verb as in (19).

(19) **U.**píjel^{I} víno z mé sklenice. Czech
ATN.drink.IPF.PAST wine.SG.ACC from my glass.SG.ACC
(i) 'He was taking a sip of wine from my glass.' (progressive)
(ii) 'He took / was taking sips of wine from my glass.' (iterative)

In (19), the prefixed verb ***u.****píjel* is imperfective. The measure prefix *u-* here approximately contributes *a small quantity of* with respect to the bare Incremental Theme 'wine'. Hence, it is glossed 'ATN' standing for the traditional *attenuative* Aktionsart classification. The measure prefix *u-* is directly applied to the imperfective verb *pít* 'to (be) drink(ing)' yielding the perfective verb ***u.****pít* 'to drink (up) a small quantity (of *x* from *y*)'. The denotation of this perfective verb serves as an input to the imperfective operator, which results in the derivation of the secondary imperfective ***u.****píjet*, realized in the past tense form in (19). The imperfective operator is morphologically instantiated by a variety of allomorphs in Slavic languages, here it is realized by a stem extension. The imperfective operator takes perfective verbs that express total event predicates, *TOT(P)(e)*, and generates imperfective verbs that express predicates that lack the *TOT* operator in their logical representation, i.e., they are unmarked with respect to *TOT*: *IMP: TOT(P)(e)* $\rightarrow$ *(P)(e)*. The unmarked nature of imperfectives is motivated by the observation that

imperfectives have a variety of contextually determined interpretations: namely, they may express total events just like perfectives, but also they may have the progressive, generic or iterative interpretation (see also Comrie 1976). The most natural readings of (19) are (i) a single event ongoing at some reference point ('progressive' interpretation) involving a single small quantity of wine, or (ii) a multiplicity of events, each of which involves some small quantity of wine (generic or iterative interpretation), depending on the context. In either case, the logical structure of (19) will contain the predicate [DRINK(SMALL-QUANTITY(WINE))]. That is, in the logical representation of examples like (19), the prefix *u-* is first combined with the bare Incremental Theme argument 'wine', and the result is composed with an aspectless verb stem 'drink', following the standard rules of aspectual composition (see Krifka 1989, 1992a and Dowty 1991). The imperfective (*IMP*) operator is a higher level compositional operator that operates over predicates of eventualities *(P)(e)*, telic as in (19) or atelic.

If the (Incremental) Theme argument is not present in the thematic structure of a prefixed verb used as a lexical A-quantifier, the prefix may target some other quantifiable dimension associated with the described event, such as frequency, temporal extent, as well as a variety of affective connotations regarding intensity, persistency, and the like. In some cases, the domain of quantification may remain indeterminate, because it may be impossible or irrelevant to determine which dimension of the described event is quantified. A good example is the Russian verb *naplákat'sja*^{P} 'to cry a lot'. Does the prefix *na-* measure the temporal trace ('to cry for a long time'), the amount of tears ('to shed a lot of tears', to give a somewhat poetic translation), or simultaneously both? The considerable flexibility and indeterminacy with respect to their domains of quantification is one important characteristics that Slavic verbal prefixes used as verb-internal operators with weak quantificational and measurement effects share with vague weak quantifiers like *a lot, a little, more, most* and *much*, for example (Partee p.c.).

4. GRAMMATICAL ASPECT VS. EVENTUALITY TYPES: NEW EVIDENCE

The two different modes of interpretation of bare Incremental Theme arguments, which I propose in Sections 3.2.1 and 3.2.2, can be independently and in general terms motivated within Carlson's (2000) framework. This in turn will allow me to provide new compelling evidence in support of the claim (also made elsewhere) that the category of grammatical aspect and the classification of verbal predicates into eventuality types (or Aktionsarten) are two independent dimensions in the general domain of 'event structure'.

Carlson's (2003a) main goal is to provide a semantic motivation for Diesing's (1992) Mapping Hypothesis. It states that the material from the VP is mapped into the nuclear scope of a DRT-type tripartite structure and the material from the IP into a restrictive clause. The restrictive clause is presuppositional, and consequently any NP/DP that is presuppositional in nature must be in the IP to be interpretable: definite descriptions, demonstratives, proper names, specific indefinites, partitives,

quantified DPs (with strong quantifiers). In contrast, the nuclear scope is the scope of the obligatory existential closure, which unselectively binds all free variables within the VP. What is striking is that only weak indefinites *must* stay in the VP, which follows given that they assert the existence of their range, rather than presuppose it.

Carlson's (2003a) framework relies on two levels of semantic description: namely, propositional semantics and event semantics. The level of event semantics, which is associated with the VP level, specifies denotations of verbs, including their eventuality types (or Aktionsarten). The ontology associated with event semantics contains no individuals, only properties. Given that nominal arguments added at the VP level are property-denoting (predicative type), verbs are not semantically functional, and instead they compose with nominal arguments by type restriction. Most importantly, a combination of a verb with a noun here yields a denotation that is within the denotation type of a verb. This proposal finds some support in the behavior of paradigm examples of weak indefinites: namely, incorporated nominals, as well as closely related bare singular count and bare plural direct objects (as in Hindi, for example, see Dayal 2004). In general, nominals in incorporation and incorporation-like structures are taken to be property-denoting (see also McNally 1998).

Event semantics is context-free and serves as input into a standard context-sensitive propositional semantics with possible worlds and a domain of individuals. Propositional semantics corresponds to the IP level. Arguments, which are added at this level, are individual-denoting, and compose with verbs by function application, as is standard in most versions of Montague Semantics. Assuming that all linguistic expressions that depend on contextual factors for their interpretation invoke possible worlds (see Stalnaker 1978, among others), all contextually-dependent elements must be located at the IP level to be interpretable. They include operators that require a restrictor clause in the DRT-type tripartite structure, which is 'filled in' by propositional information from the context: namely, tense, modality, genericity as well as perfective and imperfective operators, which correspond to the categories of the grammatical aspect.

Given the above assumptions, weak indefinites must stay within the VP for two main reasons: (i) they conform to the structure of VP denotations, and (ii) they can be interpreted without reference to context. For example, an eventuality describable by *John fed dogs* is automatically redescribable by *John fed animals*, hence, in mereological terms, we get ⟦*feed dogs*⟧ ≤ ⟦*feed animals*⟧. In this respect, bare plural arguments behave like arguments with weak quantifiers such as *a lot of*: ⟦*John fed a lot of dogs*⟧ ≤ ⟦*John fed a lot of animals*⟧. In contrast, arguments with strong quantifiers do not preserve the structure of VP denotations: For example, an eventuality properly described by *John fed every dog*, which contains the strong quantifier *every dog*, is not describable by *John fed every animal*.

We may align the two different modes of interpretation of bare mass and plural arguments in Slavic languages with the two different modes of composition between a verb and its arguments in Carlson's framework. We have seen that the completive,

or 'totality', aspectual semantics of perfective verbs, which contain no verb-internal operators with weak quantificational or measurement meanings, induces the definite referential interpretation of their bare mass and plural Incremental Theme arguments (see Section 3.2.1.). I account for this behavior by assuming that bare mass and plural nouns can serve as Incremental Theme arguments of such perfective verbs after a type shift by means of σ from their inherent predicative type $<e,t>$ to the argumental individual type e. Consequently, bare mass and plural nouns interpreted as referential definites combine with the relevant perfective verbs by the standard function application at the level of propositional semantics. This also presupposes that the predicate modifier *TOT* posited here for the interpretation of the aspectual semantics of perfective verbs denoting total (or completed) events must be interpreted at the level of propositional semantics, and have a functional correspondent at the syntactic IP level. This is also the syntactic level at which definite noun phrases must be located to be interpretable, on Diesing's (1992) Mapping Hypothesis.

Weak indefinite effects of measure prefixes on bare mass and plural (Incremental) Theme arguments (see Section 3.2.2 above) can be predicted, if we assume that such prefixes have their domain of operation limited to the level of event semantics, the level at which denotations of verbs, including their eventuality types are specified, and the corresponding syntactic VP level. A prefix used in this way is taken to be an intersective modifier of nominal meanings, type $<<e,t>,<e,t>>$. It is combined with a nominal predicate introduced by an (Incremental) Theme argument, and the result, which is also a property-denoting nominal predicate, is composed by type restriction with the meaning of an aspectless verb stem/root. Event semantics only has properties as ontological entities, as Carlson proposes, and the mode of composition between verbs and property-denoting nominal arguments is here motivated by incorporation(-like) phenomena, among others. I also propose that a prefix used as a weak quantifier can only be applied to the (Incremental) Theme argument. In languages that manifest typical cases of incorporation, incorporation is limited to one argument, which is often taken to stand in the Theme relation to the verb (see Miner 1986 and Woodbury 1975, for example). However, it is not clear why exactly this type of thematic relation should be prominent in incorporation(-like) phenomena across typologically diverse languages. (For a discussion of this point see Farkas and de Swart 2003.)

This proposal relies on the requirement that the nominal argument, which is first modified by a prefix, is 'consumed' by the aspectless verb stem and subject to the existential closure at the semantic level of composition that is below the propositional level of aspectual operators: namely, at the level of event semantics and its corresponding syntactic VP level. Implicit in this mode of composition is the claim that prefixes cannot be exponents of a function (or functions) posited for the interpretation of the perfective aspect (pace Piñón 1995, Slabakova 1997 and Zucchi 1999, for example, to give just a few among the most recent references). If prefixes were viewed in this way, they would uniformly correspond to functional projections at the IP level and their weak indefinite effects on bare nominal arguments would

not necessarily follow from assumptions that are independently made in Diesing and Carlson.

There are also other independent considerations that speak against viewing prefixes as morphological exponents of the perfective aspect. Verbal prefixes are neither necessary nor sufficient markers of the aspectual category of 'perfectivity', as Filip (1993/99, 2000 and 2004) argues. There are unprefixed verbs that are perfective, such as the Russian *dat'* 'to give', and prefixed verbs that are imperfective, such as the Russian *otdavat'* to give, place, put, i.e., hand over for a certain purpose'. Although some uses of prefixes make no (distinct) idiosyncractic lexical contribution to the meaning of verbs, and thus appear to be 'perfectivizing' prefixes pure and simple (see the Polish prefix *z-* in *zjadł* in 'he ate (up)' in (1), for example), such uses are not systematic, and there is no single prefix dedicated solely and in all of its occurrences to only such a perfectivizing function. Slavic verbal prefixes constitute a semantically heterogeneous class, and there is no (strong) correlation between verbal prefixes and telicity (or quantization), which is often equated with the semantics of perfectivity. (The same point is made with respect to verbal prefixation and telicity in German by Kratzer 2004.)

I propose that verbal prefixes belong to the general class of modifiers of eventuality types, rather than being morphological exponents of the perfective aspectual operator. They are semantically characterized as functions that map sets of eventualities of a certain type and onto sets of eventualities of some (possibly) other type. That is, their semantic contribution (qua eventuality type modifiers) to the core event predication is on a par with modifiers of eventuality types expressed by a variety of syntactic devices, such as adverbial phrases (*John ran from the bus stop to the post office*) or secondary predicates (*John scrubbed the floor clean*) in English, for example. Spencer and Zaretskaya (1998), for instance, argue that a large class of Russian prefixed verbs has essentially the same semantic structure as the resultative predication in English. In the most general terms, the presence versus absence of modifiers of eventuality descriptions affects the homogeneity and quantization entailments, in the sense of (8a-b). In contrast, semantic operators that interpret the categories of the grammatical aspect, perfective, imperfective and progressive, are higher level compositional operators that take eventuality descriptions (basic or derived) as their input. As in Carlson's (2000) framework, aspectual operators, and also genericity and tense operators, are taken to be propositional operators with functional correspondents at the syntactic IP level. Given the above observations, we arrive at the following schematic logical representation:

(20) a. [TENSE [GEN* [ASP [EVENTUALITY-MOD* [eventuality description]]]]]

b. pře-piso-vá-va-l[I] Czech
over-write-IMP.ASP-GEN-PAST.3SG
'he used to write over / rewrite'

(20a) is compatible with an independently proposed structure in de Swart (1998), and it also closely reflects the order of markers in the surface morphology of Slavic verbs. This is illustrated with the Czech example in (20b), which contains overt morphological exponents of all the semantic operators in (20a). Here we see that a basic eventuality description is expressed by a verbal predicate whose morphological exponent is an aspectless verb stem 'write'. It serves as a base to which first eventuality (type) modifiers like prefixes can be applied. In (20a), *EVENTUALITY-MOD** captures the recursivity of eventuality modifiers. In English, combinations of several modifiers are common: cp. *come out from under the bed*. In West and East Slavic languages, we may find two or even three verbal prefixes functioning as eventuality type modifiers within a single verb, while South Slavic languages like Bulgarian allow for more than three. Recursivity is one of the hallmark characteristics of derivational morphology, and in so far as Slavic prefixes are recursively applicable to one and the same verb they behave like derivational rather than inflectional morphemes, at least in Indo-European languages. This, in turn, can be taken as an additional piece of evidence in support of the argument made here that Slavic verbal prefixes cannot be viewed as overt markers of the perfective operator. That is, verbal aspect in Slavic languages is standardly taken to be a grammatical category, and if this also implies that it is an inflectional category (see also Spencer, 1991), then prefixes cannot be *aspectual* morphemes, because such morphemes ought to have inflectional characteristics. In contrast, overt morphological and syntactic exponents of temporal and grammatical aspect operators prohibit recursion (cp. **John talkeded*, **John was being running*).

As far as the realization of *ASP* in (20a) is concerned, it is clearly instantiated only by the allomorphic variations of the imperfective suffix in Slavic languages. In the Czech example (20b), it is realized by the suffix *–va-*. As Filip (2000) argues, the imperfective suffix is a piece of inflectional (aspectual) morphology, because it has *a constant and only* aspectual meaning in *all* of its occurrences. There is also the semelfactive suffix (*-nu-* in Russian, for example) which only occurs in a limited subclass of perfectives. However, apart from these two morphemes, there is no one-to-one correspondence between the *ASP* operators, perfective (*PERF*) and imperfective (*IMP*), and verbal morphology in Slavic languages. Apart from these two morphemes, there are no other morphemes or formal properties that would unambiguously and in all of their occurrences mark verb forms as either perfective or imperfective. Therefore, in general, the grammatical aspect in Slavic languages, perfective and imperfective, is best viewed as a property of a fully formed verb, excluding its generic and temporal suffixes.

Finally, in the schema (20a), *GEN** capture the recursivity of the generic operator. In Czech, for example, the generic suffix can be iterated for emphasis (see Filip and Carlson 1997). Notice that in the schema *GEN** and *ASP* are separate. This is motivated by the arguments made in Filip and Carlson (1997) that genericity is a category sui generis, formally and semantically independent of the category of aspect. They invalidate any proposals that subsume genericity under imperfectivity (see Dahl 1985 and Comrie 1976, among others).

Temporal operators take the widest scope and introduce an existential closure over the eventuality variable introduced by a base eventuality description. A temporal operator maps the eventuality described by a given predicate onto the time axis via its temporal location in relation to the utterance time.

5. CONCLUSION

In this paper I propose that specific parts of verbal morphology in Slavic languages manifest a clear division of labor in the way in which they contribute to the expression of grammatical aspect (perfective, imperfective) and to the eventuality type (aka 'Aktionsart') of a verb, which are manifested in their differential effects on the interpretation of bare mass and plural arguments linked to the (Incremental) Theme relation.

There are several issues whose discussion would have been a part of this paper, had the space limits not prevented it. Let me just briefly mention three. The first concerns non-compositional properties of prefixal combinations as well as the polysemy of prefixes and their impact on the perfective semantics of a whole prefixed verb. Why does a Russian perfective verb with the prefix *na-* like *napisat'* 'to write up' entail nothing about the quantity of the 'created object', while a perfective verb like *navarit'* 'to cook (up) a lot (of x)' requires that there was a large quantity of the 'created object' as a result of cooking? The second issue regards compositional semantic analysis and the nature of the mapping between syntax and semantics. The problem is that data involving word-internal lexical operators, such as Slavic measure prefixes discussed here, appear to be of non-compositional nature (cf. also Bittner 1995 with respect to West Greenlandic Eskimo). The third issue regards bare NPs, incorporation and anaphora. What is the anaphoric behavior of bare nominal arguments that are linked to prefixes used as lexical A-quantifiers and that are here claimed to have weak indefinite meanings similar to that of incorporated nominals? Farkas and de Swart (2003) discuss the cross-linguistic variation in which languages differ with respect to whether their incorporated nominals introduce discourse referents.

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ADVERBS OF COMPLETION IN AN EVENT SEMANTICS

Abstract. Adverbs of completion such as *completely*, *partly*, and *half* assert to what extent a given situation type is realized, where the situation type at issue may be either a state type (in the case of adjectives, e.g., *completely empty*) or an event type (in the case of many verbs, e.g., *completely eat the cereal*). After introducing the basic data and critically reviewing two previous analyses, I propose a new approach to adverbs of completion. The hallmark of the new approach is to provide as uniform a semantics as possible for adverbs of completion in both of their uses, taking seriously the intuition that their meanings make reference to events and degrees. The analyses are cast in an event semantics supplemented by a degree semantics familiar from treatments of gradable adjectives.

Keywords. Adverbs of completion, event semantics, events, degrees, aspect.

1. INTRODUCTION

There is a class of adverbs that say something about how much of a given situation type is realized:

(1) a. Stanley completely ate his Wheaties (Jackendoff 1972:53).
b. Rebecca partly solved the problem.
c. Mary opened the door halfway.

The effect of *completely* in (1a) is to remove any doubt that any of Stanley's Wheaties were left uneaten, the use of *partly* in (1b) implicates that not all of the problem was solved, and the role of *halfway* in (1c) is to assert that the door traversed half of its spatial arc to being closed. I will refer to such adverbs as 'adverbs of completion' (though 'adverbs of extent' would also be appropriate).

Other adverbs of completion comparable to those in (1) are *entirely*, *fully*, *totally*, *wholly* (for *completely*), *partially* and *partway* (for *partly*), and *half* (for *halfway*):

(2) a. Stanley ate his Wheaties entirely.
b. Rebecca partially solved the problem.
c. Mary half opened the door.

Clearly, the sentences in (2) are very similar in meaning to, even if not always entirely equivalent to, the corresponding ones in (1). One difference is that the meaning of *partway* and *halfway* seems to be necessarily spatial, whereas that of

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partly and *half* may be nonspatial as well. This is seen by the difference in acceptability between (1b) and *#Rebecca solved the problem partway* (cf. *Mary opened the door partway*), on the one hand, and between *Stanley half ate his Wheaties* and ?#*Stanley ate his Wheaties halfway*, on the other. In other cases, e.g., *partly* vs. *partially*, the difference (if there is a salient one) is less palpable.

There are also adverbials of completion, namely, PPs that function similarly to adverbs of completion:

(3) a. Mary read the book to the penultimate chapter.
b. He sang the aria from the first cadenza. (Thomason and Stalnaker 1973:218)
c. Rebecca solved the problem to some extent.

For example, just as *half* in (2c) qualifies the extent to which Mary opened the door, *to the penultimate chapter* in (3a) specifies the extent to which she read the book. Observe that adverbs of completion can modify gradable adjectives as well:

(4) a. Stanley's bowl was completely empty.
b. The problem was partly solved.
c. The door was halfway open.

Intuitively, the role of adverbs of completion as adjective modifiers is the same as their role as verb modifiers. Thus, just as *completely* in (1a) entails that Stanley's eating of his Wheaties was realized to the maximal degree, *completely* in (4a) implies that his bowl's emptiness was realized to the maximal degree. I assume that any account of adverbs of completion should be general enough to cover both their use as verb modifiers and their use as adjective modifiers.

The aim of this paper is to sketch a new approach to adverbs of completion, focusing on *completely*, *partly*, and *half*.

2. THREE PROPERTIES

In this section I discuss three properties of adverbs of completion that form the empirical basis for my analysis in section 4.

2.1. Basic Distribution

It is an old discovery that adverbs of completion are very restricted with respect to the variety of positions that they may appear in, as observed, for example, in Jackendoff (1972) and Jacobson (1978). Essentially, they are restricted to immediate

preverbal position and postverbal (postobject) position, where the 'verbal position' in question is that of the main verb:[1]

(5) a. Stanley will have (completely, partly) eaten his Wheaties (completely, partly).
b. (*Completely, *Partly) Stanley (*completely, *partly) will (*completely, *partly) have eaten his Wheaties.

At first glance, *partly* seems to defy this generalization, given that it can appear in clause-initial position:

(6) (What did you do today?)
Well, partly I went shopping, partly I cleaned my room, and partly I worked on my paper.

However, it is not difficult to see that this use of *partly* is not the same as its use as an adverb of completion (though the two uses are no doubt related). In fact, *partly* is a sentence modifier in (6) and has the function of asserting different activities for different parts of today. If *partly* were an adverb of completion in (6), then the three clauses in (6) should be equivalent to the following three sentences, respectively, and yet they are not:[2]

(7) a. #I partly went shopping. (#I went shopping partly.)
(cannot mean: 'I did part of the shopping')
b. I partly cleaned my room. (I cleaned my room partly.)
c. #I partly worked on my paper. (#I worked on my paper partly.)
(cannot mean: 'I worked on part of my paper')

For instance, the second clause in (6) asserts that I cleaned my room during some part of today and not that I cleaned part of my room, as the sentence in (7b) entails. Similarly, the third clause in (6) states that I worked on my paper during some part of today, whereas the sentence in (7c) is not even acceptable with *partly* as an adverb of completion. Given that the equivalence between the respective clauses in (6) and the sentences in (7) does not hold, we can conclude that *partly* is not an adverb of completion in the former.

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[1] The adverb *half* (cf. (2c)) is doubtlessly a prefix, even if English orthography does not always reflect this, and so it can only immediately precede the main verb: *Mary half closed the door* (**half*).

[2] An interfering factor that should be controlled for in assessing whether the said equivalence holds is that partly can also appear after the subject as a sentence modifier, e.g., (*What did you do today?*) *Well*, *I partly went shopping*, *I partly cleaned my room*, *and I partly worked on my paper*, but it does sound more natural in clause-initial position. As a sentence modifier, *partly* can at best occur with a pause in clause-final position.

Another feature of adverbs of completion is that they take narrow scope with respect to negation and other adverbials:

(8) a. Stanley didn't (completely) eat his Wheaties (completely).
b. Stanley (*completely) didn't eat his Wheaties.
(9) a. Stanley rarely (completely) ate his Wheaties (completely).
b. Stanley (*completely) rarely ate his Wheaties.
(10) a. Stanley probably (completely) ate his Wheaties (completely).
b. Stanley (*completely) probably ate his Wheaties.

In certain select cases, however, adverbs of completion appear to be able to take scope over negation:

(11) a. ?I completely (partly) don't understand the problem.
b. ?She completely (partly) doesn't agree with me.

Insofar as the examples in (11) are really acceptable (and if are, they are certainly colloquial), I suggest that the negation and the verb semantically form a kind of 'negative verb' that the adverb of completion has scope over. More specifically, not understanding something can be construed as *failing* to understand something (after having tried) and not agreeing with someone can be construed as *disagreeing* with someone (after having considered the issues). This phenomenon occurs naturally with many attitude verbs, which even when negated tend to imply (positive) mental effort on the part of subject. In contrast, the negation of action verbs, e.g., *eat* in (8), does not usually imply (positive) physical effort on the part of the subject. If these observations are correct, then examples like those in (11) do not constitute a real exception to the generalization that adverbs of completion take narrow scope with respect to normal (sentence) negation.

A final point about the distribution of adverbs of completion is that they take narrow scope with respect to both readings of *again*:

(12) a. Mary opened the door again.
(repetitive: what happened again was that Mary opened the door,
restitutive: Mary opened the door and so it was again the case that the door was open)
b. Mary opened the door halfway again.
(repetitive: what happened again was that Mary opened the door halfway,
restitutive: Mary opened the door halfway and so it was again the case that the door was halfway open)

Whereas the repetitive interpretation of (12a) requires Mary to have opened the door before, its restitutive interpretation merely presupposes that the door was open

before, but not necessarily that it had been opened by Mary (or anyone else, for that matter). The point about (12b) is that *halfway* must take narrow scope with respect to *again*: (12b) cannot mean either that what happened again was that Mary opened the door but this time she opened it (only) halfway (repetitive, with wide scope of *halfway*) or that Mary opened the door halfway and so it was again the case that the door was open but this time (only) halfway (restitutive, with wide scope of halfway). In other words, however we construe *again*, *halfway* is in its scope. In fact, the only modifiers 'closer' to the verb than adverbs of completion are verb particles:

(13) a. Stanley completely (partly, half) ate up his Wheaties.
b. He ate them completely (partly, half) up.

The word order in (13b), in particular, reveals rather transparently how adverbs of completion take scope over verb particles. In sum, the distributional evidence suggests that adverbs of completion are verb modifiers, meaning that they basically appear internal and not external to the VP. This conclusion is in fact compatible with the views of both Jackendoff (1972:74-75) and Jacobson (1978:137) on the syntax of *completely*.[3]

2.2. Not (Always) Extensional

Adverbs of completion are not extensional in the sense that the truth of the sentences in which they appear is not (always) preserved if they are dropped:

(14) a. Rebecca completely solved the problem → Rebecca solved the problem
(the dropping of *completely* preserves truth)
b. Rebecca partly (half) solved the problem ↛ Rebecca solved the problem
(the dropping of *partly* (*half*) does not preserve truth)

Thomason and Stalnaker (1973:218) were originally troubled by examples comparable to (14b) (cf. (3b)), because they wanted to entertain the hypothesis that 'predicate modifiers' (to use their term) generally preserve truth when dropped. Since adverbs of completion are clearly predicate modifiers, their exceptional behavior in this regard suggests that Thomason and Stalnaker's hypothesis does not

[3] At the same time, this conclusion is not so obviously compatible with the views of Alexiadou (1997, sects. 5.2.4, 5.6) and Cinque (1999, sects. 4.2.3, 4.2, 4.2.9) on the syntax of *completely*. The difficulty is that Alexiadou and Cinque both place *completely* in the specifier position of a functional projection (Cinque even offers a choice of two different functional projections) that is relatively low in the hierarchy but still above the VP. However, since Alexiadou and Cinque are not clear about how they envision the semantic composition, their views may turn out to be compatible with the verb modifier approach that I am advocating—it is simply hard for me to tell.

extend to the full class of predicate modifiers.[4] Of course, *completely* differs from *partly* and *half* in preserving truth when dropped (see (14a)), but this seems to be due to the fact that the meaning of *completely* (as a special case among adverbs of completion) already asserts maximal realization of the situation type in question.

Observe that the non-extensionality of *partly* and *half* (in contrast to *completely*) naturally applies to their use as adjective modifiers as well:

(15) a. The problem was completely solved → The problem was solved (the dropping of *completely* preserves truth)
b. The problem was partly (half) solved ↛ The problem was solved (the dropping of *partly* (*half*) does not preserve truth)

However, even if adverbs of completion are not (always) extensional, they are also not intensional in the way that more familiar intensional expressions are, given that they do not create opaque contexts. For instance, if Stanley intentionally ate his Wheaties but did not realize that his Wheaties was his lunch, it does not follow that he intentionally ate his lunch. In contrast, if Stanley partly ate his Wheaties but did not realize that his Wheaties was his lunch, it nevertheless does follow that he partly ate his lunch. In short, adverbs of completion do not involve an attitude on the part of the subject, in contrast to more familiar intensional expressions.

2.3. Two Restrictions

The first restriction is that adverbs of completion, as verb modifiers, require the internal argument of the verb to be expressed but at the same time prohibit it from being expressed as a bare plural (or bare mass) NP:[5]

(16) a. #Stanley completely ate (sandwiches).
b. #Rebecca partly solved problems.
c. #Mary closed doors halfway.
(17) a. #Stanley completely ate (cereal).
b. #The university partly recycled paper.
c. #Rebecca half burned wood.

Another way of describing this restriction is that adverbs of completion are incompatible with aspectually durative expressions of change. If the object NPs in (16) and (17) had an overt determiner, then the corresponding sentences would be acceptable. Intuitively, what goes wrong in (16) and (17) is that the choice of a bare

[4] Thomason and Stalnaker conclude with the suggestion that meaning postulates will be necessary to distinguish those predicate modifiers that preserve truth when dropped from those that do not.

[5] Schmitt (1996, chap. 2) observes this phenomenon for *half* and draws some useful crosslinguistic comparisons.

plural (or bare mass) NP does not yield a situation type for which it makes sense to say that it was completely (partly, half) realized.

The second restriction is that adverbs of completion, as adjective modifiers, do not combine with all gradable adjectives (cf. (4)):

(18) a. #Stanley's bowl is completely big.
b. #The (whole) problem is partly difficult.[6]
c. #The door is half heavy.

Intuitively, the difference between those gradable adjectives that are compatible with adverbs of completion and those that are not is that the former are associated with a scale having a maximal degree, whereas the latter are associated with a scale lacking a maximal degree.[7]

One of the aims of the analysis that I present in section 4 is to show that these two restrictions are essentially the same.

3. TWO PREVIOUS APPROACHES

Adverbs of completion have not been the focus of many analyses in the past. Here I will briefly critically review two approaches that I am aware of, the first being due to Parsons (1990) and the second, to Moltmann (1997).

Parsons (1990:122) analyzes *partway* as a predicate operator that applies to a predicate of states, yielding a new predicate of states. Basically, Parsons claims (p. 15) that *partway* and other adverbs of completion are really only adjective modifiers and not verb modifiers at all. Ignoring irrelevant details, his analysis of *x closes the door partway* is as follows (*e* and *e'* are variables for events, and *s* and *s'* are variables for states):

(19) a. partway + $\text{closed}_{\text{adj}}$ = $\lambda s'[\mathit{partway}(\lambda s[\mathit{closed}(s)])(s')]$
b. x closes the door partway =
$\exists e[\mathit{agent}(e, x) \wedge \exists e'[\mathit{theme}(e', \mathit{door}) \wedge \mathit{cause}(e, e') \wedge$
$\exists s[\mathit{partway}(\mathit{closed})(s) \wedge \mathit{theme}(s, \mathit{door}) \wedge \mathit{become}(e', s)]]]$

Parsons points out that the meaning represented in (19b) does not entail that the door is closed but only that it is partway closed (the non-extensionality of *partway* is taken care of in this way).

Tenny (2000:304-306) adopts Parsons's analysis of *partway* (also to be used for *partly*) and applies it to other sentences, including the following one:

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[6] Naturally, *The problem is partly diffcult* is fine, but this means that part of the problem is difficult and not that the (whole) problem's degree of difficulty falls somewhere on the (positive) scale of difficulty.

[7] A similar point is made in Kennedy and McNally (1999, sect. 3.2).

(20) x eats the sandwich partway (= x partly eats the sandwich) =
$\exists e[agent(e, x) \wedge \exists e'[theme(e', sandwich) \wedge cause(e, e') \wedge$
$\exists s[partway(consumed)(s) \wedge theme(s, sandwich) \wedge become(e', s)]]]$

Parsons's analysis of *partway* (and his implied account of adverbs of completion) is unsatisfactory for at least two reasons. First, no definition of *partway* is given, nor (in the absence of a definition) are any meaning postulates for *partway* offered. Second, no compositional semantic analysis is presented. In this regard, it is quite unclear how *partway* can apply to the predicate of states buried in the semantic decomposition of certain verbs. (Or does Parsons intend for his semantic decomposition of verbs to be mirrored as decomposition in the syntax?) Until such issues are addressed, it is hard to regard his analysis as a serious contender.

In what she calls a 'part-quantificational account' of adverbs of completion, Moltmann (1997:184) claims that "[a]dverbs of completion specify to which extent the parts of a concrete event instantiate the parts of a given abstract event." Taken literally, this expresses a different intuition from the one that I espouse, namely, that adverbs of completion specify to what extent a given situation type is realized, but taken loosely it could amount to the same thing. However, Moltmann intends it quite literally. In connection with *John completely agreed*, she writes that *completely* "specifies that each part of the abstract event of agreement expressed by John agreed is instantiated by some part of John's concrete act of agreement." The meaning that Moltmann assigns (p. 192) to *completely* is basically the two-place relation shown in (21), where e, e' are variables for concrete events, E, E' are variables for abstract events, $\subseteq$ is a part relation, and I stands for a relation of instantiation between concrete events and abstract events.

(21) completely $\Rightarrow \lambda E \lambda e[\forall E'[E' \subseteq E \rightarrow \exists e'[e' \subseteq e \wedge e'IE']]]$

Although not evident in (21), this analysis presupposes a function h that maps relations between concrete events e and n participants to a relation between abstract events e and n participants just in case e instantiates E.

While it would take me too far afield to address all the details of Moltmann's analysis, I should like to mention the following four problematic points. First, many notions (abstract events, the relation I, the function h) are introduced just for the analysis of adverbs of completion. They do not seem to be independently motivated in her framework. Second, even if we (reluctantly) grant the existence of abstract events, it seems dubious that they both need not have occurred and yet still may have concrete participants and be located in time and space, as Moltmann claims (p. 185). (How can something that has not occurred be located in space and time?) Third, although Moltmann treats adverbs of completion as verb modifiers (which is welcome), her other assumptions require her to postulate (p. 186) a special and somewhat cumbersome semantic rule in order to be able to combine them with verbs. Fourth and finally, her analysis does not account for the two restrictions

mentioned in section 2.3, although in connection with the first restriction she mentions (p. 192) "the dependence of the part structure on the description." Even so, she does not make this "dependence" explicit in her analysis.

In sum, I conclude that there is still room for improvement regarding how adverbs of completion should be analyzed.

4. A NEW APPROACH

The guiding intuition behind the analysis that I will sketch is that the semantics of adverbs of completion makes reference to the degree to which a situation type is realized. For example, in the case of *completely* the degree of realization of the situation type in question is maximal, whereas in the case of *partly* it is partial. In working out this intuition, I will pursue a fairly modular approach to the semantics of adverbs of completion: basically, adverbs of completion have a common semantic interface with adjectives and verbs, and independent differences between adjectives and verbs are handled by independent mechanisms.

4.1. Preliminaries

I will adopt an event semantic framework that presupposes three (pairwise disjoint) sorts of objects in the domain of discourse: *ordinary objects* (x, y, …), *events* (e, e', …), and *degrees* (d, d', …). The domain of events should be understood in the broad sense, as including processes and states as well. For present purposes, it is appropriate to model degrees as *real numbers* in the closed interval bounded by 0 and 1 (i.e., [0,1]). In addition, I will make use of a *proper part* relation ($\subset$) on each of the domains of ordinary objects and events and a *greater-than* relation ($>$) as well as a *greater-than-or-equal* relation ($\geq$) on the domain of degrees, the latter two relations being interdefinable in the usual way. Finally, I will assume the dual notions of (metaphysical) *possibility* ($\Diamond$) and *necessity* ($\Box$), these also being interdefinable. Since various kinds of predicate variables will appear in the semantic representations, it is useful to specify in advance the types of variables that will play a role:

(22) a. two-place relations between events and ordinary objects: R, R', …
b. three-place relations between events and two ordinary objects: S, S', …
c. three-place relations between events, ordinary objects, and degrees: T, T', …
d. four-place relations between events, two ordinary objects, and degrees: U, U', …
e. two-place functions from events and ordinary objects to degrees: f, f', …

f. two-place relations between events and (two-place) relations between events and ordinary objects (a.k.a. generalized quantifiers): Q, Q', … (of type $\langle\langle e_O,\langle e_E,t\rangle\rangle,\langle e_E,t\rangle\rangle$)

In connection with (22f) I point out that the notion of a generalized quantifier in an event semantics differs in two respects from the usual one familiar from non-event semantic frameworks: first, it applies to a relation between events and ordinary objects (as opposed to a predicate of ordinary objects), and second, it yields a predicate of events (as opposed to a formula denoting a truth value). These two differences take into account both that verbs are generally analyzed as having an event argument and that (non-tensed) sentences should be analyzable as predicates of events. The usual notion of a generalized quantifier does not take these two factors into account.

With these prequisites in place, I am in a position to propose an analysis for the adverbs of completion *completely*, *partly*, and *half*. Syntactically, there are two cases to distinguish, depending on whether the adverb of completion takes a verb or an adjective as its argument. Since the case of adjective modification is more straightforward, I will begin with it.

4.2. Adjective Modification

I analyze the three adverbs of completion in their use as adjective modifiers as follows:

(23)

a. $[_{\text{Adj}'}$ completely $[_{\text{Adj}}\ \alpha]]$;
completely $\Rightarrow\ \lambda T\lambda x\lambda e[T(e, x, 1) \wedge \Diamond\exists e'\,\exists x'\,[T(e', x', 1)]]$
$=_{\text{def}}$ completely_a

b. $[_{\text{Adj}'}$ partly $[_{\text{Adj}}\ \alpha]]$;
partly $\Rightarrow \lambda T\lambda x\lambda e[\exists d[T(e, x, d) \wedge d > 0] \wedge \Diamond\exists e'\,\exists x'[T(e', x', 1)]]$
$=_{\text{def}}$ partly_a

c. $[_{\text{Adj}}$ half $[_{\text{Adj}}\ \alpha]]$;
half $\Rightarrow \lambda T\lambda x\lambda e[\exists d[T(e, x, d) \wedge d \geq 0.5] \wedge \Diamond\exists e'\,\exists x'[T(e', x', 1)]]$
$=_{\text{def}}$ half_a

As seen in (23), each adverb combines with an adjective whose meaning is represented by a three-place relation T between events, ordinary objects, and degrees.[8] This has the effect of restricting the value of the degree argument in a certain way: whereas *completely* and *half* set its value to 1 and to at least 0.5, respectively, *partly* merely requires it to be greater than 0. Furthermore, each adverb also carries the presupposition that the maximal degree of 1 is attainable with

[8] Note that the event argument of adjectives should be thought of as a state argument—recall that I am not officially distinguishing events in the narrow sense from states.

respect to *T* for some event *e'* and ordinary object *x'*.[9] Note also that the syntactic result of modification is an Adj' in the case of *completely* and *partly* and a new adjective in the case of *half*.[10]

Recall from (4) and (18) that adverbs of completion can modify many but not all gradable adjectives. As mentioned in section 2.3, the idea is that gradable adjectives differ as to whether they are associated with a scale allowing for a maximal degree or not. For example, adjectives such as *empty*, *solved*, and *open* are associated with scales having a maximal degree, whereas *big*, *difficult*, and *heavy* are not. (Another way of putting this is that some scales are closed at the top, whereas others are open at the top.)

Let's demonstrate how the three adverbs of completion can sucessfully combine with *empty* (cf. (4a)). I assume that gradable adjectives basically denote two-place measure functions from events and ordinary objects to degrees, as shown in (24a) for *empty* (in prose, the degree to which *x* in *e* is empty). In addition, an accompanying axiom guarantees that the property of being empty can be realized to the maximal degree of 1 (intuitively, there is a limit to how empty things can be). In (24b), I give the analysis of a (phonologically null) degree morpheme *deg-a* that combines with a gradable adjective and makes its degree argument available for modification. Finally, the result of applying *deg-a* to *empty* is a three-place relation between events, ordinary objects, and degrees, as seen in (24c).[11]

(24) a. $[_{\text{Adj}}$ empty$] \Rightarrow \lambda x \lambda e[\textsf{empty}(e, x)]$ (of type $\langle e_O, \langle e_E, e_D \rangle\rangle$)
Axiom. $\Diamond \exists e \exists x[\textsf{empty}\ (e, x) = 1]$

b. $[_{\text{Adj}}$ *deg-a* $[_{\text{Adj}}\ \alpha]]$;
deg-a $\Rightarrow \lambda f \lambda d \lambda x \lambda e[f(e, x) = d]$

c. $[_{\text{Adj}}$ *deg-a* $[_{\text{Adj}}$ empty$]] \Rightarrow \lambda d \lambda x \lambda e[\textsf{empty}(e, x) = d]$

Clearly, the relation in (24c) is an appropriate argument for the adverbs of completion (see (23)), and in (25) I provide the results of applying each adverb to this relation.

(25) a. $[_{\text{Adj}'}$ completely $[_{\text{Adj}}$ *deg-a* $[_{\text{Adj}}$ empty$]]] \Rightarrow$
$\textsf{completely\_a}(\lambda d \lambda x \lambda e[\textsf{empty}(e, x) = d]) =$

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[9] Technically, I treat this condition as part of the assertion and not as a presupposition, given that I am not assuming a framework that can handle presuppositions properly. Even so, I will continue to speak informally of presuppositions.

[10] Recall that *half* is a prefix. When speaking of categories such as Adj' (also V'), I mean to remain as neutral as possible regarding the precise phrasal categories in question. For example, I gather that Kennedy (1999, sect. 2.2) would consider my Adj' in (23) to be a DegP (a degree phrase), though he does not explicitly discuss modification of adjectives by adverbs of completion.

[11] Here I am more or less following Kennedy's (chap. 2, 1999) conception. The two main differences are that he does not assume an event argument for adjectives and does assume a more elaborate syntax for them (adjectives are embedded in a DegP). Moreover, he does not state axioms such as the one in (24a).

$\lambda x \lambda e$[empty(e, x) = 1 $\wedge$ $\Diamond \exists e' \exists x'$ [empty(e', x') = 1]]

b. [$_{\text{Adj}}$ partly [$_{\text{Adj}}$ *deg-a* [$_{\text{Adj}}$ empty]]] $\Rightarrow$
partly_a($\lambda d \lambda x \lambda e$[empty($e$, x) = d]) =
$\lambda x \lambda e$[$\exists d$[empty(e, x) = $d \wedge d > 0$] $\wedge$ $\Diamond \exists e' \exists x'$[empty($e'$, x') = 1]]

c. [$_{\text{Adj}}$ half [$_{\text{Adj}}$ *deg-a* [$_{\text{Adj}}$ empty]]] $\Rightarrow$
half_a($\lambda d \lambda x \lambda e$[empty($e$, x) = d]) =
$\lambda x \lambda e$[$\exists d$[empty(e, x) = $d \wedge d \geq 0.5$] $\wedge$ $\Diamond \exists e' \exists x'$[empty($e'$, x') = 1]]

Since the meaning of *empty* satisfies the requirement that the maximal degree of 1 be attainable (see (24a)), the resulting combinations are semantically coherent. For instance, the predicate of events corresponding to the sentence in (4a) (ignoring tense) can be concisely represented as follows (in prose, the set of events in which Stanley's bowl is empty to the maximal degree):

(26) Stanley's bowl be completely empty $\Rightarrow$
λe[completely_a(e, stanley's_bowl, $\lambda d \lambda x \lambda e'$ [empty(e', x) = d])]
= λe[empty(e, stanley's_bowl) = 1 $\wedge$ $\Diamond \exists e' \exists x'$[empty($e'$, x') = 1]]

Turning to those gradable adjectives that are incompatible with adverbs of completion, let's illustrate with *big* (cf. (18a)) how this incompatibility arises. The analysis of *big* parallels that of *empty* (see (24)) with the crucial exception that the corresponding axiom asserts that the property of being big cannot be realized to the maximal degree of 1. Intuitively, this axiom encodes that is no limit to how big things can be, or, to put it another way, that the interval of degrees serving as the range of *big* is open on the right.

(27) a. [$_{\text{Adj}}$ big] $\Rightarrow$ $\lambda x \lambda e$[big(e, x)] (of type $\langle e_O, \langle e_E, e_D \rangle \rangle$)
Axiom. $\neg \Diamond \exists e \exists x$[big($e$, x) = 1]

b. [$_{\text{Adj}}$ *deg-a* [$_{\text{Adj}}$ big]] $\Rightarrow$ $\lambda d \lambda x \lambda e$[big($e$, x) = d]

Since the semantics of adverbs of completion presupposes that the maximal degree of 1 is attainable, there is an evident presupposition failure if an adverb of completion combines with *big*. For example, the result of applying *completely* to *big* is shown in (28), where the requirement that the property of being big be realizable to the maximal degree of 1 clashes with the axiom associated with *big*, which asserts that it cannot be (see (27a)).

(28) #[$_{\text{Adj}}$ completely [$_{\text{Adj}}$ *deg-a* [$_{\text{Adj}}$ big]]] $\Rightarrow$
completely_a($\lambda d \lambda x \lambda e$[big ($e$, x) = d]) =
$\lambda x \lambda e$[big(e, x) = 1 $\wedge$ $\Diamond \exists e' \exists x'$[big($e'$, x') = 1]]

Before closing this section, I will indicate how the non-extensionality of *partly* and *half* (in contrast to *completely*) as adjective modifiers is accounted for (see sect.

2.2). For example, if Stanley's bowl is partly (half) empty, it does not follow that it is empty. This is because the unmodified, positive form of a gradable adjective makes implicit reference to a *standard degree* (d_{stnd}) of comparison that is fixed by the context for the property in question. Technically, I treat the standard degree as a free variable that is introduced by a degree morpheme *pos-a* which is applied to the basic adjective, as illustrated in (29) for *empty*.[12] Note also that *deg-a* (see (24b)) contrasts with *pos-a* in this respect, because *deg-a* makes the degree argument available for modification and does not restrict its value in any way.

(29) $[_{\text{Adj}}\, pos\text{-}a\ [_{\text{Adj}}\ \alpha]]$;
$pos\text{-}a \Rightarrow \lambda f \lambda x \lambda e[f(e, x) \geq d_{stnd}]$
$[_{\text{Adj}}\, pos\text{-}a\ [_{\text{Adj}}\ \text{empty}]] \Rightarrow \lambda x \lambda e[\textsf{empty}(e, x) \geq d_{stnd}]$

In the case of *empty*, the standard degree would define the threshold that ordinary objects (e.g., cereal bowls) must meet in order to count as empty—in general, it seems reasonable to think that it will fall somewhere between 0.9 and 1, taking the value of 1 to correspond to complete emptiness. Now, the simple observation is that since *completely* restricts the value of the degree argument to be 1, this will always be at least as high as the standard, but the matter is very different for *partly* and *half*, which both allow for a value of the degree argument that may be less than the standard degree. Consequently, the semantics of *partly* and *half* in combination with an adjective does not generally entail the meaning of the unmodified, positive form of the adjective.

4.3. Verb Modification

How do adverbs of completion modify verbs? If the strategy is to keep the semantics of adverbs of completion in their two uses maximally similar (and this is the strategy), then we have two immediate problems to contend with: first, most verbs presumably do not have a degree argument to begin with, and second, it is not terribly clear at first glance what it should mean for an event type to be realizable to the maximal degree of 1. In what follows, I will propose a semantics for adverbs of completion as verb modifiers with an eye to these two issues.

Concentrating on the case in which adverbs of completion combine with a transitive verb, I suggest the following analyses for *completely*, *partly*, and *half*, respectively:

(30) a. $[_{\text{V}'}$ completely $[_{\text{V}}\ \alpha]]$;
completely $\Rightarrow \lambda U \lambda Q \lambda x \lambda e[Q(e, \lambda y \lambda e'\,[U(e', x, y, 1)]) \wedge$

[12] Strictly speaking, the standard degree is probably best thought of as the value of a certain function that is for simplicity not explicitly represented in (29). See Kennedy (1999, sect. 2.3.2) for discussion.

$\Diamond\exists e_1\exists x_1[Q(e_1, \lambda y\lambda e'[U(e', x_1, y, 1)])] \wedge$
$\Box\forall e_2\forall x_2[Q(e_2, \lambda y\lambda e'[U(e', x_2, y, 1)]) \rightarrow$
$\neg\exists e_3[Q(e_3, \lambda y\lambda e'[U(e', x_2, y, 1)]) \wedge e_3 \subset e_2]]]$
$=_{def}$ completely_v

b. $[_{V'}$ partly $[_V \alpha]]$;
partly $\Rightarrow \lambda U\lambda Q\lambda x\lambda e[\exists d[Q(e, \lambda y\lambda e'[U(e', x, y, d)]) \wedge d > 0] \wedge$
$\Diamond\exists e_1\exists x_1[Q(e_1, \lambda y\lambda e'[U(e', x_1, y, 1)])] \wedge$
$\Box\forall e_2\forall x_2[Q(e_2, \lambda y\lambda e'[U(e', x_2, y, 1)]) \rightarrow$
$\neg\exists e_3[Q(e_3, \lambda y\lambda e'[U(e', x_2, y, 1)]) \wedge e_3 \subset e_2]]]$
$=_{def}$ partly_v

c. $[_V$ half $[_V \alpha]]$;
half $\Rightarrow \lambda U\lambda Q\lambda x\lambda e[\exists d[Q(e, \lambda y\lambda e'[U(e', x, y, d)]) \wedge d \geq 0.5 \wedge$
$\Diamond\exists e_1\exists x_1[Q(e_1, \lambda y\lambda e'[U(e', x_1, y, 1)])] \wedge$
$\Box\forall e_2\forall x_2[Q(e_2, \lambda y\lambda e'[U(e', x_2, y, 1)]) \rightarrow$
$\neg\exists e_3[Q(e_3, \lambda y\lambda e'[U(e', x_2, y, 1)]) \wedge e_3 \subset e_2]]]$
$=_{def}$ half_v

All three adverbs combine with a verb whose meaning is represented by a four-place relation *U* between events, two ordinary objects, and degrees, and they yield a V' (in the case of *half*, a new verb) whose meaning is represented by a three-place relation between events, ordinary objects, and generalized quantifiers. Thus, the effect of each adverb is twofold. On the one hand, it restricts the value of the degree argument just like in (23): whereas *completely* and *half* set its value to 1 and 0.5, respectively, *partly* forces it to be greater than 0. On the other hand, each adverb raises the logical type of the verb's internal argument to that of a generalized quantifier.

A comparison of (30) with (23) makes it clear that the semantics assigned to the adverbs in their two uses is very similar, the main difference being in the additional presupposition (beginning on the third line of each formula) that the adverbs carry in their use as verb modifiers. Intuitively, the rationale for raising the logical type of the verb's internal argument to that of a generalized quantifier is to have access to how it is described (in other words, to have scope over the NP that realizes it). The information provided by the generalized quantifier is incorporated into the description of the event type, which the two presuppositions make vital use of. In a nutshell, the first presupposition (second line) requires that the event type be realizable to the maximal degree of 1 with respect to an event e_1 and the second presupposition (third/fourth line) asserts that it is necessarily the case that if the event type is realized to the maximal degree of 1 with respect to an event e_2, then there is no proper subevent e_3 of e_2 with respect to which the event type is realized to the maximal degree of 1. Essentially, the role of the second presupposition is to place a constraint on what it means for an event type to be realized to the maximal degree of 1. It has the consequence that the internal argument of the verb cannot be expressed as a bare plural or bare mass NP (see section 2.3), as discussed below.

The first immediate problem mentioned above is that adverbs of completion apply to verbs with a degree argument, and yet most verbs arguably do not start out with a degree argument. Now, if verbs do not have a degree argument to begin with, then they have to acquire one along the way. To this end, I introduce a *degree function* δ from events, ordinary objects, and two-place relations between events and ordinary objects to degrees.[13] Basically, δ is a kind of measure function—it measures the extent to which an ordinary object *x* is affected (or effected, for that matter) in an event *e* with respect to a relation *R*. For example, if *R* is the relation of eating between events and objects that are eaten (i.e., the internal argument relation of *eat*), *e* is an eating event, and *x* is an apple, then the value of δ as applied to *e*, *x*, and *R* represents how much of the apple is eaten in *e*, where the value of 1 indicates that the apple is fully eaten in *e*, the value of 0 means that the apple is not at all eaten in *e*, and a value greater than 0 entails that a part of the apple is eaten in *e*. For the purposes of this paper, I will not attempt to lay down the axioms for δ but will simply remark that its value should increase in the course of an event with respect to an ordinary object and the chosen relation.

In order to make the degree argument introduced by δ modifiable, I propose that a degree morpheme *deg-v* having the essential content of δ is applied to the basic verb, as shown in (31) for *eat*.

(31) a. $[_V \text{ eat}] \Rightarrow \lambda y \lambda x \lambda e[\textsf{eat}(e, x, y)]$

b. $[_V \textit{ deg-v } [_V \alpha]]$;
$\textit{deg-v} \Rightarrow \lambda S \lambda d \lambda y \lambda x \lambda e[\delta(e, y, \lambda y' \lambda e' [S(e', x, y')]) = d]$

c. $[_V \textit{ deg-v } [_V \text{ eat}]] \Rightarrow \lambda d \lambda y \lambda x \lambda e[\delta(e, y, \lambda y' \lambda e' [\textsf{eat}(e', x, y')]) = d]$

Observe the parallel between *deg-v* in (31b) and *deg-a* in (24b), the crucial difference being that *deg-v* serves both to add a degree argument to the verb and to make it modifiable, whereas *deg-a* merely makes the (already existing) degree argument of the gradable adjective modifiable. As illustrated in (31c), the result of applying *deg-v* to a transitive verb is a four-place relation between events, two ordinary objects, and degrees. Recall from (30) that this is precisely the kind of input that the adverbs of completion require. By way of illustration, let's consider the result of combining *completely* with *eat*:

(32) $[_{V'} \text{ completely } [_V \textit{ deg-v } [_V \text{ eat}]]] \Rightarrow$
$\textsf{completely\_v}(\lambda d \lambda y \lambda x \lambda e [\delta(e, y, \lambda y' \lambda e' [\textsf{eat}(e', x, y')]) = d] =$
$\lambda Q \lambda x \lambda e[Q(e, \lambda y \lambda e' [\delta(e', y, \lambda y' \lambda e'' [\textsf{eat}(e'', x, y')]) = 1]) \wedge$
$\Diamond \exists e_1 \exists x_1 [Q(e_1, \lambda y \lambda e' [\delta(e', y, \lambda y' \lambda e'' [\textsf{eat}(e'', x_1, y')]) = 1])] \wedge$
$\Box \forall e_2 \forall x_2 [Q(e_2, \lambda y \lambda e' [\delta(e', y, \lambda y' \lambda e'' [\textsf{eat}(e'', x_2, y')]) = 1]) \rightarrow$
$\neg \exists e_3 [Q(e_3, \lambda y \lambda e' [\delta(e', y, \lambda y' \lambda e'' [\textsf{eat}(e'', x_2, y')]) = 1]) \wedge$

[13] I made use of a similar degree function for the semantics of *gradually* in Piñón (2000).

$e_3 \subset e_2]]]$

It is perhaps easier to appreciate the force of this formula once it is fed both a generalized quantifier argument and a subject argument. If we aim to derive the sentence in (1a), the respective arguments are the following:

(33) a. his Wheaties $\Rightarrow \lambda R \lambda e[R(e, \mathsf{his\_wheaties})]$
b. Stanley $\Rightarrow \mathsf{stanley}$

Applying the formula in (32) to these two arguments, we get the following predicate of events for the untensed sentence:

(34) Stanley completely eat his Wheaties $\Rightarrow$
$\lambda e[\delta\ (e, \mathsf{his\_wheaties}, \lambda y' \lambda e''\ [\mathsf{eat}(e'', \mathsf{stanley}, y')]) = 1 \wedge$
$\Diamond \exists e_1 \exists x_1[\delta\ (e_1, \mathsf{his\_wheaties}, \lambda y' \lambda e''\ [\mathsf{eat}(e'', x_1, y')]) = 1] \wedge$
$\Box \forall e_2 \forall x_2[\delta\ (e_2, \mathsf{his\_wheaties}, \lambda y' \lambda e''\ [\mathsf{eat}(e'', x_2, y')]) = 1 \rightarrow$
$\neg \exists e_3[\delta\ (e_3, \mathsf{his\_wheaties}, \lambda y' \lambda e''\ [\mathsf{eat}(e'', x_2, y')]) = 1] \wedge$
$e_3 \subset e_2]]]$

This predicate denotes the set of events in which Stanley eats his Wheaties to the maximal degree of 1 and presupposes both that it is possible for someone to eat his (i.e., Stanley's) Wheaties to the maximal degree of 1 (surely it is) and that it is necessary that if someone eats his Wheaties to the maximal degree of 1 in an event e_2, then no proper part e_3 of e_2 is an event in which that person eats his Wheaties to the maximal degree of 1 (also true). Let's now contrast the previous semantically coherent sentence with the unacceptable one in (17a), which contains the bare mass NP *cereal* in place of *his Wheaties*. The analysis of *cereal* as a generalized quantifier is as follows:

(35) cereal $\Rightarrow \lambda R \lambda e[\exists y[R(e, y) \wedge \mathsf{cereal}(y)]]$

The application of the formula in (32) first to this generalized quantifier and then to the term for *Stanley* in (33b) yields the predicate of events representing the tenseless (and unacceptable) sentence in (17a):

(36) #Stanley completely eat cereal $\Rightarrow$
$\lambda e[\exists y[\delta\ (e, y, \lambda y' \lambda e''\ [\mathsf{eat}(e'', \mathsf{stanley}, y')]) = 1 \wedge \mathsf{cereal}(y)] \wedge$
$\Diamond \exists e_1 \exists x_1 \exists y_1[\delta\ (e_1, y_1, \lambda y' \lambda e''\ [\mathsf{eat}(e'', x_1, y')]) = 1 \wedge$
$\mathsf{cereal}(y_1)] \wedge$
$\Box \forall e_2 \forall x_2\ [\exists y_2[\delta\ (e_2, y_2, \lambda y' \lambda e''\ [\mathsf{eat}(e'', x_2, y')]) = 1 \wedge$
$\mathsf{cereal}(y_2)] \rightarrow$
$\neg \exists e_3 \exists y_3[\delta\ (e_3, y_3, \lambda y' \lambda e''\ [\mathsf{eat}(e'', x_2, y')]) = 1 \wedge$

$$\text{cereal}(y_3) \wedge e_3 \subset e_2]]]$$

This predicate denotes the set of events in which Stanley eats a quantity of cereal to the maximal degree of 1 and presupposes both that it is possible for someone to eat a quantity of cereal to the maximal degree of 1 (which seems true) and that it is necessary that if someone eats a quantity of cereal to the maximal degree of 1 in an event e_2, then no proper part e_3 of e_2 is an event in which that person eats a quantity of cereal to the maximal degree of 1, which is certainly false. For example, Stanley's complete eating of half a bowl of Wheaties may well be a proper part of his complete eating of a bowl of Wheaties. Since it is easy to see that this presupposition will fail with bare plural NPs as well (cf. (16)), we have an account of why all such 'bare object NPs' are unacceptable with adverbs of completion. (Although I do not provide derivations with *partly* and *half*, they are the same as *completely* in this respect.)

Notice that the failure of the second presupposition in (36) implies that the first presupposition fails as well, although it initially appeared to be satisfied. In other words, event types such as the one corresponding to *eat cereal* are not realizable to the maximal degree of 1 (just as the property of being big is not either; recall (27) - (28)). Of course, this does not mean that a person cannot eat a given quantity of cereal to the maximal degree of 1 (it happens all the time), but rather that there cannot be a largest event which realizes the event type corresponding to *eat cereal*.

As a final remark, I will return to the non-extensionality of *partly* and *half* (in contrast to *completely*) as verb modifiers discussed in section 2.2. Essentially, the idea is to adopt the same solution as was suggested for adjectives in (29), namely, that the unmodified, positive form of a verb makes implicit reference to a standard degree of comparison that is fixed by the context for the property in question. This standard degree is introduced by a degree morpheme *pos-v* that is applied to the basic verb, as exemplified in (37) for *eat*.

(37) a. $[_V$ *pos-v* $[_V\ \alpha]]$;
$\textit{pos-v} \Rightarrow \lambda S \lambda y \lambda x \lambda e[\delta(e, y, \lambda y' \lambda e'\ [S(e', x, y')]) \geq d_{\text{stnd}}]$

b. $[_V$ *pos-v* $[_V$ eat$]] \Rightarrow \lambda y \lambda x \lambda e[\delta(e, y, \lambda y' \lambda e'\ [S(e', x, y')]) \geq d_{\text{stnd}}]$

If it is claimed that Stanley ate his Wheaties, then the truth of this claim is compatible with the possibility that some Wheaties were left in his bowl uneaten. However, if too many Wheaties remained, then the claim seems false. I assume that the context sets a standard degree that determines the threshold that events in which the kind of object at issue is eaten must meet in order to count as eatings of that kind of object. Turning to the adverbs of completion, it is clear that the maximal degree of 1 set by *completely* will always be at least as high as the standard, but this is not so for either *partly* or *half*, both of which allow for a value of the degree argument that may be less than the standard. Accordingly, there is no general entailment from

the meaning of *partly* or *half* in combination with a verb to the meaning of the unmodified, positive form of the verb.

5. ACKNOWLEDGEMENTS

I am grateful to an anonymous reviewer for helpful comments and questions. This work was supported in part by the Hungarian Scientific Research Fund (OTKA TS 40705). The author's web address is ⟨http://nytud.hu/~pinon⟩.

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EMMON BACH

EVENTUALITIES, GRAMMAR, AND LANGUAGE DIVERSITY

...the true difference between languages is not in what may or may not be expressed but in what must or must not be conveyed by the speakers.

Roman Jakobson, 1959

Abstract. Languages differ widely in what is put into their grammars. Typological studies must take this into account. In the realm of "eventology" I compare a number of North American languages from the point of view of showing how a basic and probably universal classification of events, processes, states can enter into the grammar of words and phrases in different ways. The principal exhibits are from languages in the two branches of Wakashan, which are typologically very similar in gross characteristics and whose differences are thus especially interesting for questions of language diversity. The discussion is set out against a background of issues revolving around language diversity.

Keywords. Sapir-Whorf hypothesis.

1. BACKGROUND

The idea that different languages express or impose different worldviews has been around for a long time. One expression of it is the so-called "Sapir-Whorf" hypothesis. We could just as well call it the "Humboldt-Cassirer-Sapir-Whorf" hypothesis. It is an idea that is not limited to technical and specialist writers like Whorf. Let me cite two representative contemporary writers, one a First Nations scholar, the other a Canadian novelist and poet. In an essay entitled "Jagged Cultural Clashes," Leroy Little Bear (2000:78) writes:

> Language embodies the way a society thinks. Through learning and speaking a particular language, an individual absorbs the collective thought processes of a people. Aboriginal languages are for the most part, verb-rich languages that are process- or action-oriented. …
>
> …The languages of Aboriginal peoples allow for the transcendence of boundaries. For example, the categorizing process in many Aboriginal languages does not make use of the dichotomies either/or, black/white, saint/sinner. There is no animate/inanimate dichotomy. Everything is more or less animate. Consequently, Aboriginal languages allow for talking to trees and rocks, an allowance not accorded in English. If everything is animate, then everything has spirit and knowledge. If everything has spirit and knowledge, then all are like me. If all are like me, then all are my relations.

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 167 - 180.

In "Marsh Languages," a beautiful poem about language loss, Margaret Atwood (1995: 54-55) speaks of

> The sibilants and gutturals,
> the cave language, the half-light
> forming at the back of the throat,
> the mouth's damp moulding
> the lost syllable for "I" that did not mean separate,
> all are becoming sounds no longer
> heard because no longer spoken,
> and everything that could once be said in them has
> ceased to exist.
> ...
> Translation was never possible.
> Instead there was always only
> conquest, the influx
> of the language of hard nouns,
> the language of metal,
> the language of either/or,
> the one language that has eaten all the others.

Both of these writers express the idea that there are fundamental *linguistic* differences between languages at the conceptual level.

We find expressions of such ideas in many contemporary writings from Aboriginal, First Peoples, Native writers, as well as writers like Margaret Atwood who are sympathetic to First Peoples. Let me pick out three ideas (I will use the tendentious labels "NeoColonial" and "Aboriginal."):

i. Aboriginal languages are verbal and dynamic; NeoColonial languages are nominal;
ii. Aboriginal languages are not categorical like NeoColonial languages;
iii. In NeoColonial languages time is linear; in Aboriginal languages time is cyclical / circular.

Such expressions of opinion are part of a political backdrop to the questions I will be raising. I will get back to a discussion of this backdrop toward the end of this essay.

Long ago, when I first read Whorf's influential essay, "An American Indian view of the universe" (Whorf, 1956), I found myself thinking: What he says about Hopi may or may not be true, but I am skeptical about what he says about English and other Standard Average European (SAE) languages and their metaphysics. Whorf expresses the view that languages like English embody a basically Newtonian view of time and space, while Hopi is congenial to a much more relativistic conception of the universe. But Einstein was no Hopi.

Quite a few years later but still quite a few years ago I ventured into such questions myself from the point of view of model-theoretic semantics (Bach, 1981,

1986). Model-theoretic semantics requires setting up some basic apparatus for the structure of denotations: individuals, truth-values, functions of various sorts, possible worlds and times. Doing this requires making some choices about the basic stuff of the world that is used in the models.

One fundamental question is:

i. What ontological commitments do natural languages or Natural Language seem to make?

Or put another way:

ii. What kinds of metaphysical presuppositions do we need to make in setting up model structures for languages or Language?

Implicit in those formulations is this question: Do we find differences among languages in respect to their basic model structures?

Many writers seem to take it as given that languages do not differ in their semantics. Others—notably Whorf—seem to take the notion of "parochial" semantics (Mark Stein's term: Stein, 1981) as self-evident. Myself, I believe that the question cannot be decided in advance, but boils down to an empirical issue, however difficult it may be to study it.

Toward the end of this essay I will touch on some (partly other) general topics and slogans in the back-, over-, and underground of this paper. But our main topics, in the context of this book, fall under terms and notions such as: **verbal aspect / Aspect / Aktionsarten / verb classification.** From these various terms, I will try to use two like this:

Grammatical **aspect** will refer to various properties of the grammatical system of a language that relate to the shape or perception of events, states, and so on. **Aktionsart** will refer to the classifications of verbs and other expressions and their referents along the Aristotelian and thence-derived terminology of "telic, atelic, achievements, accomplishments, states, processes," and so on as developed by many writers from Vendler and Kenny on.

The relation between these two varies from language to language in the way in which distinctions of the second kind are played out in the grammar and in the structure and meanings of words. A big part of the theoretical issues discussed here and elsewhere is figuring out the relationship between these two, as well as understanding what is meant by "grammatical." My conclusions or hypotheses will be:

- All languages make use of the same model structure at the most abstract level.

- Languages can differ as to how distinctions that can be constructed from this basic metaphysical "stuff" enter into their lexical and grammatical systems.
- Differences among languages registered by their users rely in part on different understandings of what is meant by 'language.'

What this last point means is this: when speakers or users of a language report intuitions about basic metaphysical assumptions that are part of their language and when a semanticist or linguist makes different claims or denies the validity of the native speaker's claims, it is probably because they are talking about different things, using the word "language" in different senses, or talking about different meanings of "meaning."

I will now lay out some exhibits from Northamerican indigenous languages. Here I draw mainly on languages from the two main branches of Wakashan, but with some side glances at other languages from the Siouan, Athabaskan, Algonquian groups. At the end I will come back to some of the general questions just mentioned, including questions about native speakers' intuitions, as illustrated in the beginning of this essay.

2. EXHIBITS: SOME NATIVE LANGUAGES OF NORTH AMERICA

The Wakashan languages are located in British Columbia, and (Makah) at the tip of the Olympic peninsula. Their general characteristics are: Verb initial, very polysynthetic, exclusively suffixing. The time depth between Southern (SW) and Northern (NW) Wakashan is probably somewhere between 3,000 and 5,000 years. **Southern Wakashan (SW)** includes: Nuuchahnulth (Nootka), Makah, Dididaht (Nitinat). **Northern Wakashan (NW)** includes: Kwakw'ala (Kwakiutl), Heiltsuk (Bella Bella), Ooweky'ala (Rivers Inlet), Haisla.

The two languages that I have had direct experience with are: Ahousaht (Nuuchahnulth) (SW) and (much more extensively) Haisla (NW). I will draw upon the work of others, principally Sapir and Swadesh (1939) for Southern Wakashan and Boas (1947 and elsewhere) for Northern Wakashan Kwakw'ala.

To understand the form of some of the examples for both Northern and Southern Wakashan, the following points should be noted:

- Pronounceable words (free forms) are built up by taking a root (marked √ in analyses) or a root modified into various patterns of reduplication, insertion, and ablaut (vowel changes), and tacking on lexical or "semantic" suffixes, finally inflections or clitics.
- The suffixes sometimes require a special extension or modification of the root, and may induce changes on the final segment of the stem: glottalization, "softening" (voicing in Northern Wakashan, various other segmental modifications in both Southern and Northern Wakashan), and a good deal of allomorphy in suffixes and (more in SW) stems.

Discussions of aspects in Nuuchahnulth (for example, Sapir and Swadesh, 1939, Swadesh, 1939) have used the following terms:

durative	quality or action or thing viewed as persistent, interpretations depend on meaning of item
momentaneous	quality or thing or action viewed as a whole, interpretation depends on meaning of item: become..., do...once, etc.
inceptive	'start to ...'
iterative	'do ... at intervals'
graduative	'gradually ..., ...ing'
repetitive	emphasizing repetition: '...ing over and over'

Here's a set of examples from Sapir and Swadesh, 1939 (241): Root: √**mitx^{w}-** 'turn about':

A. Durative base:

Durative **mitx^{w}aa** 'turning about, circling'

Inceptive **mitx^{w}iičiƛ)*** 'to start turning about'

Graduated Inceptive **miitx^{w}ičiƛ)** 'starting to turn about'

Pre-inceptive **miitx^{w}ičiƛši(ƛ)** 'to start starting to turn about'

Inceptive iterative **miitx^{w}ičiił** 'to start turning about at intervals'

Repetitive **miitxmiitx^{w}a** 'turning round and round' (emphasized repetition)

Repetitive inceptive **miitxmiitxši(ƛ)** 'to start turning round and round'

B. Momentaneous base:

Momentaneous **mitxši(ƛ)** 'to make a circuit, turn'

Graduative **miitxši(ƛ)** 'making a circuit, turn'

Pre-graduative **miitxšiƛši(ƛ)** 'to start making a circuit, turn'

Iterative **mitxmitxš** 'to make a circuit, turn at intervals'

Iterative Inceptive **mitxmitxššiƛ)** 'to start in on a spaced series of circuits, turns'[1]

[1] SS39 (i.e. Sapir and Swadesh 1939:238): "(ƛ) [lateral affricate] movable ƛ , always connected with momentaneous aspect forms, which is lost before glottalizing incremental [= word EB] suffixes, e.g. *matši(ƛ)* 'fly off' '--*aƛ* 'now' > *matši*ʔ*aƛ* `fly off now'."

The Sapir-Swadesh analysis posits two layers of (at least) semantic aspectual modification: let me call these *primary* and *secondary* aspect: the first has to do with the durative - momentaneous dimension, the second with the other modifications. Two of the examples show that the secondary modifications can be accrued in different orders: inceptive-iterative, and iterative-inceptive. In Sapir and Swadesh (1939), the system is explained as follows (my summary of the text on p. 240):
There are two primary aspects, durative and momentaneous. The other aspects are derived from these, yielding forms such as the inceptive, the iterative, the repetitive, the graduative. Sapir and Swadesh recognize two classes of elements (stems and suffixes):

Class I: the durative is representative of the basic meaning of the element. Subclasses:

(a) the momentanous expresses approximately a transition to the durative...:

qaḥ ak d[urative]. 'dead' (√qaḥ -)
qaḥ ši(ƛ) m[omentaneous]. 'to die'
ya:cok d. 'walking' (√ya:c- 'walking')
ya:cši(ƛ) m. 'to start off walking'

(b) the durative expresses the existence of an entity; the momentaneous, if used at all, expresses any action with or with reference to the entity...:

ta:na: 'money' d.
ta:na:qši(ƛ) m. 'to give, bet, use money'
ʔaya d. 'many'
ʔayači(ƛ) m. 'to handle, give away, bet many'
qo:ʔas d. 'person'
qo:acši(ƛ) m. 'to act like a person, do something brave'

Class II: the durative expresses a temporal extension of the action of the momentaneous...[example below]. Both aspects seem to be equally representative of the basic meaning of the element. Elements which have no durative may be included as a subclass.

mitx^{w}a: d. 'circling about'
mitxši(ƛ) m. 'make a circuit, turn about'

The description given can be supplemented by the following from Haas, Swadesh and Swadesh, 1933, writing about closely related Dididaht:

> Every formally complete word, unless it is a connective particle, has an aspect. Aspects that occur in the above text [see reference below] are durative, momentaneous, inceptive, graduative, and momentaneous iterative. The durative expresses a *continuous existence, state, or activity* [EB my italics]; thus duratives are translatable by English nouns, adjectives, and verbs expressing states and continued activities. The momentaneous expresses momentary occurrences, including transitions into states and states of activity (these are generally translated "to start doing"). The inceptive expresses transitions into existence, states and states of activity; it is generally translated "to become ; to get to be ing, to start ing." (It will be seen that the territory of the momentaneous crosses into that of the inceptive.) The graduative expresses a linear or protracted occurrence of that which is expressed by the momentaneous. The momentaneous iterative expresses an iteration of that which is expressed by the momentaneous. The aspect is usually contained in the last element of the formally complete word, whether this is a stem or stem-suffix of the type that may appear finally, or actually a completive suffix whose function is only to indicate the aspect and thus complete the word.

The reader will probably agree that this is a pretty rich system of aspectual modification.[2]

A sidelight: Swadesh (1939, compare also Boas, 1947) put forward the influential idea that the Southern Wakashan languages did not utilize a lexical distinction between Nouns and Verbs. But note that there seems to be semantic distinction in the descriptions just cited between stative and non-stative predicatives.

We can see even more elaborate systems of verbal aspect in the Athabaskan languages, such as Navajo (Young and Morgan, 1987), Koyukon (Axelrod, 1993), or Ahtna (Kari, 1980, 1990). Carlota Smith's book (1977) includes a detailed discussion of aspect in Navajo, among other languages.

Northern Wakashan does not share this richly elaborated aspectual palette. Boas (1947: 290--291) lists just a few items under Aspect for Kwakw'ala (I have retranscribed Boas's forms and examples):

> **-a** 'the usual single action or continuous state'
>
> **-[x]'id** momentaneous and inchoative,...'fundamentally the change of one state to another.' Boas comments that it can be used with verbs ending on **-la** expressing repeated or continued action. (Boas lists another item under Tense with the same shape: **-x'id** , with the meaning 'recent past.' Both are given like that but elsewhere the aspectual suffix is given in the shape I have used: **-[x]'id** , where the bracketing indicates that the **x** only occurs after sonorant final segments (including vowels).) In Haisla at least, when this suffix is used with an item with a 'nominal' meaning, such as **beg^{w}anem** 'person' -- **beg^{w}anemx'id** -- it means 'to become a person' or (statively) 'something in the form of a person.'

[2] For a clear presentation of the Tense and Aspect systems of the Southern Wakashan language Kyuquot, see Rose, 1981.

-'la / -ala continuous: 'used both nominally and verbally, with verbs it expresses actions that imply multiplicity, repetition or continuity'

-alha 'to be in the position of performing some action'

I can report roughly the same situation for Haisla, an Upper North Wakashan language at the other geographical extreme from the languages lumped together in Boas's Kwakiutl: nothing of the richness of Southern Wakashan aspectual derivations.

3. COMPARISON

Let us take a quick look, by way of comparison, at some characteristics of a couple of other languages, from unrelated families. First, Lakhota, a Siouan language of the Great Plains as described in Boas and DeLoria (1941).

Lakhota Aktionsart enters into the grammar of Lakhota in the system of person marking in the verb. One set of prefixes for subjects is used with action verbs, another -- resembling but not identical to the object markings used with transitive verbs -- is used with stative verbs. Some transitive verbs use elements from the stative set for the subject as well. The distinction is grammaticized in the sense that membership in the two classes of active and stative verbs is not completely predictable from the meaning. (Boas and Deloria, 1941.) Here some examples:[3]

machuita 'I'm cold'
nichuita 'you're cold'
wathi 'I dwell'
yathi 'you dwell'

The affixes for the first class of predicates are (almost) formally identical to the affixes for objects of transitive verbs; thus the system is reminiscent of the ergative/absolute case systems of some languages (but is actually quite different).

The distinction between stative and active verbs in Lakhota has gone into the linguistic literature under the heading of Unaccusativity. Whether the Lakhota system is properly considered a manifestation of Unaccusativity or not—and I am rather skeptical—we can note that the active/stative distinction in general has become part of the cluster of properties that are discussed under the heading of Unaccusativity. Thus this distinction in Aktionsart has been discussed as an important part of the conceptual machinery of many languages.

The active - stative distinction depends on only one part of the typology of eventualities: stative vs non-stative or active. It also brings in a dimension that is strictly not part of that typology in the narrow sense: differences of predicates with

[3] Boas and Deloria (1941:23 ff.78). Thanks to George Whirlwind Soldier for help with Lakhota.

respect to such notions as control or agentivity. Moreover, like other concepts in the cluster of properties discussed under the rubric of Unaccusativity, the distinction is available for incorporation into the grammar of languages. In Lakhota the grammatical nature of the distinction is expressed in the inflectional characteristics of verbs.

Secondly, the **Eastern Algonquian** languages Western Abenaki and Massachusett show even less systematic exploitation of verb classification than the languages I have mentioned so far. Massachusett shows sporadic use of reduplicative patterns for some of the distinctions given before for Southern Wakashan (p.c. Roger Higgins and Shaun Gaffney). These languages have very rich systems of derivational and inflectional morphology. Socalled finals establish the membership of an inflected word in the major Algonquian verb classes: Animate and Inanimate Intransitive and Transitive (where the class of the object is crucial) -- AI, II, TA, TI -- and contribute to the meaning of the verb in various concrete and abstract ways, but none of these derivational affixes touch aspectual classification.

4. DISCUSSION

Summarizing what we have seen in our exhibits:

The Southern Wakashan languages show a very elaborate aspectual system with a pervasive contrast between durative and momentaneous forms, comparable to the perfective-imperfective systems of Slavic (compare Filip, this volume), with a rich set of secondary modifications of the basic dichotomy.

Northern Wakashan seems to lack this basic and pervasive structural dichotomy. Although words with analogous meanings exist in the languages, the obligatory contrast does not seem to play the same systematic role. ("In revenge," Northern Wakashan languages have a much more richly developed system of demonstrative inflections.)

In Lakhota, we noted a grammatical reflex of something like a basic Aktionsart dichotomy in the classification of stative and active verbs, both intransitive and transitive.

Finally, we mentioned two Eastern Algonquian languages, Western Abenaki and Massachusett, both showing a typically rich Algonquian verbal architecture where grammatical aspect and Aktionsart do not seem to play much of a systematic role at all.

How can we know that these comparisons are valid? Stated otherwise: if Nuuchahnulth had been described by Boas, and Kwakw'ala by Sapir and Swadesh, would the comparison just made have come out more or less the same. This leads to what we might call **Zellig Harris's problem** (Harris, 1951): If we wish to compare languages, how do we ensure that the terms of the description are not being compared rather than the "languages themselves"? This was one of the motivations

for Harris to try to systematize "methods in structural linguistics" (the original title of his book published in 1951).

Let's return now to some of the questions and issues I mentioned at the beginning of this essay.

What ontological commitments do natural languages or Natural Language seem to make?

What kinds of metaphysical presuppositions do we need to make in setting up model structures for languages or Language?

4.1. Some basic issues: Languages are not all the same.

If you read some contemporary writers (Chomsky,1995; Pinker, 1994), you will see statements to the effect that all languages are basically the same, with only minor or "superficial" differences. For example, Chomsky has written:

> "The primary [task at hand for the Minimalist Program] is to show that the apparent richness and diversity of linguistic phenomena is illusory and epiphenomenal, the result of interaction of fixed principles under slightly varying conditions." (N. Chomsky, 1995: 8)

I ask: Why is the richness and diversity only "apparent"? The view that all peoples basically speak one language ("Earthese") will surprise many speakers of the world's languages, many of them multilingual. In the consciousness of language users, there is a world of difference when they struggle with a new idiom, or, if they are multilingual, when they compare their experience of the various languages they know.

There is a kind of practical paradox or puzzle here, which has its political ramifications, as I hinted at the outset of this essay. Many people will bristle when they hear the claim that their language -- which seems to them quite unique -- is in essence just like any other language. And many linguists will share this reaction. It used to be that linguists were enjoined to describe each language on its own terms. Now it is often *presumed* that all languages are basically the same.

Linguistic theory has to deal with two questions: A. How come languages are so similar? B. How come languages are so different? The attention paid to these two questions has varied a lot over the years. If you start from the sense that languages are basically very similar, then Question B should be uppermost, if you start from the sense that they are very different then it is Question A that burns. In fact, both questions presuppose that we have some way of characterizing differences and similarities among languages as well as some expectations about what is expected in the way of variation. In my opinion, neither presuppositions are met at present, a view shared by Johanna Nichols:

> ....standard historical method ... has no theory of diversity and no way of scientifically describing diversity. Hence, diversity has no theoretical status in historical linguistics (or, for that matter, in synchronic linguistics). (Nichols, 1992: 5)

Here, I want to emphasize that languages can be pretty different, and that linguistic theories that do not accommodate the existing and undeniable differences are not adequate.

4.2. Grammatical meaning: Boas and Jakobson

One way in which languages obviously differ is in the way in which various properties are part of the grammar proper or not. In the comparisons given above we have seen variation along these lines. Aspect, Aktionsart, and so on are prime examples of linguistic variability of this sort. Jakobson grappled with the notion of "grammatical meaning" in the essay from which the epigraph at the head of this essay was taken. I don't believe that more recent formal approaches to natural language semantics have gotten very far beyond what Jakobson and Boas thought about this matter. In the era of those discussions, a common idea was that when you are forced to make a distinction, say in tense or number, by an obligatory part of the grammar of a language, then implications could be drawn from making one or another choice in a way that is different from the choice of one or another lexical item. Something like this idea can be implemented by making use of different kinds of meaning: presupposition, conventional or conversational implicatures, entailments, and so on.

Whatever the case, it seems to me that at the level of R-language, whether something is or is not a matter of grammar probably plays a large role in judgments of speakers about the (cultural and linguistic) metaphysical substructure of their language. Here would also belong, no doubt, the existence and utilization of "semantic parameters" of the sort discussed by Gennaro Chierchia in his study of plurality and mass nouns (Chierchia, 1998). The semantic parameters of Chierchia have to do not with the basic model structures for the semantics of different languages, but rather in the mappings from the grammar to model-theoretically distinguishable elements. In the areas of interest in the present context—properties of eventualities—I have tried to show how different languages make different use of the structures of denotations in the perhaps universal model structures.

As the result of much work in a variety of frameworks and theories over the last decades, events and the general typology of eventualities are here to stay in any serious accounts of the semantics of natural languages. The details of the insights of this work have been worked out in a variety of different ways, sometimes as refinements or sortings introduced into the basic set of individuals used in the model structure, with and without direct reflexes in the syntax, sometimes as contructs from functions, worlds, and so on. It seems pretty clear that this "eventology" is there and available as part of what individual languages have to work with in their systems of meanings, just as a the basic and universal structure of the vocal apparatus is there for use in the phonetic and phonological systems of all languages. But the details of just how this basic stuff is exploited varies a lot from language to language, in semantics as in phonology. One dimension of variation in semantics is

the extent to which and the way in which the universally available distinctions become part of the grammar of words, phrases, and lexical items.

4.3. Natural language metaphysics, R-languages, the consciousness of the native speaker

If we want to investigate the fundamental Whorfian questions raised in the beginning of this essay, we are faced with a familiar conundrum: speakers of a language, members of a culture say that in their language such and such is the case: time is circular not linear, for example, or the language does not embody sharp notions of "either/or." How are we to understand such claims?

We have heard of I-languages and E-languages (Chomsky, various writings). Some years ago I introduced (semi-jocularly) the term R-language (Bach, 1995). I meant this to stand for "real language" in the sense that speakers of natural languages "have" their languages, with all the vicissitudes and quirkiness of human history and creativity. I submit that when speakers of natural languages talk about how their languages differ from others, are unique in various ways, and so on, they are talking neither about I-languages nor E-languages but about R-languages: in large part close to their consciousness, accessible to a certain amount of introspection, but inevitably bound up with the whole cultural matrix in which the language exists.

Maybe we can make use of a distinction between "structure" and "texture"? (Bach, 2002) When I am close to the way words are built and follow one another, what they sound and feel like, I am at the textural side. Someone who does not know a language, an R-language, really has no access to this texture. If you have studied a second language you will have experienced the way in which the language is registered to you in the beginning, with apprehensions largely shaped by the language(s) you have known before. But as you advance in your familiarity with the language you begin to apprehend it on its own terms. A linguist says to you: Language A is really basically the same as Language B. You are put in mind perhaps of an anatomist who, when challenged about his belief that two individual people are in essence the same, shows you two X-rays of their skeletons. The anatomist might say: up to skin and muscle, all people are basically the same. If someone is the last speaker of a language and says she is lonely because she has no one to talk to in her mothertongue any more, she will not be comforted by the assurance that after all, up to skin and muscle, all languages are basically the same.

Consider the problem of translatability. One of the findings of modern linguistics is that "all languages are created equal" in the sense that it is possible—by and large—to express any content in any language, given time and effort and the ability to paraphrase and explain the meanings of lexical items that do not exist in the target language. (The hedge here is put in to allow a reference to Gil, 1991, and similar studies that contradict the strong form of the thesis of equivalence.) But this equivalence applies only to the bare denotational content of the message. Many aspects of "meaning" in the broadest sense cannot be carried over directly, as is

most apparent when you try to translate poetry, even leaving aside the musical side of this kind of language. The untranslatable aspects are located most vividly in the texture of the language. It is an equivocation in words like "language" and "meaning" that allows me to hold consistently that all languages are equivalent in expressive power and that you can never capture exactly in one language the meaning of a piece of another language. And I believe that the realization of the different senses of "language" and "meaning" points the way to a possible understanding of the puzzle from which we began.

5. ACKNOWLEDGMENTS

I am grateful to Katie Fraser, Ahousaht Nuuchahnulth linguist and speaker, for introducing me to her language, and to many people in Kitamaat Village, BC, for helping me over the years with Haisla. I thank Pat Shaw for giving me the Atwood poem and Wynn Chao for many helpful comments on this paper. Remaining defects, infelicities, or misrepresentations are my fault alone.

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SERGEI TATEVOSOV

FROM HABITUALS TO FUTURES

Discerning the path of diachronic development

Abstract. This paper explores the problem of diachronic development of verbal forms expressing future time reference. The analysis proposed so far (Bybee et al. 1994 and, especially, Haspelmath 1998) suggest that habitual-future polysemy frequently attested across languages only emerges as a side effect of the independent development of two grammatical morphemes along the same grammaticalization path. This analysis fails to explain the distribution of a few verbal forms in Nakh-Daghestanian languages. In these languages, individual-level and stage-level predicates possess different potential as to the diachronic development of habituals: habitual grams applied to SLPs readily acquire future time reference, while those applied to ILPs retain present time reference. To account for these I propose that habituals can directly develop into futures via modality. Establishing such a grammaticalization path allows to avoid unnecessary theoretical assumptions without loosing advantages of the previous analysis, and to provide a unifies explanation to apparently unrelated facts about present-future polysemy.

Keywords. Diachronic development, habitual, future time reference, individual-level/ stage-level predicates.

1. INTRODUCTION

In a wide variety of languages, verbal forms are attested that can refer to both present and future. (1) from Kannada provides a paradigmatic example of such a form, other languages of the same type cited in the literature (see, particularly, Haspelmath 1998) being Welsh, Udmurt, Lezgian, and a few others:

(1) avanu manege **ho:gu-tt-a:ne**
he home **go-NON.PAST-3:M:SG**
1. 'He **goes** home (**habitually**)'; 2. 'He **will go** home'
(Bhat 1999:17)

(1) has two readings: habitual (1.1) and future (1.2). On the habitual reading, (1) characterizes the individual referred to by the subject NP by saying that in the present this individual possesses the property of going home (e.g. after his working hours are over). (1.2) differs from (1.1) in two significant characteristics: first, it is not habitual, but episodic, that is, referring to a single event; second, the event referred to is predicted to occur in the future.

The problem of grammatical polysemy, an example of which is (1), can be approached in different ways. One of the common strategies is to assume that the morpheme in question is in fact monosemic, and that the whole range of its uses can

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 181 - 197.

be derived by applying certain rules to the general meaning. Yet, in many cases much more revealing is a different strategy: to account for the distribution of a grammatical morpheme along the diachronic dimension, as different uses of the morpheme may reflect different stages of its development.

Various typological studies of the meaning and distribution of grammatical categories recognized universal restrictions on the diachronic development of tense-mood-aspect (TMA) categories and on their synchronic distribution. It has been found out, in particular, that language-specific grammatical morphemes (grams, for short) come to existence along the restricted number of *paths of diachronic development*[1].

Martin Haspelmath (1998:48), relying on Bybee et al. (1994), explains the habitual-future polysemy by assuming the following path of diachronic development[2] for present and future grams:

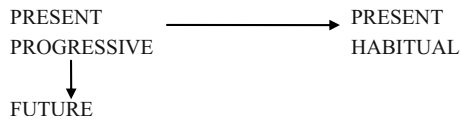

Figure 1. Grammaticalization path of present-future grams

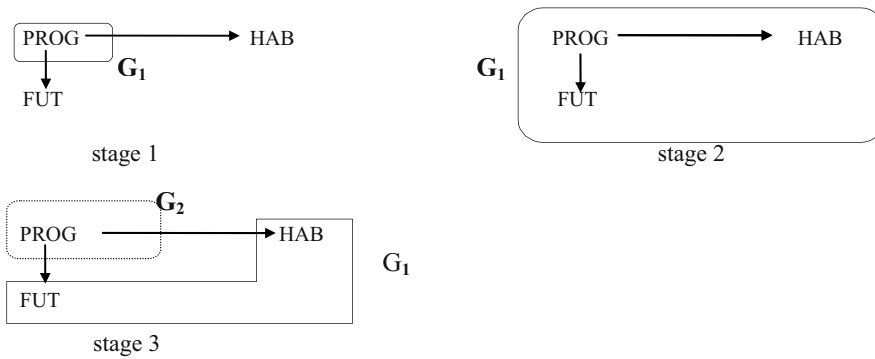

Figure 2. Diachronic development of grams displaying habitual-future polysemy

[1] In the present study, as in Bybee and Dahl (1989), Bybee et al. (1994), and Dahl (2000), the notion of grammatical morpheme comprises various morphosyntactic carriers of grammatical meaning: bound morphemes proper, auxiliaries, particles, etc.

[2] Paths of diachronic development, or grammaticalization paths are represented as oriented graphs. Nodes of such graphs are most commonly thought of as *cross-linguistic gram types*, that is, as clusters of semantic properties that tend to be expressed grammatically in genetically and areally unrelated languages and possess their typical morphosyntactic means of expression. See Bybee, Dahl (1989), Heine et al. (1991), Traugott, Heine (1991), Bybee et al. (1994), Rissanen et al. (1997), Ramat, Hopper (1998), Dahl (2000a) for details about current versions of the grammaticalization theory. Below nodes in grammaticalization paths come in SMALL CAPITALS.

How exactly the grammatical morpheme develops is shown in Figure 2. Assume that we have a gram G_1 which is associated with the present progressive meaning (stage 1). According to Figure 1, for G_1 there are three possibilities: to accommodate *present habitual* uses, yielding a *general present* gram, to accommodate *future* uses, or both. This scenario allows language specific grams comprising all possible combinations of meanings: 'progressive', 'future', 'habitual', 'progressive + future', 'progressive + habitual', 'progressive + habitual + future' (stage 2). A gram associated with the 'future + habitual' cluster can only appear as a by-product of the development of another gram: if a gram G_1 covers all the three meanings, and then a new progressive gram G_2 appears, forcing the older G_1 out of progressive contexts, the resulting range of meanings of G_1 will be 'habitual' and 'future' (stage 3).

Apparently, this theory makes correct predictions about the attested distribution of language-specific grams: one not infrequently finds grams which are ambiguous between general present and future meanings (Uralic languages are especially rich in such grams), as well as 'habitual + future' grams. A number of illustrations are given in Haspelmath's paper, more examples from Dravidian and Indo-Iranian languages are cited in Bhat (1999). Nakh-Daghestanian habituals discussed below also fall under this type of grammatical polysemy. A lot of questions remain, however.

Haspelmath's account crucially relies on three assumptions about what is a *possible grammaticalization path*. First, grammaticalization paths can branch. Second, if a gram has reached a branching node A (stage 1 in Figure 2), it can further develop along both branches B_1 and B_2 (stage 2). Third, it is not necessary for a gram to retain uses corresponding to the node A (stage 3).

Of these assumptions, only the first one seems to be uncontroversial: cases where the same gram develops along different paths in different languages are in fact well documented; for example, the Slavic perfect has yielded a past perfective gram in Russian, but an indirect evidence gram in Bulgarian[3].

Admitting the other two assumptions causes serious complications, however. It is definitely not correct that *any* gram at *any* path can develop along two branches simultaneously, as gram G at stage 2 in Figure 2 does. Even if branching should be allowed at the cross-linguistic level (in a language X a gram A can evolve into a gram B_1, and in a language Y a gram A can evolve into a gram B_2), this does not necessarily imply that the same branching should exist in any single language: (sub)paths $A \rightarrow B_1$ and $A \rightarrow B_2$ can be mutually exclusive and thus unavailable for one and the same language-specific gram. For instance, a perfect gram can yield either a perfective/past or an indirect evidence gram, and no language is attested in which evolution of the perfect proceeded in both directions.

Therefore, additional phenomenon-specific mechanisms are called for to explain why a gram reaching a branching node does not always develop in more than one

[3] Strictly speaking, allowing nodes on GPs to branch is not theoretically unproblematic. It appears, in fact, that some nodes are branching while others are not, while the path formalism in itself does not disallow any node to branch. Accordingly, some additional machinery is necessary to explain this fact.

direction. For this reason, assuming for a language specific gram the possibility of development in multiple directions inevitably weakens the restrictive power of the theory.

Under the third assumption, the restrictiveness of the theory decreases to nothing, as a gram is allowed to be associated with *any* unrelated nodes on different branches of a grammaticalization path provided that these nodes are connected to some 'ancestor' node. Accordingly, having found a gram expressing meanings m_1 and m_2, one need not be interested in discovering how these meanings are related: it is enough to postulate a common ancestor meaning m_0.

These problems could have been ignored if the theory had provided the full empirical coverage of the data. But this is not the case. In what follows, I will discuss the material from three Nakh-Daghestanian (East North Caucasian) languages and show that this data are problematic for the theory represented in Figures 1-2. In these languages, habitual-future grams exhibit lexical restrictions which are not predicted by the theory. The range of future uses of these grams is not predicted either.

2. HABITUALS, FUTURE, AND INDIVIDUAL LEVEL / STAGE LEVEL DISTINCTION

2.1. Meaning of habituals

Partial verbal paradigms of Godoberi, Bagwalal, and Karata are represented in Table 1. These languages resemble each other as to the structure of the paradigm and the inventory of inflectional affixes. Each language has a present habitual gram marked by shading in Table 1.

Table 1. Main present and future forms in Godoberi, Bagwalal, and Karata (the verb 'plough')

	Godoberi	Bagwalal	Karata
Present (=Imperfective converb + present auxiliary)	b-eL'-ata-da	b-eL'-irā-X ekˈˤa	b-eL'L'-ida ida
Present Habitual	b-eL'-ida	b-eL'-ir-ō-b	b-eL'L'-ida
Inflectional Future	b-eL'-i-sū	b-eL'-a-s̄	b-eL'L'-a-s̄
Periphrastic Future (=Future participle + present auxiliary)	b-eL'-i-Li-bu-da	b-eL'-ā-ɬ-o-b ekˈˤa	—
Negative Future	—	b-eL'-irā-č'e	—

(2) shows the Present Habitual[4] of the verb *b-eL'i* 'plough'. (2) indicates that the situation 'My father ploughs the field' obtains regularly, and the sentence refers to

[4] I follow Comrie (1976) in capitalizing labels for language-specific grams.

the unspecified number of repetitions of this situation. The progressive reading of (2) is not available.

(2)	im-o-l	Xure	***b-eL'-ida***	**KARATA**
	father-OBL-ERG	field	**N-plough-HAB**	
	1. *'(My) father **is ploughing** the field'			
	2. '(My) father **ploughs** the field {regularly}'			

Another kind of interpretation of the Present Habituals is demonstrated by (3):

(3)	im-o-wa	ʕali	***w-iʔ-ida***	**KARATA**
	father-OBL-DAT	Ali	**M-know-HAB**	
	'(My) father **knows** Ali'			

(3) shows that the Present Habitual of the verb 'know' refers to a single continuous situation, and not to a set of repeating situations, as in (2).

Apparently, the contrast between verbs like 'plough' and 'like' can be easily interpreted in terms of the celebrated stative/dynamic distinction. However, (4) shows that there are stative verbs which pattern with 'plough', but not with 'know':

(4)	im-o-wa	ʕali	***haʔ-ĩda***.	**KARATA**
	father-OBL-DAT	Ali	**see-HAB**	
	(My) father **sees** Ali {from time to time || *continuously}.			

In (4), the same interpretation as in (2) obtains: the proposition 'my father sees Ali' is true at some time intervals and false at others; the sentence can only mean that my father sees Ali from time to time. Unlike the English Simple Present, the Present Habitual in Karata cannot be used if somebody *sees* something uninterruptedly, although, as in English it can be used if somebody *knows* something[5].

In the same way, nominal clauses in (5a-b) differ as to whether a single continuous situation or an unspecified number of situations is referred to:

(5)	a. maHammad	učitel	***w-uk'-ida***	**GODOBERI**
	Mohammed	teacher	**M-be-HAB**	
	'Mohammed **is** a teacher'			

[5] Henk Verkuyl (p.c.) has pointed out that a lot observations have been made that 'see' has also nonstative properties or, at least, nonstative uses (Gruber 1967, Verkuyl 1972, among others). In fact, sentences like *I saw him when I went down to make myself a cup of tea* arguably have eventive reading (≈'catch sight'), and sentences like *John saw/heard for hours that De Gaulle had died* are analyses in Verkuyl (1972) as terminative. However, following Dowty (1979:114) who analyzes **see** (x,y) as stative and **look** (x, y) as dynamic (DO (x, [**see** (x, y)])), I assume at least in cases like 'x sees y' where both x and y are individuals it is uncotroversial to suggest that 'see' is stative.

b. maHammad anži-La ***w-uk'-ida*** **GODOBERI**
Mohammed Anzhi-LOC **M-be-HAB**
1. 'Mohammed **regularly visits** Anzhi';
2. *'Mohammed **is** in Anzhi'

Therefore, I suggest that here we are dealing not with the stative/dynamic contrast, but with the contrast of *individual-level* and *stage-level* predicates.

ILPs, both nominal (such as 'be a teacher' from (5a)) and verbal (such as 'know' from (3)), denote temporally stable and essential properties which cannot be removed, at least without changing the qualities of an individual. SLPs, in contrast, refer to transitory and accidental properties, as, for example, 'be in Anzhi' from (5b) or 'plough a field' from (2). The ILP/SLP opposition has been recognized by Gregory Carlson (1977) after Milsark (1974). Carlson (1977), Diesing (1988), Kratzer (1995), Chierchia (1995), among many others, identify a number of peculiarities of ILPs as compared to SLPs[6].

The difference between ILPs, such as 'know Ali', and SLPs, such as 'plough a field', is normally visible outside the tense-aspect domain. We see, however, that it is exactly this difference that affects the interpretation of the Present Habitual in (2)-(5). Thus, both (5a) and (5b) are stative, but whereas (5a) contains the ILP 'be a teacher', with the interpretation being similar to (3), in (5b) the SLP 'be in Anzhi' occurs, and (5b) resembles (2). Therefore, the borderline is drawn within the group of stative predicates, separating stage level statives from individual level statives.

2.2. Modal and future uses of habituals

The fullest spectrum of semantic possibilities comes with (6)-(9), which are non-elicited sentences from Bagwalal:

[6] Thus, ILPs are not allowed in small clause complements of perception verbs, cf. *John saw Mary talk to Bill* vs. **John saw Mary love Bill*; they are odd in existential *there*-sentences, cf. *There are firemen available* vs. **There are firemen altruistic*. The range of possible readings of nominal arguments is wider with SLPs than with ILPs: the bare plural subject of *Firemen are available* can have both specific ('there are some firemen') and generic ('all firemen') readings, while the subject of *Firemen are altruistic* has the generic reading only. Another subject effect is observed in NPs containing weak quantifiers: *many firemen* in *Many firemen are available* allows for both existential ('there are firemen'), and partitive ('many of the firemen') readings, but for *Many firemen are altruistic* only a partitive reading is appropriate. Clauses containing ILPs show restrictions as to the adverbial modification, cf. **When Mary knows French, she knows it well* and **Mary knows French in her room*. ILPs exhibit lifetime effects: *Carthage was in Africa* implies that Carthage does not exist anymore. The SLP/ILP distinction is cross-linguistically relevant: for example, Finch (2001) observes that the distribution of the copula in Benghali obeys the following generalization: the overt copula indicates the stage level reading; the zero copula favours the individual level reading, but allows for the stage level reading too.

(6) men hanč'u-b Xabar ***b-as-in-ō-b***
you.ERG false-N tale **N-tell-IPFV-HAB-N**
{Two friends are going to deceive a woman telling her that they are magicians. You must talk to her, one of them said,} 'you **are an expert in telling** false tales'

(7) hešta-ji-Re in-šu-b mašina ***b-ič'-ir-ù-b***, — heL'i
how-Q-PTCL LOG-OBL-GEN.N car **N-break-IPFV-HAB-N** say
o-šu-r, — c'inu-b mašina-Re a-b!
that-OBL-ERG new-N car-PTCL this-N
'How **can** my car **break**, he said, it's a new car!'

(8) gaʔi b-is-a-nā, o-ru-r mē
traffic.police HPL-find-POT-COND that-OBL-ERG you
aštrafawat ***ǯē-r-ō-w***
fine **do-IPFV-HAB-M**
'If (you) meet {lit. find} traffic police, they **will possibly fine** you'

(9) men-da č'eXila w-uk'a-w-lā ***w-et-ir-ō-w***
you-PTCL hayloft M-be-PART.M-like **M-think-IPFV-HAB-M**
aram-u-r
people-OBL-ERG
{The speaker noticed that straw stuck to the hearer's clothes. — You must tidy yourself up, or} 'people **will decide** that you have been at the hayloft'

Of these four sentences, only (6) can be said to express habitual meaning. But even in (6) the claim is made not about a habitual situation itself, but rather about the ability of an individual to perform situations of this kind. (7)-(9) has nothing to do with habituality: (7) questions the possibility of a situation 'the car breaks', and (8)-(9) are predictions about possible events in the future. In all the four sentences, a modal meaning of possibility is present. (6) involves *ability,* or *participant-internal possibility* that characterizes an individual's capacities (the terms are coined by Bybee et al. 1994, van der Auwera and Plungian 1998 respectively). (7) refers to a sort of possibility that describes general knowledge of the world ("new cars do not break") rather than knowledge of properties of a particular car, that is, to a *root possibility,* or *participant-external possibility*. In (8)-(9) we are dealing with epistemic possibility, where a situation is subject to epistemic evaluation. Crucially, in (8)-(9) the situations referred to are located in the future, whereas the present reading is totally inappropriate. Consider also (10):

(10) ʕali-r hunša ***b-eL'i-r-ō-b***
Ali-ERG field **N-plough-IPFV-HAB-N**
1. 'Ali will possibly **plough** the field'
2. *'**Maybe**, Ali **is ploughing** the field'

Habituals from stative SLPs share with habituals from dynamic SLPs this range of interpretations. (11) demonstrates the Present Habitual of the verb 'see':

(11) ʕali-ba mahammad ***hā-nō-w***
Ali-AFF Mohammed **see-IPFV-HAB-M**
1. 'Ali **(frequently) meets** Mohammed' <habitual proper>;
2. 'Ali **is able to see** Mohammed' {e.g. after his sight has been recovered} <ability>;
3. 'Ali **will possibly see** Mohammed' <epistemic possibility>

Crucially, no modal/future readings are available for ILPs. Consider (12):

(12) ʕali-ba ʕurus mis' ***b-ī-r-ō-b***
Ali-AFF Russian language **N-know-IPFV-HAB-M**
1. 'Ali **knows** Russian';
2. *'Ali **can know** Russian';
3. *'Ali **will possibly know** Russian'

Therefore, asymmetry between ILPs and SLPs extends to the whole range of interpretations of the Present Habitual, not only with properly habitual uses of this gram. In Andic languages, only SLPs exhibit habitual-future polysemy, while ILPs fail to produce future time reference.

Another crucial observation concerns the range of future uses of the Present Habitual. Consider (13):

(13) šˬala ʕali-r hunša ***b-eL'i-r-ō-b***
tomorrow Ali-ERG field **N-plough-IPFV-HAB-N**
1. *{Take your car away from this field!} 'Ali **will plough** the field tomorrow' <intentional>;
2. *'Ali **is going to plough** the field tomorrow' {he is preparing his tractor} <prospective>;
3. *{According to the timetable,} 'Ali **ploughs** the field tomorrow' <scheduled>

(13) demonstrates that the range of future uses of the Present Habitual is considerably restricted: it can only occur in *predictive* contexts (cf. also (8)-(9) above), and is completely inappropriate in *prospective, intentional, and scheduled future* contexts[7]:

[7] These uses of future grams are discussed extensively in typological literature. I do not go into further details here, and refer the reader to the relevant parts in Ultan (1978), Comrie (1985), Dahl (1985), Bybee et al. (1991), Bybee et al. (1994), Dahl (2000b).

2.3. Negative future in Bagwalal

In Bagwalal, the majority of verbal forms have negative counterparts. But the structure of polarity oppositions is different for ILPs and SLPs, as represented in Figure 3.

	affirmative		***negative***
Present Habitual	ek-un-ō-b	———	ek$_{\circ}$ã-č'-u-b
Inflectional Future	ek$_{\circ}$-ã-s̄	———	***ek-unā-č'e***
Periphrastic Future	ek$_{\circ}$-ã-ł-o-b ek$_{\circ}^{'}$a	____	ek$_{\circ}$-ã-ł-o-b weč'e

Figure 3. Present Habitual, Inflectional Future, Periphrastic Future, and their negative counterparts (ek$_{\circ}$ã 'eat', SLP).

	affirmative		***negative***
Present Habitual	bī-r-ō-b	———	***bī-rā-č'e***
Inflectional Future	bij-a-s̄		
Periphrastic Future	bij-ā-ł-o-b ek$_{\circ}^{'}$a	———	bij-ā-ł-o-b weč'e

Figure 4. Present Habitual, Inflectional Future, Periphrastic Future, and their negative counterparts (b-ija 'know', ILP).

As Figures 3-4 show, for SLPs, the form of the Negative Future (suffix *-č'e*) is a negative counterpart of the Inflectional Future, but for ILPs it functions as a counterpart of the Present Habitual. Accordingly, with SLPs the Negative Future indicates future time reference (FTR), while with ILPs — present time reference (PTR). Consider first the dynamic SLP 'eat', both affirmative and negative:

(14) a. den beq ***ek$_{\circ}$-un-ō-b***
I.ERG apricot **eat-IPFV-HAB-N**
'I **eat** apricots' <Present Habitual>

b. den beq ***ek$_{\circ}$ã-č'-u-b***
I.ERG apricot **eat-NEG-HAB-N**
'I **do not eat** apricots' <Negative Present Habitual>

c. den beq ***ek$_{\circ}$-unā-č'e***
I.ERG apricot **eat-IPFV-FUT.NEG**
'I **won't eat** apricots' <Negative Future>

(14a) shows the Present Habitual of 'eat', and its negative counterpart occurs in (14b). The Negative Future, demonstrated by (14c), displays FTR, and can be thus regarded as an item that forms a polarity opposition with the Inflectional Future *ek$_{\circ}$ãs̄* 'will eat'. (Apart from the Inflectional Future, as Figure 3-4 indicate, in

Bagwalal there is a Periphrastic Future, also indicating FTR, which possesses its own negative counterpart: *ek˚-ã̃-ł-o-b ek'a* 'will eat' vs. *ek˚-ã̃-ł-o-b weč'e* 'wont't eat'. The Inflectional and Periphrastic Future are synonymous.)

With ILPs, the system is organized in a different way, the Negative Future functioning as a counterpart of the Present Habitual. Consider (15a-c):

(15) a. ʕali-ba ʕurus mis' ***b-ī-r-ō-b***
Ali-AFF Russian language **N-know-IPFV-HAB-N**
'Ali **knows** Russian' <Present Habitual>
b. *ʕali-ba ʕurus mis' ***b-ija-č'-u-b***
Ali-AFF Russian language **N-know-NEG-HAB-N**
'Ali **doesn't know** Russian' <Negative Present Habitual>
c. ʕali-ba ʕurus mis' ***b-ī-rā-č'e***
Ali-AFF Russian language **N-know-IPFV-FUT.NEG**
1. 'Ali **doesn't know** Russian' <Negative Future >;
2. *'Ali **won't know** Russian'

(15a) corresponds to (14a): here the Present Habitual of 'know' is represented. As for the negative variant, in (15b), unlike in (14b), the Negative Present Habitual is inappropriate. (15c), then, indicates that the Negative Future functions as a negative counterpart of the Present Habitual; here it displays PTR but not FTR. (As Figure 4 suggests, the Negative Periphrastic Future *b-ij-ā-ł-o-b weč'e* 'won't know' functions as a negative counterpart of two future forms.)

Stative SLPs again, as in the case discussed in 2.2, pattern with dynamic SLPs rather than with stative ILPs. As (16a-b) show, the Negative Future combined with the verb 'hear' is interpreted in the same way as the Negative Future of 'eat' in (14c), that is, as referring to the future. For 'don't hear', as in (14b), the Negative Present Habitual is used.

(16) a. di-ba hessa-ɬ̄ hašˀ˚ ***ãh-inā-č'e***.
I.OBL-AFF river-GEN sound **hear-IPFV-FUT.NEG**
'I **won't hear** the noise of the river.'
b. angi hessa-ɬ̄ hašˀ˚ ***ãhã-č'-u-b*** ‖***ãh-inā-č'e.***
here river-GEN sound **hear-NEG-HAB-N hear-IPFV-FUT.NEG**
'Here one **cannot hear** the noice of the river.'

Let us take stock of what has been observed so far. In Andic languages, there are two instances of present-future ambiguity. First, the Present Habitual can refer to situations in the future; such uses are predictive, they obligatorily involve some sort of epistemic evaluation, and they are only allowed for SLPs. Second, the Negative Future in Bagwalal has both present and future readings, but these readings exhibit

complementary distribution, relevant lexical classes again being SLPs and ILPs: the former have FTR, the latter are associated with PTR.

3. FROM PRESENT TO FUTURE: DISCERNING THE PATH OF DIACHRONIC DEVELOPMENT

3.1. Problems for the future-from-progressive theory

Andic data reveal two problems for the diachronic explanation represented in Figures 1 and 2.

First, if future uses develop out of progressive uses, as Figures 1-2 suggest, why does the relevant lexical restriction concern the ILP/SLP distinction rather than the stative/dynamic distinction? In fact, the progressive, an alleged source for grams expressing FTR, is incompatible with all *stative predicates*, not only with individual-level statives, cf. **He is knowing German* and **He is seeing John*. Accordingly, if the Figures 1 and 2 are correct, we can expect that lexical restrictions on the distribution of a gram ambiguous between PTR and FTR, if any, can be formulated in terms of the stative/dynamic rather than the ILP/SLP opposition.

Second, if future uses develop out of progressive uses, why it is that only a predictive interpretation is available for the Present Habitual in examples (8)-(10)? The theory represented in Figures 1 and 2 predicts the existence of language-specific grams that show 'progressive' + 'future' clustering. Yet, such clustering is not attested, provided that by 'future' we mean a gram indicating merely FTR and not one of the more specific meanings, 'predictive', 'intentional', 'prospective', and 'scheduled future'. Moreover, cross-linguistically, 'progressive' tends to combine with the 'scheduled future', which occurs in sentences like *I am leaving tomorrow*[8]. According to Vet's (1994) insightful analysis, the 'scheduled future' emerges when a certain situation occurs prior to the moment of speech, and the speaker is entitled to assume that it has to result in an asserted future situation. This enables the speaker to refer to the future situation as if it were ongoing at the moment of speech: *I am leaving tomorrow* is felicitous if, for instance, I have already bought a ticket. But, to the best of my knowledge, progressive grams are not used in predictive contexts, cf. *What happens if I eat this mushroom? — You* ***will die*** || ****are dying*** (Dahl's (1985) TMAQ #81). Only general imperfective, and not merely progressive, grams are attested that comprise FTR not restricted to 'scheduled' contexts, in particular, involving the predictive future.

[8] The *going to* construction (as in *He is going to read this paper tomorrow*) is not a counterexample. As discussed extensively in Bybee et al. 1991, this construction constitutes a separate gram in itself (one of the so called GO-future type), and cannot be regarded as an instance of the progressive.

3.2. Outline of the alternative analysis: habituals to futures via possibility

If the above observations are correct, they cast serious doubt on the analysis in Figures 1-2. Given the fact that predictive uses are only possible for the present imperfective ('present progressive' + 'present habitual') but not for the pure progressive, we find that an implicational relation holds between the 'habitual' and 'predictive': if a present gram does not express the 'habitual', it does not express the 'predictive' either. Therefore, expressing 'habitual' meaning appears to be an enabling condition for the creation of a true present-future gram associated with the whole domain of FTR. This provides justification for linking 'habitual' directly to 'predictive' on the grammaticalization path, as represented in (17).

(17) PROGRESSIVE → HABITUAL → PREDICTIVE FUTURE →
→ PROSPECTIVE/INTENTIONAL FUTURE

Such an analysis seems to be less problematic than that in Figures 1-2. First, it does not require branching paths, nor any vague assumptions about how a legal branching path should look. Second, it correctly disallows both 'progressive' + 'predictive future' and, consequently, 'progressive' + 'general future' clustering[9]. Third, it explains in a more straightforward fashion habitual-future polysemy, as 'habitual' and 'future' meanings are now adjacent on the path. Moreover, it makes explicit the fact that a gram whose evolution is directed from the habitual meaning to the meaning of FTR acquires predictive uses before the other future uses. This seems to be exactly the case with habituals in Andic languages, discussed in section 2.1. Finally, direct connection between HABITUAL and PREDICTIVE FUTURE correctly relates lexical restrictions on the habitual to lexical restrictions on futures. Whatever restrictions of the former are, restrictions on the latter are expected to be derivable from them. In Andic languages, interpretation of habituals in their habitual proper uses is sensitive to SLP/ILP distinction, and the same is true of their future uses. Meaning of the Negative Future is also conditioned by the membership of a predicate in ILP or SLP class.

The PROGRESSIVE → HABITUAL part of the path represented in (17) has been discussed and exemplified in Bybee et al. (1994:140-152), and I do not have anythihg to add to their generalizations. Another part of the path, HABITUAL → PREDICTIVE, should be discussed in more detail. In particular, we have to explain how exactly the development from habitual to predictive future proceeds, and how the SLPSLP/ILP distinction is involved in this development.

[9] Under this analysis, scheduled future is separated from other future meanings and may be treated as a contextual effect on present grams triggered by a certain configuration of a relevant piece of discourse (see Vet 1994 for more details). Separation of the scheduled future can be justified by the fact that there are no documented cases where 'scheduled future' is generalized to more general future meaning.

SLP/ILP distinction has been subject to various studies[10]. The analysis that seems to be directly relevant for the issue under discussion is offered by Krifka et al. (1995:32), who capture an essential characteristic of habitual sentences formed from SLPs (e.g. *He speaks German*), namely, that they express *generalizations over episodic situations*: GEN[…s…;…](Restrictor[…s…]; Matrix[…s…]). For Krifka et al. 1995, an expression Q[...x...;...](Restrictor[...x...]; Matrix[...{x}...]) is a generalization over x iff it allows models in which more than one value can be assigned to x such that ∃[Restrictor[...x...]] is true (where ∃ binds all free variables except x); any generalization says that if an entity has certain characteristics (specified by the Restrictor), then it also has certain other properties (specified by the Matrix) to a certain degree; the degree is determined by the quantifier. Discussing the semantics of the generic operator, Krifka at al. (1995:22) observe that a possible requirement could be that whenever a habitual statement holds, there are *several* times at which a corresponding episodic statement holds. Although this generalization does not account for all generic sentences (e.g., *This machine crashes oranges* can be true without any single episodic situation in which the machine crushes oranges), it captures an important intuition behind sentences like *He ploughs his field* or *He visits New York*. Evidently, these sentences cannot be true unless there are occasions at which the participant is ploughing the field or at which his actual location is New York.

This strongly suggests that habituals from SLPs are related to the plurality of episodic situations. In its essential part, this analysis of habituality accords with one offered by Henk Verkuyl (1993: 325-327, 1995), who assumes that habituality involves *unbounded pluralization of temporal intervals* associated with corresponding episodic clauses.

Unlike SLPs, ILPs like *know German* are not generalizations over episodic situations described by the same lexical item: no episodic situation can be referred to as *knowing German*. Accordingly, ILPs are not related to the plurality of episodic situations.

Given this difference, it is possible to formulate a hypothesis of how modal and future uses develop from habitual ones. I suggest that in this development, the mechanism of pragmatic inference is involved, and that the shift from the habitual meaning to the meaning of possibility essentially relies on the following principle:

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[10] Carlson (1977) suggests that semantic theory should assume a sortal distinction between two types of entities — individuals and stages, and whereas ILPs apply to individuals, SLPs applies to stages. Kratzer (1995) analyzes this contrast in terms of argument structure. She assumes that SLPs possess a Davidsonian argument, supplying a variable that ranges over events, while ILPs lack this argument. Alternatively, Chierchia (1995) suggests that both types of predicates have an event argument, but the peculiarity of ILPs is that the corresponding variable must be obligatorily bound by the generic operator, and ILPs can be thus characterized as inherent generics. Diesing 1988, 1992 provides a purely syntactic account for the ILP/SLP distinction: she assumes that subjects of SLPs are generated within the VP, while subjects of ILPs originate in the Spec IP position. Manninen (2001) offers a feature-based analysis, involving two binary features [αhabitual] and [αevent], which is compatible with the minimalist framework. Recently, Jäger (to appear) has argued that ILP/SLP distinction is not a uniform binary contrast but rather a collection of related but different distinctions.

(18) If x performs p regularly (that is, there is a plurality of p(…x…)), then x is *able* to perform p.

Indeed, general knowledge of the world implies that ability to do something is a prerequisite for doing something on a regular basis, and information concerning regularity can be easily reanalyzed as indicating ability. In fact, in the null context, a statement like *He speaks German* is likely to be interpreted as describing one's capacity rather than the very fact that one happens to demonstrate this capacity regularly.

As soon as the ability use of a habitual gram is established, this gram can enter the path of diachronic development of modals expressing possibility, that is, acquire meanings of 'root possibility' and 'epistemic possibility' as represented in (19).

(19) ABILITY → ROOT POSSIBILITY → EPISTEMIC POSSIBILITY (Bybee et al. 1994:199)

(19) predicts exactly the range of interpretations demonstrated in (6)-(9) above: (6) involves ability, (7) is interpreted as root possibility, and (8)-(9) are both instances of epistemic possibility.

Epistemic modals, then, regularly produce a gram expressing FTR (Bybee et al (1994:266), van der Auwera, Plungian (1998:98)). As Bybee et al. (1994:207) observe, «when no other tense indicator is present, the possibility and probability markers make FTR ... In a few cases, the expression of simple future is another use of the epistemic marker.» This suggestion receives support from well documented cases where possibility is closely associated with FTR. Bybee et al. (1994:208) cites a few languages (Island Carib, Nakanai, Trukese, Chepang, Cantonese) where grams are attested that express both of these meanings. In particular, examples from Cantonese (Bybee et al. (1994:265)) involve polysemy very close to that in Bagwalal: 'I may be going to Japan next week' vs. 'he can cook very well'. Consider also (20)-(22) from Mandarin Chinese (Ching-hsiu Chang (2001:64-66)) showing the distribution of the particle *hui*, which corresponds precisely to the distribution of Andic habituals, discussed above:

(20) a. Ren jie hui si.
Human.beings all *hui* die
'All human beings are mortal.' <ILP, present time reference>

b. Ta mei-tian zao-shang dou hui qu gong-yuan san-bu.
He everyday morning usually *hui* go park walk
'He usually goes to the park for a walk every morning.' <SLP, habitual, present time reference>

(21) Ren hui shuo hua.
People *hui* speak language
'People can speak.' <SLP, ability, present time reference>

(22) Ming-tian hui xia-yu.
Tomorrow *hui* rain
'It will rain tomorrow.<SLP, future time reference, predictive>

Therefore, a habitual gram that enters the path represented in (19) can end up expressing FTR. At earlier stages, FTR is restricted to predictive contexts, more closely associated with epistemic possibility, but later it readily extends to other future contexts as well. The complete path of diachronic development is shown in (23).

(23) PROG → HABITUAL → ABIL → ROOT POSS → EPIST POSS → PREDICT FUT → PROSP/INT FUT

Crucially, (18) is valid only for generalizations over episodic situations like *speak German*: from a statement about an unspecified number of episodic situations one deduces a statement about a possibility of a single episodic situation. This is not a possible option, however, when we are dealing with a statement about a situation like *know German*, which is not associated with multiple episodic situations; in this case (18) is irrelevant.

Accordingly, the modal grammaticalization path represented in (19) is only available for habituals from SLPs. In contrast, habituals from ILPs have no chance to enter this path[11]. In Mandarin Chinese, according to Ching-hsiu Chang 2001:67, the situation is absolutely the same: «Among the three <uses of *hui*>, only the predictive *hui* is required to take the stage-level predicate ... <Other uses...> are more flexible that they can take either individual-level predicates or stage-level predicates...»

Therefore, as far as the development of habituals is concerned, SLPs precede the ILPs; if the latter acquire modal and future uses at all, it happens at later stages of development, when these uses become conventionalized with SLPs and can extend to ILPs by analogy. This explains both the lack of modal and future readings of the positive habituals discussed in section 2.2. and the asymmetry in the distribution of the Negative Future in Bagwalal in section 2.3.

[11] Of course, modal uses may have their own lexical restrictions; for instance, modals applied to non-agentive predicates typically fail to produce the ability reading. Yet, these are restrictions on grams that *have already entered* modal path. For habituals from ILPs, in contrast, this path is merely invisible.

4. CONCLUSION

The tentative analysis outlined above needs, of course, further elaboration and refinement as well as more cross-linguistic justification. First, within grammaticalization theory many assumptions about the structure of grammaticalization paths and properties of nodes on these paths remain implicit, and this study does not attempt to overcome this weakness. Secondly, we lack sufficient cross-linguistic data about the meaning and the distribution of habitual, modal, and future language-specific grams and, especially, about the lexical restrictions on these grams. Yet, I believe that the Nakh-Daghestanian material discussed above allows us to identify a plausible path of diachronic evolution of habitual grams and to reveal the significance of the SLP/ILP contrast in the development of grammatical systems of which these grams are part.

5. ACKNOWLEDGMENTS

I am very grateful to Henk Verkuyl, Östen Dahl and an anonymous referee for helpful comments on an earlier version of this paper. The study has been supported by the Russian Foundation for Basic Research (project #05-06-80258-a).

6. ABBREVIATIONS

AD localization 'near, close to the landmark', **AFF** affective, **COND** conditional, **DAT** dative, **ERG** ergative, **FUT.NEG** negative future, **GEN** genitive, **HAB** habitual, **HPL** class of human beings (=M & F), **INF** infinitive, **IPFV** imperfective, **LOC** locative, **LOG** logophoric, **M** masculine, **N** neuter, **NEG** negation, **OBL** oblique, **PART** participle, **POT** potential, **PTCL** particle, **Q** question.

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HOOI LING SOH & JENNY YI-CHUN KUO

PERFECTIVE ASPECT AND ACCOMPLISHMENT SITUATIONS IN MANDARIN CHINESE

Abstract. This paper addresses a difference between English and Mandarin Chinese in how the perfective aspect interacts with accomplishment situations. We propose that the source of the difference lies in the different nominal systems in English and Mandarin. Specifically, while English nominal heads distinguish count nouns from mass nouns, Mandarin nominal heads do not (Chierchia 1998).

Keywords. Aspect, accomplishment, mass and count nouns, Mandarin Chinese, *-le*.

1. INTRODUCTION

It has been observed that Mandarin Chinese differs from English in that it is not contradictory to conjoin an accomplishment sentence with the perfective marker *–le* and an assertion that the event is not complete (Chu 1976, Tai 1984, Smith 1991, 1994, Sybesma 1997, 1999, Klein et al. 2000).[1] For example, the Mandarin example in (1) is acceptable, while the corresponding English example in (2) sounds contradictory.[2]

(1) Wo zuotian xie-le yi-feng xin, keshi mei xie-wan.
I yesterday write-LE one-Cl letter, but not write-finish
'I wrote a letter yesterday, but I didn't finish writing it.' (Tai 1984)

(2) #I wrote a letter yesterday, but I didn't finish writing it.
(adapted from Smith 1991: 107)

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[1] It is however contradictory to conjoin an achievement sentence with the perfective marker *–le* in Mandarin and an assertion that the event is not complete.

(i) #Ta faxian-le yi-ge mimi, keshi mei faxian-dao.
he discover-LE one-Cl secret but not discover-complete
'He discovered a secret, but he didn't discover it.'

It should be noted that the literature is not entirely clear on this fact. For example, it has been noted that (ii) is acceptable (Sybesma 1997: 218), and one could argue that achievement sentences behave like accomplishment sentences in Mandarin (see Tai 1984 and Sybesma 1997).

(ii) Ta sha-le Lisi san-ci, keshi mei sha-cheng.
he kill-LE Lisi three-time but not kill-success
'He went through the motion of killing Lisi three times, but he did not succeed.'

However, Sybesma (1997) also notes that the sentence may not be completely acceptable to native speakers. We find that other achievement sentences (e.g., *ta dao-le xuexiao* 'he arrived at school' and *ta ying-le* 'he won') behave like (i) rather than (ii). The exception in (ii) could be due to the lexical meaning of *sha*, which is not equivalent to *kill* in English.

[2] Cl stands for classifiers.

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 199 - 216.

Tai (1984) argues that Mandarin differs from English in that there are no simple accomplishment verbs in Mandarin (see also Sybesma 1997). An accomplishment verb in Mandarin is expressed in the form of a resultative verb compound as shown in (3). A perfective sentence with a resultative verb compound cannot be followed by an assertion that the event is not complete.

(3) #Wo zuotian xie-wan-le yi-feng xin, keshi mei xie-wan.
I yesterday write-finish-LE one-Cl letter, but not write-finish
'I finished writing a letter yesterday, but I didn't finish writing it.'

On the other hand, Smith (1991, 1994) argues that the source of the difference between English and Mandarin lies in the aspectual marker. Unlike English, the perfective marker in Mandarin, *-le,* indicates the termination of the event, and not the completion of the event. In other words, the event may be terminated (with an arbitrary final point) without having reached the natural end point in Mandarin.[3]

In this paper, we show that *–le* in Mandarin does not always indicate termination in accomplishment situations. Specifically, we show that *–le* indicates the completion (and not just termination) of the event in situations involving certain objects of creation (compare Sybesma 1997: 252-253). In addition, we show that the completion of the event in a perfective accomplishment is necessary with a numeral object, but not with a demonstrative object (compare He 1993: 180, Zhang 1997). We propose an account for why completion is necessary with some objects of creation in Mandarin, but not others. We also propose an analysis for why completion is necessary in perfective accomplishments with a numeral object, but not with a demonstrative object in Mandarin. We claim that the difference between English and Mandarin shown in (1) and (2) lies in their different nominal systems. Specifically, while English nominal heads distinguish count nouns from mass nouns, Mandarin nominal heads do not (Chierchia 1998).

2. CREATED OBJECTS AND NON-CREATED OBJECTS

2.1. Data

In this section, we show that the perfective *–le* indicates completion (and not just termination) in some accomplishment situations in Mandarin. These accomplishment situations involve certain types of created objects such as *yi ge dangao* 'a cake' as an object of *zuo* 'bake', and *yi-jian fangzi* 'a house' or *yi zuo*

[3] Besides termination, *-le* may indicate the inception of the event when the situation does not have an inherent end point (Shi 1990).

qiao 'a bridge' as an object of *zao* 'build'.[4] As shown in (4) and (5), it is contradictory to conjoin a perfective accomplishment sentence involving these created objects with an assertion that the event is not complete.[5]

(4) #Ta zuo-le yi-ge dangao, keshi mei zuo-hao.
he bake-LE one-Cl cake but not bake-finish
'He baked a cake, but did not finish baking it.'

(5) #Ta zao-le yi-jian fangzi /yi-zuo qiao, keshi mei zao-hao.
he build-LE one-Cl house /one-Cl bridge but not build-finish
'He built a house / a bridge, but did not finish building it.'

No such contradiction is found with other objects of creation, such as *yi-feng xin* 'a letter' as an object of *xie* 'write' (see (1)), and *yi-fu hua* 'a picture' as an object of *hua* 'draw':

(6) Ta hua-le yi-fu hua, keshi mei hua-wan.
he draw-LE one-Cl picture but not draw-finish
'He drew a picture, but he didn't finish drawing it.'[6]

Other examples include *feng yi-jian yifu* 'sew a dress/shirt' and *ke yi-ge renxiang* 'carve a portrait'.

The same verb of creation may or may not require that the event be completed, depending on the choice of the object.[7] As shown in (7), there is a contrast between the created object *yi-fu hua* 'a picture' and *yi-ge quan-quan* 'a circle' in that the event must be completed in the latter, but not in the former. The same contrast is found between the created object *yi-feng xin* 'a letter' and *yi-ge zi* 'a character' as shown in (8).[8]

(7) Ta hua-le yi-fu hua/ #yi-ge quan-quan, keshi mei hua-wan.
he draw-LE one-Cl picture/one-Cl circle but not paint-finish
'He drew a picture/a circle, but he didn't finish drawing it.'

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4 In general, the term "object" is used here to refer to the grammatical object (i.e., the complement of a verb). In the context of "created object", it is used to refer to the entity denoted by the grammatical object.

5 The sentences are acceptable when not followed by the assertion that the event is not complete.

6 *Hua-le yi-fu hua* can be translated as either 'drew a picture' or 'painted a painting'. In this paper, we translate it with the former meaning.

7 Smollett (this volume) observes the following related difference in English:
(i) Jack built a house ?? for a month. (ii) Jack built a Lego tower for three hours.
The difference is that in the real world, a Lego tower can be added onto indefinitely without being considered "finished", while there is typically a point where we consider a house to be complete.

8 The difference cannot be attributed to whether or not the object is a cognate object. This is because while *hua* may be a cognate object of *hua-hua* 'drawing', *zi* a cognate object of *xiezi* 'writing', they behave differently in that *hua-le yi-fu hua* 'drew a picture' need not be completed while *xie-le yi-ge zi* 'wrote a word/character' must be.

(8) Ta xie-le yi-feng xin/ #yi-ge zi, keshi mei xie-wan.
he write-LE one-Cl letter/one-Cl character but not write-finish
'He wrote a letter/a character, but he didn't finish writing it.'

With non-creation verb+object sequences, the completion of the event is not necessary, as shown in (9).

(9) Wo zuotian kan-le yi-ben shu, keshi mei kan-wan.
I yesterday read-LE one-Cl book but not read-finish
'I read a book yesterday, but I didn't finish reading it.'

2.2. Analysis

Why is completion necessary with certain created objects, but not with other created objects or non-created objects? We suggest that there are two classes of created objects, depending on when the object that is brought into existence by the creation activity can be considered the relevant object. In one class, the object cannot be considered the relevant object until the process of creation has reached its inherent end point or culminated in the sense of Parsons (1989). We call this class of created objects No Partial Object (NPO). The NPO class includes *yi-jian fangzi* 'a house' in a building event, *yi-ge dangao* 'a cake' in a baking event, *yi-ge quan-quan* 'a circle' and *yi-ge zi* 'a word' in a drawing and a writing event respectively. For example, a drawing of a mathematical object cannot be properly called 'a circle' until the first point in the drawing of a circle is connected to the last point. In the other class of created objects, the object can be considered the relevant object before culmination. We call this class of created objects Allows Partial Object (APO).[9] The APO class includes *yi-feng xin* 'a letter' in a writing event and *yi-fu hua* 'a picture' in a drawing event. For example, if the event of drawing a picture is stopped before culmination, the partially created object can be properly called 'a picture'.[10]

We propose that in creation events, *–le* indicates the completion of the event leading to the creation of an object that qualifies as the relevant object. With the NPO class, *–le* indicates the completion of the event to the point where the object is created. With the APO class, *–le* indicates the completion of the event to the point where a partial object is created. An event must be completed with the NPO class

[9] See Chan (1996) for the notion of a partial object. Chan (1996) claims that the perfective *–le* does not indicate termination or completion in accomplishment situations in Mandarin. Rather, the difference between English and Mandarin is due to the fact that Mandarin speakers tolerate partial objects more easily than English speakers do.

[10] The difference between the NPO and the APO class may be related to a difference in the range of precision standards under which the creation event may be considered culminated (see Zucchi 1998). With the APO class, the event may be considered culminated relatively early in the creation process, while with the NPO class, the event can only be considered culminated late in the creation process.

because the event must reach its inherent end point before one can consider the object created. The completion of the event is not necessary with the APO class because the event does not need to culminate for a partially created object to qualify as the relevant object. Because of the existence of a partial object, it is possible for certain creation events to not reach their inherent end points. The completion of the event is not necessary with non-creation events because the existence of the object does not depend on the completion of the event.

Our claim that a partially created object of the NPO class (e.g., a house, a cake) cannot be considered the relevant object seems at first glance to be incompatible with Parsons' (1989, 1990) notion of unfinished objects. Parsons (1989: 225) notes that people describe unfinished objects such as cakes as "cakes", and that these objects exist during the early stages of their creation and before they have "well-defined spatial locations". For example, one can refer to an unfinished cake as "the cake" in the sentence *Sam put the cake in the oven*. We think that there is a difference between referring to an unfinished object as the relevant object, and identifying the object as the relevant object. It is acceptable to refer to an unfinished cake as "the cake". However, if asked to determine whether "the cake" that has not been put in the oven IS a cake, we would answer in the negative. We think that the existence of a cake in Parsons' example can only be as an abstract object (Verkuyl 1972, 1993).[11]

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[11] The distinction between the NPO and the APO class may be detected in *ba*-constructions. In *ba*-constructions, the direct object of a transitive verb is introduced by *ba*- in a pre-verbal position as shown in (ib). The events expressed by *ba*-constructions are bounded (Sybesma 1992 cited in Liu 1997, Liu 1997).

(i) a. Ta chi-le [na-wan fan].
he eat-LE that-Cl rice
'He ate that bowl of rice.'

b. Ta ba [na-wan fan] chi-le.
he BA that-Cl rice eat-LE
'He ate that bowl of rice.'

In *ba*-constructions, there is a contrast between creation and non-creation events in whether a completive marker (e.g., *hao* 'complete', *wan* 'finish', *diao* 'off') is required after the verb (compare Yang 1995). A completive marker is optional with non-creation events.

(ii) a. Ta shao-le [na-feng xin].
he burn-LE that-Cl letter
'He burned that letter.'

b. Ta ba [na-feng xin] shao-(diao)-le.
he BA that-Cl letter burn-off-LE
'He burned that letter.'

Within creation events, there seems to be a contrast between events involving an NPO object and ones involving an APO object. There appears to be a stronger requirement that the verb be followed by a completive marker when the event has an NPO object, than when it has an APO object. Compare (iiib) and (ivb).

(iii) a. Ta zao-le [na-jian fangzi].
he build-LE that-Cl house
'He built that house.'

b. Ta ba [na-jian fangzi] zao*(hao)-le.
he BA that-Cl house build-complete-LE
'He built that house.'

(iv) a. Ta xie-le [na-feng xin].
he write-LE that-Cl letter
'He wrote that letter.'

b. Ta ba [na-feng xin] xie-??(hao)-le.
he BA that-Cl letter write-LE
'He wrote that letter.'

While we believe that one may detect a distinction between the two classes of creation objects in *ba*-constructions, the results of our survey of twelve Mandarin speakers provide only weak support for our intuitions. Three of the speakers we interviewed do not show any contrast between the APO and the NPO creation objects. They require a completive marker after the creation verb in *ba*-constructions. The other speakers tend to accept *ba*-sentences without a completive marker with an

3. NUMERAL OBJECTS VERSUS DEMONSTRATIVE OBJECTS

3.1. Data

In this section, we show that in Mandarin, the event must be completed when the perfective accomplishment sentence includes a numeral object, but not when the object is a demonstrative noun phrase. A clear contrast is found among non-creation events as shown in (10) and (11).

(10) Ta chi-le #liang-ge dangao/ na-ge dangao, keshi mei chi-wan.
he eat-LE two-Cl cake/ that-Cl cake but not eat-finish
'He ate two cakes/that cake, but he did not finish eating them/it.'

(11) Ta kan-le #liang-ben shu/ na-ben shu, keshi mei kan-wan.
he read-LE two-Cl book/that-Cl book but not read-finish
'He read two books/that book, but he did not finish reading them/it.'

This generalization also holds when the object involves *yi* 'a/one', even though it may not seem so at first glance.

(12) a. Ta chi-le yi-ge dangao, keshi mei chi-wan.
he eat-LE one-Cl cake but not eat-finish
'He ate #one cake/a certain cake, but he did not finish eating it.'

b. Ta kan-le yi-ben shu, keshi mei kan-wan.
he read-LE one-Cl book but not read-finish
'He read #one book/a certain book, but he did not finish reading it.'

In general, *yi* 'a/one' in Mandarin can be interpreted either as an indefinite determiner or the numeral *one*. However, the sentences in (12) are acceptable only when *yi* 'one/a' is interpreted as an indefinite determiner, rather than as a numeral.

When the sentence contains a creation verb with an NPO object, the contrast between a demonstrative object and a numeral object cannot be detected. This is shown in (13). The sentence sounds contradictory whether the object involves a numeral or a demonstrative determiner. This is because when the creation event involves an NPO object, the event must reach the inherent end point regardless of the form of the object.

APO object more often than those with an NPO object. Further studies may help clarify what the judgments reveal.

(13) #Ta zuo-le liang-ge dangao/yi-ge dangao/na-ge dangao,
he bake-LE two-Cl cake/ one-Cl cake/ that-Cl cake
keshi mei zuo-hao.
but not bake-finish
'He baked two cakes/a (one) cake/that cake, but he did not finish baking them/it.'

When the sentence contains a creation verb with an APO object, the contrast between a numeral and a demonstrative object surfaces, as shown in (14). This is because the creation event must reach the point where the partially created object qualifies as the relevant object. There is no requirement that the inherent end point of the event be reached.

(14) a. Ta hua-le #liang-fu hua/ na-fu hua,
he draw-LE two-Cl picture/ that-Cl picture
keshi mei hua-wan.[12]
but not draw-finish
'He drew two pictures/that picture, but he didn't finish drawing them/it.'

b. Ta hua-le yi-fu hua, keshi mei hua-wan.
he draw-LE one-Cl picture but not draw-finish
'He drew #one picture/a picture, but he didn't finish drawing it.'

We propose an analysis for why completion is necessary with a numeral object but not with a demonstrative object in Mandarin in the following section.

3.2. Analysis

3.2.1. Assumptions

Following Jackendoff (1991), we assume that nominal arguments may bear the conceptual features ±bounded [±b] and ±internal structure [±i]. The boundedness feature indicates whether the boundaries of an entity are in view or are of concern. The [-b] value does not entail that the entity is necessarily unbounded in space. The internal structure feature indicates whether the entity has inherent division into discrete members. Note that the [-i] value does not mean the lack of internal structure, but rather the absence of necessary entailment about internal structure. We assume the universal feature specification given in (15) (Jackendoff 1991: 20).

[12] The demonstrative object behaves likes a bare noun phrase, which is potentially mass. It is not contradictory to conjoin a perfective accomplishment sentence with a bare noun phrase object and an assertion that the event is not complete (Sybesma 1997: 253). For example, *ta chi-le dangao, keshi mei-you chi wan* 'he was eating cake, but he did not finish' is fine in Mandarin.

(15)	[+b, -i]	individuals	(a pig)
	[-b, -i]	substances	(water)
	[+b, +i]	groups	(a committee)
	[-b, +i]	aggregates	(buses, cattle)

Individuals, usually described by count nouns in English, are [+b, -i]. Substances, usually described by bare mass nouns in English, are [-b, -i]. Groups are [+b, +i]. Aggregates, normally described by plural nouns in English, are [-b, +i].

Our analysis capitalizes on a well-known observation that the nature of the nominal argument affects the aspectual properties of an event (Jackendoff 1996, Krifka 1989, 1992, 1998, Liu 1997, Smith 1991, Sybesma 1999, Tenny 1992, Verkuyl 1972, 1993, Yang 1997 among others). With an accomplishment verb, when the nominal argument is [+b] (e.g., *the apple*, *fifteen sandwiches*), the event is telic/bounded. It can be followed by temporal adverbials such as *in an hour*, but not *for an hour* (Jackendoff 1996: 306).

(16) a. Bill ate the apple/fifteen sandwiches in an hour.
b. Bill ate ??the apple/*fifteen sandwiches for an hour.

When the nominal argument is [-b] (e.g., *custard*, *sandwiches*), the event is atelic/non-bounded. It can be followed by temporal adverbials such as *for an hour,* but not *in an hour* (Jackendoff 1996: 307).[13]

(17) a. *Bill ate custard/sandwiches in an hour.
b. Bill ate custard/sandwiches for an hour.

Following Smith (1991: 106-107), we assume that the perfective aspect indicates completion in a telic/bounded event, but termination in an atelic/non-bounded event.

Unlike Jackendoff (1991), we assume that the features are encoded in the nominal head, and nominal projections, in a bottom-up manner.[14] (18) shows the feature specifications of English noun phrases.[15] The structure of a bare mass noun is given in (18a). The N head of a bare noun is specified as [-b, -i]. This feature specification percolates up to the NP and the DP level. (18b) shows the structure of a bare plural. The head noun is specified as [-b, +i], with the feature specification percolating up to the NP and the DP level. The same applies to a singular count noun in (18c), which is specified as [+b, -i] at the N-level, and at the NP and DP level. In contrast with these three types of noun phrases, the feature specification on

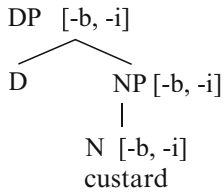
[13] Jackendoff's notion of boundedness can be interpreted in terms of [+Specified Quantity of A] and [+ADD TO] (Verkuyl 1993: 230).

[14] See Verkuyl (1972, 1993) for the idea that aspect is compositionally determined on the basis of semantic information expressed by different syntactic elements.

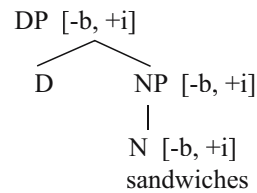
[15] DP stands for Determiner Phrase, NumP stands for Number Phrase, and NP stands for Noun Phrase.

a numeral plural is different at the N-level from its specification at the DP level, as shown in (18d). At the N-level, a numeral plural is specified as [-b, +i] (like a bare plural). This feature specification percolates up to the NP-level. We assume however that a numeral changes the boundedness feature of the constituent it selects from [-b] to [+b].[16] As a result, at the level of NumP, the constituent is specified as [+b, +i], and this feature specification remains at the DP level.

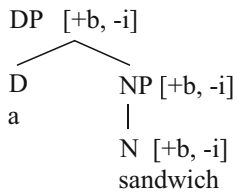
(18) a. Bare mass nouns [-b, -i]
Example: *custard*



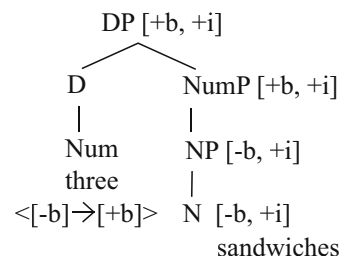
b. Bare plurals [-b, +i]
Example: *sandwiches*



c. Singular count nouns [+b, -i]
Example: *a sandwich*



d. Numeral plurals [+b, +i]
Example: *three sandwiches*



The effect of a numeral on the boundedness feature can be observed in (19) (Jackendoff 1996: 306-307).

(19) a. Bill ate sandwiches *in an hour/for an hour.
b. Bill ate fifteen sandwiches in an hour/*for an hour.

Besides numerals, we suggest that elements in D (e.g., the definite determiner, the demonstrative or an indefinite determiner) change the boundedness feature of the constituent they select from [-b] to [±b]. [±b] means that the constituent has the option of being either [+b] or [-b]. Jackendoff (1996: 307) notes that a definite mass noun phrase is ambiguous between a bounded and an unbounded reading, whereas a

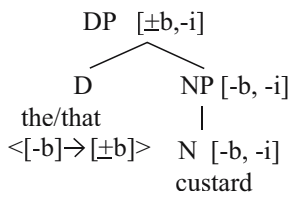
[16] The idea comes from Jackendoff's (1991: 21) system of functions. See Verkuyl and Zwart's (1992: 493) summary of Jackendoff's system of conceptual features and functions, where the entity described by a numeral plural is [+b, +i].

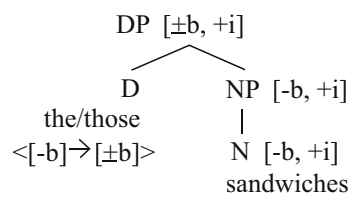
bare mass noun phrase must be unbounded.[17] For example with a bare mass noun in (20a), the event is atelic/non-bounded. With the addition of the definite determiner in (20b), the sentence may present either a telic/bounded or an atelic/non-bounded event (Jackendoff 1996: 307).

(20) a. Bill ate custard for hours/*in an hour.
b. Bill ate the custard for hours/in an hour.

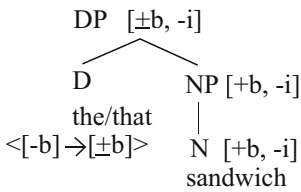
(21a) and (21b) show the effect of the definite determiner and demonstrative on the boundedness feature of the constituent. Note that the definite determiner and the demonstrative do not affect the boundedness feature of the selected constituent if the constituent is specified as [+b] as shown in (21c) and (21d). Note also that the indefinite article in English in (18c) does not change the value of the boundedness feature of its selected constituent given that the constituent is [+b]. We will show later that an indefinite numeral in D in Mandarin behaves like a demonstrative in changing the boundedness value of its selected constituent from [-b] to [±b].

(21)



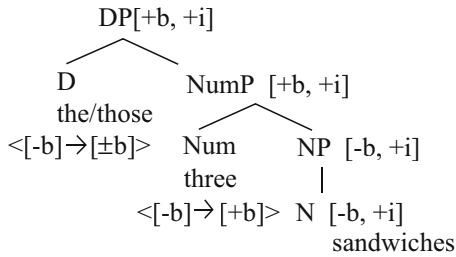


c. Definite singular count nouns [+b, -i]
Example: *the/that sandwich*



[17] In Jackendoff (1991), it is argued specifically that the source of the bounded reading for a definite mass noun such as 'that water' is not from the definite determiner. 'That water' is unbounded, and the bounded reading is derived by a rule of construal that inserts the operator COMP "composed of" to give us the interpretation of 'a bounded individual composed of water'.

d. Definite numeral plurals [+b, +i]
Example: *the/those three sandwiches*



One may wonder why elements in D affect the boundedness feature of the selected constituent and why they only affect [-b] constituents, and not [+b] constituents.[18] We assume that D has a referring function and it mediates between the description provided by the NP and the specific entity in the real world the description is applied to (Cheng and Sybesma 1999: 513). This referential function of D allows the boundary of the substance or aggregate to be brought into view, when the actual entity referred to is bounded (e.g., when the phrase 'that water' is understood as referring to a particular glass of water) (see footnote 17).[19] With an entity that is already [+b], the effect of bringing the boundary into view will not be detected.

The feature changing rules are summarized in (22).[20]

(22)	Numeral	[-b] → [+b]
	Elements in D	[-b] → [±b]

Unlike English nouns, which have a count/mass distinction, we assume following Chierchia (1998) that the extensions of Chinese nouns are mass. Unlike Chierchia (1998), we assume that there are two types of mass nouns (Jackendoff 1991: 22): those that denote substances (e.g., water) and those that denote aggregates (e.g., furniture). We refer to the former as mass mass nouns, and the latter as count mass

[18] We thank the reviewers for raising this question, and we thank Jeanette Gundel for discussing this issue with us.

[19] It may be that the use of a determiner to access an existing representation in the mind of the addressee makes it possible to leave unexpressed elements that contribute the [+b] feature to the nominal argument (Jeanette Gundel, personal communication).

[20] Instead of rules like the ones given in (22), a conference participant suggested that we consider an alternative analysis in terms of feature percolation from the head only. Within this analysis, a numeral would be specified as [+b] and the feature of the head percolates up to NumP. A definite determiner would be specified as [±b] or [+b] and this feature would percolate up to DP. While the alternative analysis seems simpler and more desirable, it introduces certain other complications. For example, for the analysis to work, we need to stipulate that a [±b] determiner cannot select a [+b] complement. Otherwise, we would lose the contrast between (21a), (21b) versus (21c) and (21d).

nouns, following Doetjes (1997 cited in Cheng and Sybesma 1999). Mass mass nouns are [-b, -i], while count mass nouns are [-b, +i]. Cheng and Sybesma (1999) suggest that these two classes of mass nouns correspond to two classes of classifiers: classifiers that create a unit of measure (e.g., *bei* 'cup' in *liang bei jiu* 'two glasses of wine') and classifiers that name the unit that the entity denoted by the noun naturally occurs in (e.g., *ben* 'unit' in *liang ben shu* 'two units of books') (Cheng and Sybesma 1999).[21] The classifiers associated with mass mass nouns are called mass-classifiers and those associated with count mass nouns are called count-classifiers. Because a mass classifier creates a unit of measure, we suggest that it changes the internal structure feature of its selected constituent from [-i] to [+i]. A count classifier does not create a unit of measure. It makes the unit syntactically visible for counting (Doetjes 1996 cited in Cheng and Sybesma 1999) or it provides a suitable level at which the objects can be individuated for counting to be possible (Chierchia 1998: 93). Hence, it does not affect the value of the internal structure feature of its selected constituent. We add the following rule to the ones in (22).[22] However, the use of this rule will not be demonstrated in this paper.

(23) Mass classifier [-i] → [+i].

3.2.2. A proposal

In this section, we address why completion is necessary with a numeral object but not with a demonstrative object in Mandarin. We propose that the difference between a numeral object and the demonstrative object is that the former is [+b], while the latter is [±b].

Consider (24a). The count mass noun in the numeral expression is specified as [-b, +i]. The count classifier does not change the internal structure value of its selected constituent (i.e., NP). The numeral changes the [-b] feature of its selected constituent (i.e., ClP) to [+b]. The resulting feature specification percolates up to the DP level and a numeral expression in Mandarin receives [+b, +i] specification.

On the other hand, a demonstrative noun phrase in Mandarin is [±b, +i] as shown in (24b). We assume following Cheng and Sybesma (1999) that classifiers in Mandarin are always preceded by a numeral, whether the numeral is overt or covert. Following Soh (2001), based on Tang (1990) and Li (1997, 1998), we assume that a numeral with a referential interpretation (but not a numeral with a quantity reading)

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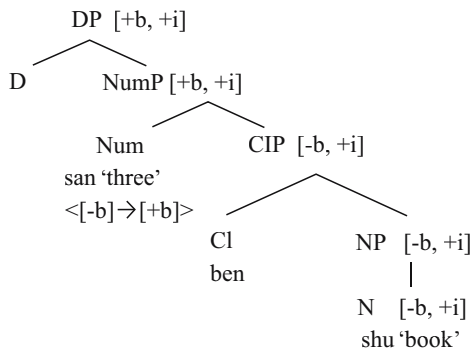
[21] In both Cheng and Sybesma (1998) and Cheng and Sybesma (1999), it is argued that Chinese nouns have a count/mass distinction. In the earlier paper, the distinction is taken to indicate that Chinese has count nouns as well as mass nouns. In the latter paper, the distinction is taken to indicate that Chinese has two types of mass nouns: count mass nouns and mass mass nouns. We assume their latter position here.

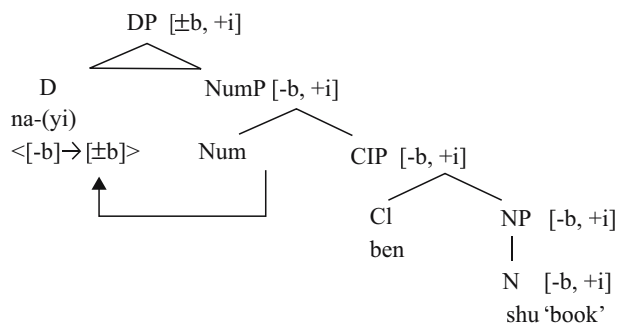
[22] Our treatment of classifiers differs from Jackendoff's (1991: 22-23), where 'a grain of rice' involves the function ELT (element of) that takes an aggregate rice [-b, +i] and maps it into [+b, -i]. Similarly, 'a drop of water' involves the function ELT that takes a substance [-b, -i] and map it into [+b, -i].

adjoins to D.[23] This adjunction process occurs whether or not D is lexically filled by a demonstrative. One piece of evidence for this movement comes from the fact that nothing can intervene between the demonstrative and the numeral-classifier sequence (Tang 1990: 410-415). Another piece of evidence is that the demonstrative one-Cl sequence *na yi ben* 'that one-Cl' and *zhe yi ben* 'this one-Cl' are often reduced to *nei ben* 'that-one-Cl' and *zhei ben* 'this-one-Cl', with the numeral phonologically incorporated into the demonstrative (Tang 1990). At the N-level, the noun is specified as [-b, +i] as it is a count mass noun. This feature specification percolates up to the NP level. The count classifier does not change the value of the internal structure feature of the NP constituent. We suggest that only a numeral in Num may change the value of the boundedness feature of its selected constituent from [-b] to [+b]. A numeral with a referential interpretation in D takes on the function of a determiner and together with the demonstrative, they change the [-b] feature to [±b]. The resulting feature specification percolates up to the DP level.

(24) a. Numeral expressions [+b, +i]
Example: *san ben shu* 'three books'



b. Demonstrative noun phrases [±b,+i]
Example: *na (yi) ben shu* 'that book'

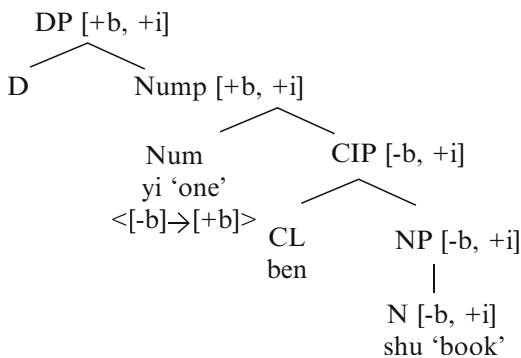


[23] Soh (2001) assumes following Li (1997, 1998) that a quantity number expression does not have a DP layer unlike a non-quantity (referential) number expression. We do not represent this structural difference here.

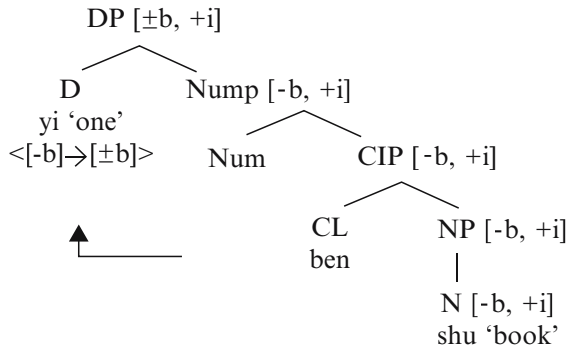
As said, we assume, following Smith (1991: 106-107), that *–le* indicates completion in a telic/bounded event, but termination in an atelic/non-bounded event. Because a situation presented by an accomplishment verb and a [-b] object is atelic/non-bounded, *-le* indicates termination when the object is [-b]. Because a situation presented by an accomplishment verb and a [+b] object is telic/bounded, *–le* indicates completion when the object is [+b]. Given that the demonstrative object allows for either [+b] or [-b] specification, the perfective *–le* may indicate either the termination or the completion of the event. Since the numeral object is specified only as [+b], *–le* can only indicate the completion of the event. The difference between a numeral object and a demonstrative object results from the different effects a numeral and a demonstrative have on the boundedness feature of the nominal projection (see (22)).

The same analysis can be extended to account for why completion is necessary with the numeral "one" and not with the indefinite determiner. We assume that *yi* occupies Num when it is interpreted as a numeral and it raises from Num to D when interpreted as an indefinite (see Soh 2001 for phonological evidence from Hokkien and Shanghai Chinese). When *yi* is interpreted as a numeral, the noun phrase is [+b, +i] as shown in (25a). When *yi* is interpreted as an indefinite determiner, the noun phrase is [±b, +i] as shown in (25b). An indefinite determiner in D, like a demonstrative, changes the boundedness feature of its selected constituent from [-b] to [±b].

(25) a. Numeral expressions [+b, +i]
Example: *yi ben shu* 'one book'



b. Indefinite noun phrases [±b, +i]
Example: *yi ben shu* 'a book'



When the object is [+b] (e.g., *yi ben shu* 'one book'), the perfective accomplishment event must be completed. When the object is [±b] (e.g., *yi ben shu* 'a book'), the event may be terminated and not completed.

4. A NEW ACCOUNT OF THE DIFFERENCE BETWEEN ENGLISH AND MANDARIN

Our analysis provides a novel explanation for the difference between English and Mandarin Chinese shown by the contrast between (1) and (2), repeated below.

(26) Wo zuotian xie-le yi-feng xin, keshi mei xie-wan.
I yesterday write-LE one-Cl letter, but not write-finish
'I wrote a letter yesterday, but I didn't finish writing it.' (Tai 1984)

(27) #I wrote a letter yesterday, but I didn't finish writing it.
(adapted from Smith 1991: 107)

While it is contradictory in English to conjoin a perfective accomplishment sentence with an assertion that the event is not complete, the corresponding Mandarin sentence is acceptable. We claim that the difference between English and Mandarin is related to their different nominal systems. In our analysis, we assume that English head nouns distinguish count nouns from mass nouns, while Mandarin head nouns are mass (Chierchia 1998, Cheng and Sybesma 1999). Because of this difference, English singular count nouns start out as being bounded ([+b, -i]) and Mandarin nouns start out as being unbounded (either as [-b, -i] or [-b, +i]). Since the features of the head nouns start out differently in English and Mandarin, the features of the DPs are also different in these two languages. Mandarin definite/indefinite noun phrases may be [+b] or [-b] as shown in (24b) and (25b). English definite/indefinite

singular count noun phrases are [+b] as shown in (21c) and (18c). Because English definite/indefinite singular count noun phrases are [+b], completion is necessary. Given that Mandarin definite/indefinite noun phrases are [±b], completion is not necessary.

5. CONCLUSIONS AND IMPLICATIONS

We propose that certain objects of creation require the perfective creation event to reach its inherent end point. We suggest that this is related to our knowledge of when a particular object of creation is considered created. We propose that in Mandarin, a numeral object has the feature [+bounded] while a demonstrative object may be [+bounded] or [-bounded]. This difference is responsible for the fact that completion is necessary with a numeral object, but not with a demonstrative object. We claim that the difference between English and Mandarin is related to the fact that English has count nouns and mass nouns, while Mandarin only has mass nouns.

Contra Tai (1984), we argue that there are simple accomplishment verbs in Mandarin. The completion of the event is necessary with numeral objects and with NPO created objects. We suggest that Mandarin perfective aspect behaves like English perfective aspect in that it indicates the completion of a telic/bounded event, and the termination of an atelic/non-bounded event. The difference between English and Mandarin has its source not from any difference in the perfective aspect in these two languages (contra Smith 1991, 1994), but rather from their different nominal systems.

Our analysis makes a clear prediction about cross-linguistic differences in how the perfective aspect interacts with accomplishment situations. Classifier languages are often distinguished from non-classifier languages by the general use of classifiers, and the fact that head nouns are mass. Our analysis predicts that in classifier languages, the perfective aspect does not always indicate completion in accomplishment situations.[24]

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[24] We thank Manfred Krifka (personal communication) for bringing to our attention the fact that the perfective aspect in Hindi, a non-classifier language, does not always indicate completion in accomplishment situations. We do not consider this a counter-example to our analysis. There may be other factors responsible for the fact in Hindi. A counter-example to our analysis would be a classifier language that always indicates completion in accomplishment situations.

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J. MICHAEL TERRY

THE PAST PERFECTIVE AND PRESENT PERFECT IN AFRICAN-AMERICAN ENGLISH

Abstract. African American English simple V-*ed* sentences such as *John ate the rutabagas* are ambiguous; they have both past perfective and present perfect readings. This paper focuses on the role that verb morphology plays in this ambiguity. It argues that the ambiguity can be traced to the presence of a covert present tense operator found in the present perfect (but not past perfective) versions of such sentences, and the interaction of this operator with *–ed*, the morphology that turns the verb *eat* into *ate*. When it interacts with a covert present tense operator, *-ed* is interpreted as perfect aspect, but when it is the highest tense/aspect marker in the sentence, it is interpreted as past tense.

Keywords. Semantics, Morphology, Tense, Aspect, African American English.

1. INTRODUCTION

As Déchaine (1993) notes, unlike their Standard American English (SAE) counterparts, African American English (AAE) simple V-*ed* sentences such as that in (1) are ambiguous; they have both past perfective and present perfect readings.

(1)	John ate the rutabagas.	(AAE)
	a. 'John ate the rutabagas.'	(SAE)
	b. 'John has eaten the rutabagas.'	(SAE)

This paper focuses on the role of verb morphology in AAE perfect and perfective constructions and the ambiguity of sentences like (1). I argue that the ambiguity of (1) can be traced to the presence of a covert present tense operator found in its present perfect version, and the interaction of this operator with what I will call *–ed*, the morphology that turns the verb *eat* into *ate*. When it interacts with the present tense operator, *-ed* is interpreted as perfect aspect, but when it is the highest tense/aspect marker in the sentence, it is interpreted as past tense.

2. THE BASIC TEMPORAL FRAMEWORK

Critical to the current discussion are the notions of tense and aspect. In defining these categories, I follow Klein (1992,1994), who, building on Reichenbach (1947), argues that they are relations between intervals of time. Tense, according to Klein, is

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 217 - 232.

a relation between the sentence's *topic time* (the time a sentence is about[1]) and its *utterance time* (the time that the sentence is uttered). Aspect, on the other hand, is a relation between the sentence's *situation time* (the smallest interval during which the eventuality a sentence's verb phrase describes[2] can be said to take place[3]) and the sentence's topic time.

2.1. The Tenses: Past and Present

I take Present Tense to be the relation *topic time included in utterance time* and Past Tense to be the relation *topic time precedes utterance time.* I assume that this is true for both AAE and SAE.

2.2. The Aspects: Progressive, Perfective and Perfect

As with the tenses, I assume that the basic inventory of aspects in both SAE and AAE is the same. This inventory comprises progressive (*situation time includes topic time*), perfective (*situation time included in topic time)* and perfect aspect (*situation time before topic time*).

While my views on aspect are greatly influenced by Klein, and I have followed him in my definitions of progressive (his imperfective), and perfect aspect, our characterizations of perfective aspect are notably different. In this I am guided by the work of Angelika Kratzer (1998), and my inventory of the basic aspects mirrors hers; I treat perfective aspect as proper inclusion of the situation time within the topic time rather than improper inclusion as Klein does.

2.2.1. Perfective Aspect

As noted, I treat perfective aspect as the relation *situation time is properly contained within topic time*. In both SAE and AAE, what are commonly called simple past tense sentences are likely past perfectives. Consider the sentences in (3) as answers to the question in (2).

(2) What happened while Esther was entering the room?

(3) a. Eugene dropped the plate of rutabagas.
b. Eugene started eating the plate of rutabagas.
c. Eugene finished eating the plate of rutabagas.
d. Eugene ate the plate of rutabagas.

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[1] Though this definition is intuitively clear, Klein's notion that sentences are "about" times is potentially problematic. Topic times may alternatively be thought of as particularly salient or focused times.

[2] Throughout this paper I refer to verb phrases as "describing eventualities". While this is perhaps the simplest and most intuitively clear description of what verbs do, technically speaking, verb phrases do not describe eventualities, rather they denote properties of eventualities.

[3] While this is not Klein's exact formulation, I believe it amounts to a translation of Klein's definition into an event semantics. The analysis I develop might also be given using other semantic tools. It could, for example, be recast in Discourse Representation Theory (DRT).

The question determines the topic time, in this case, the short period of time during which Esther was entering the room. Among the possible answers to this question are: (3a), (3b), and (3c), all of which describe events that could reasonably occur during a very short period of time. In answer to the same question, (3d) is distinctly odd, forcing an interpretation under which Eugene ate an entire plate of rutabagas while Esther was opening the door and walking into the room — surely an exaggeration. This sentence, (3d), cannot mean that Eugene started eating, finished eating, or continued eating the plate of rutabagas. The running time of the entire plate-of-rutabaga-eating event must be contained within the topic time.

It is the aktionsart or lexical aspect characteristics of the verb phrase in (3d) that allow it to reveal perfective aspect as the relation *situation time is properly contained within topic time*. The verb phrase *eat a plate of rutabagas* is telic; the event that it describes has a natural final endpoint, the point at which all the rutabagas on the plate have been eaten. In addition, no part of a plate-of-rutabaga-eating event is itself a plate-of-rutabaga-eating event. As a result, the situation time in (3d) (the smallest interval during which the event described by the verb phrase can be said to have taken place) spans the entire event. Thus, proper inclusion of the situation time within the topic time predicts the pragmatically odd interpretation of (3d).

More generally, the situation time of any eventive verb phrase will be the running time of some event. This is true even in the case of an atelic verb phrase such as *eat rutabagas*. Imagine that Eugene is engrossed in eating a plate of rutabagas when Esther enters the room. Sentence (4) is a perfectly acceptable description of this state of affairs.

(4) Eugene ate rutabagas while Esther entered the room.

Unlike *eat a plate of rutabagas*, *eat rutabagas* does not describe an event with a natural endpoint. Further, the event that it does describe can, in principle, be subdivided into events of the same kind. That is, there are parts of rutabaga-eating events that are themselves rutabaga-eating events. Therefore, the situation time in (4) needs only to span as much of Eugene's rutabaga eating as is necessary to count as rutabaga eating. Still the situation time in (4) is the running time of an event. That event just happens to be part of a larger rutabaga-eating event.

2.2.2. Perfect Aspect

In line with Klein (1992,1994), I assume a minimal definition of perfect aspect: *situation time precedes (and does not overlap with) topic time*. Because the situation time of an eventive verb phrase reduces to the running time of an event, eventive verbs (verbs like *eat, work*, and *run* as opposed to stative verbs like *have*), when marked for perfect aspect, describe events that have occurred in part or in full before the topic time. When in addition to being eventive, the verb phrase is telic, it

must describe a full event, one that is "over" or "complete" before the topic time. Thus, the core meaning of the present perfect sentence in (5a) is that there was a plate-of-rutabaga eating event (of which Eugene was the agent); this event took place before the topic time; and the topic time is included in the utterance time, the time at which the sentence is spoken.

(5) a. Eugene has eaten a plate of rutabagas.
b. Mary has lived here.

Applied to stative verbs (such as *have, live,* and *want*), perfect aspect says that the state the verb describes held at a time before the topic time. The aspectual relationship is as before, *situation time precedes topic time*. In the case of a lexically stative verb, however, the situation time (the smallest interval during which the eventuality the verb phrase describes can be said to have taken place) reduces to a moment during which the state held rather than a running time. This is because stative predicates have the subinterval property; if a stative predicate is true at some interval *I*, then it will be true at every subinterval including every moment of time in *I*[4]. The core meaning of (5b), then, is that Mary was in a state (the state of living here); Mary was in this state at a time before the topic time; and the topic time is included in the utterance time. Because being in a state at a particular interval does not guarantee that the termination point of that state lies within that interval (or even that the state terminates), this does not mean that the state need be "over" or "complete". The fact that the situation time does not overlap with the topic time does, however, help to pragmatically implicate the termination of the state. Spoken as an out-of-the-blue sentence, (5b), for example, suggests that Mary no longer lives here, but this implicature, like all conversational implicatures, is cancelable: *It's true that Mary has lived here; in fact, she still lives here now.*

3. THE CORE DATA

Returning to the core set of data, what at first glance look like SAE simple past (past perfective) sentences in AAE are, in fact, ambiguous. They have both past perfective and present perfect readings. Depending on the context in which it is spoken, the AAE sentence in (1), *John ate the rutabagas* for example, translates into SAE as either *John ate the rutabagas*, (1a), or something closer but not identical to *John has eaten the rutabagas*, (1b). (Among other possible differences, I believe the SAE *John has eaten rutabagas* introduces a resultant state not present in (1)).

Extending the core set of data, preverbal *done* sentences provide comparison data that can be used to help identify the morphological carriers of perfect and perfective aspect in AAE. On the surface, sentence (6) differs from (1) only by the

[4] Bennett and Partee (1978) suggest using the subinterval property to distinguish event predicates from states and processes. Bach (1981), however, notes that taken literally, the subinterval property is only applicable to states, not processes.

inclusion of a preverbal *done*. In contrast to the ambiguity of (1), sentence (6), like all AAE preverbal *done* sentences, is unambiguously present perfect. I take up the question of how perfect and perfective aspect are introduced into these sentences in section 4.

(6) John done ate rutabagas. (AAE)
'John has eaten rutabagas.' (SAE)

3.1. Preverbal done *Sentences as Present Perfects*

There is ample evidence that the AAE preverbal *done* sentences (e.g. the sentence in (6)) are present perfects. For example, preverbal *done* sentences can be used as any of Comrie's (1976) four types of "perfects" — *the perfect of recent past, the experiential perfect, the perfect of result,* or *the perfect of persistent situation.* This last use of the perfect, the perfect of persistent situation, is, as Comrie notes, unique to English. It is the use of the perfect in which the sentence's situation time seems to extend to the now — as for example, in Comrie's example "We've lived here for ten years" spoken when the speech time is a part of the ten year period the sentence describes. While the aspect *situation time precedes topic time* might not seem consistent with this type of sentence, Kamp and Reyle (1993) have suggested that perfect of persistent situation readings might arise due to interaction between *for*-adverbials and resultant states, which I believe should be distinguished from perfect aspect. Resultant states are kinds of eventualities whereas perfect aspect is a relation between times. We may then need to distinguish those perfect constructions which only make use of a tense and perfect aspect from those which in addition make use of a state-transforming operator. It is quite plausible that *done* is such an operator, and that it selects for perfect aspect.

Further evidence that preverbal *done* sentences are perfects comes from Dahl's (1985) survey of tense, mood and aspect. Having considered over 60 languages from a variety of language families, Dahl provides lists of prototypical occurrences (verbs and contexts) of both perfect and perfective constructions. A simple *done* V-*ed* construction can be used in all of Dahl's prototypical occurrences of the perfect, and in none of his prototypical occurrences of the perfective. The utility of Dahl's cross-linguistic approach to his survey is clear. The survey is based on what a wide variety of the world's perfect constructions have in common. None of Dahl's prototypical occurrences of the perfect require reference to a state as does Comrie's perfect of persistent situation. I take the results of Dahl's survey as support not only for the position that AAE *done* sentences are perfects, but also for the notion that stativity and perfect aspect are distinct entities, and that the definition of perfect aspect as *situation time precedes topic time* can be maintained.

As the application of Dahl's survey shows, not only do *done* sentences such as in (6) occur where we expect present tense sentences marked with perfect aspect, but they are disallowed in environments where we expect such sentences to be ungrammatical. Similarly, Green (1993) notes that like the SAE present perfect,

done sentences are incompatible with past time denoting adverbials such as *two months ago*, *last weekend*, *yesterday*:

(7) I done went back to visit *two months ago /*last weekend/ *yesterday (AAE) (Green 1993)

The ungrammaticality of these sentences can be explained using the temporal framework and system of aspects developed in section 2; present perfect sentences make assertions about the present; their topic time intervals are in the now. As a result, they are incompatible with past time denoting adverbials.

Additional evidence that simple *done* sentences are indeed present tense sentences comes from tag questions. Tag questions such as *didn't he?* and *ain't he?* in (8) are (at least in part) reflexes of the tense of the sentences they are tags to.

(8) a. You done heard Mary sing, ain't you? (AAE)
'You have heard Mary sing, haven't you? (SAE)
b. You done heard Mary sing, *didn't you/ *don't you? (AAE)

Simple *done* sentences such as that in (8a) take *ain't* tags; they are ungrammatical when followed by *didn't* or *don't*[5] tags as is shown in (8b). The *ain't he?* tag in (8a) is a reflex of present tense rather than perfect aspect. Sentences (9a) and (9b) show that *ain't he?* is a possible tag for a progressive sentence, but only a present progressive. Similarly, (9c) and (9d) show that while *ain't he?* is the tag for present tense *done* sentences, *adn't he?* or *hadn't he?* is the tag for past tense *done* sentences (past perfects).

(9) a. John (is) eating, isn't/ain't he? (AAE)
'John is eating isn't he?' (SAE)
b. John was eating, wasn't/ *ain't he? (AAE)
'John was eating, wasn't he?' (SAE)
c. John done ate, ain't he? (AAE)
'John has eaten, hasn't he? (SAE)
d. John'd done ate, hadn't he/*ain't he?[6] (AAE)
'John had eaten, hadn't he, hasn't he?' (SAE)

[5] While *don't* tags in AAE might also reflect present or a part of present tense, they are only compatible with generic and habitual active verbs, plus some lexical stative verbs.

[6] It is not at all clear how *ain't* should be translated into SAE. The ungrammaticality of the *ain't* version of (9d) seems, however, to be on par with the ungrammaticality of the SAE sentence *John had eaten, hasn't he?*

The evidence from cross-linguistic data, adverbs, and tag questions suggests that simple *done* constructions contain both present tense and perfect aspect.

3.2. The Ambiguity of African-American English Simple V-ed *Sentences*

I now offer support for the idea that AAE simple V-*ed* sentences are ambiguous between present perfect and past perfective.

In clear contrast to *done* sentences, AAE simple V-*ed* sentences appear in both past perfective and present perfect environments. In this they contrast not only with AAE English *done* sentences, but with SAE simple past constructions as well. Kratzer (1998) has argued that the SAE simple past may be ambiguous between an anaphoric past and a perfect. The AAE construction is, however, more clearly ambiguous. It appears in a wide range of perfect environments where the SAE simple past cannot. It also contrasts with the SAE construction in displaying syntactic evidence (in the form of tag questions) of present tense on its present perfect reading.

AAE simple V-*ed* constructions can occur in all of Comrie's perfect environments except for the perfect of persistent situation, which as I suggested may require the presence of a state-transforming operator in addition to perfect aspect. And turning again to Dahl's survey, unlike *done* constructions, AAE simple V-*ed* constructions can be used not only in all of Dahl's prototypical occurrences of the perfect, but in all of his prototypical occurrences of the perfective as well.

With respect to adverbial modification, AAE simple V-*ed* sentences are compatible with past time denoting adverbs, but only when they are interpreted as past perfectives. And on their present perfect readings, they can occur with adverbials that require perfect aspect. For example, in SAE, (10a) and (10b) contrast in that only (10a) is grammatical under the reading in which *since he was a child* means *since the time he was a child*. In examples (10) and (11) *since* is to be uniformly read as *since the time when* not *because*. The *since*-adverbial (with this meaning) appears to require perfect morphology and meaning. It is not licensed by the SAE simple V-*ed* construction as is shown in (10b).

(10) a. John has eaten steak since he was a child (SAE)
b. *John ate steak since he was a child. (SAE)

In the AAE Simple V-*ed* sentence in (11), on the other hand, the *since*-adverbial (with this meaning) is licensed.

(11) John ate steak since he was a child (AAE)
'John has eaten steak since the time he was a child' (SAE)

Finally, depending how they are interpreted, AAE simple V-*ed* sentences take either *didn't* or *ain't* tags. Interpreted as present perfects, they take *ain't* tags; interpreted as past perfectives, *didn't* tags. This contrast is shown in (12)[7].

(12) a. You heard Mary sing (last night), didn't you? (AAE)
'You heard Mary sing (last night), didn't you?' (SAE)
b. You heard Mary sing (before), ain't you? (AAE)
'You have heard Mary sing (before), haven't you?' (SAE)

The data in (12) reveal a covert present tense in the present perfect versions of AAE simple V-*ed* sentences. In conjunction with the evidence from Comrie's classification, Dahl's survey, and the adverbial data, they show that AAE simple V-*ed* sentences are ambiguous between simple past and present perfect.

4. THE MORPHEME -ED AS INGREDIENT OF PERFECT ASPECT AND PAST TENSE

I now turn to the question of how perfect aspect is introduced into AAE sentences. Like Green (1993), upon whose work she partly builds, Déchaine (1993) argues that *done* is a perfect aspect marker ("completive" in Green's terminology). Déchaine's explanation for the ambiguity of sentences such as (1), *John ate the rutabagas*, is that on their present perfect readings, these sentences employ a covert *done*. Comrie's classification, however, reveals that the present-perfect version of (1) and (6), *John done ate the rutabagas*, are not semantically equivalent. Preverbal *done* sentences have perfect of persistent situation readings while simple V-*ed* sentences do not. Thus, the ambiguity of sentence (1) cannot be explained by saying it is simply sentence (6) with a covert *done*. Instead, I claim the source of perfect (or completive) aspect in both simple V-*ed* and preverbal *done* sentences is *–ed*, and that the role of *done* is to introduce stativity, which allows for perfect of persistent situation readings, and makes preverbal *done* sentences more like SAE *have* constructions than their simple V-*ed* counterparts.

Consider an analogy to SAE analyses: early approaches to SAE tense and aspect treated *have* + *-en* (often spelled out as *have* + *ed*) as a unit. More recent analyses tend to base-generate participial forms, having *have* select for a perfect-participial verb phrase instead of being generated along with the participle-forming morpheme. Once *have* and *-en* are split into two standardly co-occurring yet separate morphemes, the issue arises as to where to put the semantics of perfect aspect within the *have* + *-en* complex, in *have* or in *-en*. Nearly the same problem arises with *done* and *-ed*. The evidence suggests that it is *–ed* rather than *done* that is

[7] In (12a) and (12b), the modifiers *last night* and *before* disambiguate the contexts. They are, however, not necessary when there is sufficient contextual support.

responsible for introducing the principal ingredients of perfect aspect into the *done* + V-*ed* complex. That is, the core of the relation *situation time precedes topic time* is carried by the *–ed* morpheme.

It is clear that the character of the situation time in perfect constructions, as in all other constructions, is fixed by the verb itself along with its arguments and not by its tense or aspectual morphology. We know for instance that the situation time in the sentence *John done worked* is a time during which John worked because of the verb phrase *John work*. The verb ending alone could not give us this information. The *-ed* morphology we find affixed to the verb must relate an arbitrary time (fixed descriptively by the verb) to a topic time. Likewise, the topic time itself is fixed by either the context or by adverbial modifiers, both of which are distinct from the verb ending. Thus, *-ed* morphology in AAE perfect constructions, and perhaps SAE perfect constructions as well, relates two arbitrary times via the precedence operator. It tells us one arbitrary time precedes another.

Adopting this view sheds light on the ambiguity of AAE simple V-*ed* sentences. Presumably, there is a principled explanation for why AAE simple V-*ed* sentences are ambiguous between simple past and present perfect, and not, say, present perfect and present progressive or some other two sentence types. The view that *–ed* acts as the precedence operator on times helps provide such an explanation. The notion of precedence is important to both past tense and perfect aspect. Past tense tells us that a topic time precedes the utterance time, and perfect aspect tells us that the situation time precedes the topic time. If the *–ed* morphology we find common to both simple past and present perfect constructions simply introduces the notion of precedence, then the appearance of *–ed* in both constructions and the ambiguity can be explained. In the section to follow, I show how *-ed*, when positioned under a null present tense operator, relates a situation time to a topic time, and thus is interpreted as aspect, and how when *–ed* is the highest tense/aspect marker in a sentence's syntax, it introduces a topic time, relates it to the utterance time, and thus, it is interpreted as tense.

For such a system to work, we must, syntactically speaking, separate the utterance time from tense morphology. To this end, I posit an operator (distinct from any tense morphology) that is responsible for introducing the utterance time into the semantic computation. The idea is this: whenever a simple declarative sentence (be it past or present tense) is spoken, a topic time is somehow related to the utterance time. In the case of a past tense sentence, the topic time precedes the utterance time; in the case of a present tense sentence, the topic time is included in the utterance time. Tense morphology may interact with the utterance time, but it need not carry it as part of its meaning. Instead I allow a sentence-level assertion operator to both introduce the utterance time and assert the existence of the eventuality introduced by the verb. The formulas in section 5 require an assertion operator to existentially bind the eventuality variable of the verb phrase.

In addition to separating the utterance time from tense/aspect morphology, the system should explain how perfective aspect, *situation time included in topic time,* is

introduced into past perfective constructions. I further propose that the AAE verb phrase is inherently perfective. I elaborate on this proposal in the following section.

5. FORMALIZATION

It is common within event semantics to think of verb phrases as denoting properties of eventualities. As pointed out in Partee (2000), this view goes back at least as far as Parsons (1980), and such a view is clearly articulated, for instance, in the work of Kratzer (1996,1998). Building on this tradition, I assume that verbs have both an event argument and a world argument. I go further, however, by including a time argument as well. By including a time argument in the verb phrase, I am to a degree following Partee (1973), who, based primarily on analogies between tenses and pronouns, suggested a number of reasons for treating times as arguments of verbs rather than as operators.

I take verb phrases to denote relations between eventualities, times which include those eventualities, and worlds which include those times. As I interpret the containment of an eventuality within an interval as the containment of the eventuality's situation time within that interval, this view of verb phrases amounts to their having inherent perfective aspect.

I assume, for example, that the verb phrase *John eat the rutabagas* has the denotation given in (13), where the following types are used: i = time intervals, t = truth values, e = eventualities, and w = worlds.

(13) $[[\textit{John eat the rutabagas}]] = \lambda e_e \lambda t_i \, \lambda w_w [\text{eat}(j)(r)(e)(t)(w)]$

The time argument in (13) and its interpretation have serious consequences for the way in which eventualities are related to times. Kratzer (1998) mediates between eventualities and times by putting a running time function in her aspectual operators. This function takes an eventuality and returns its running time. Perfective aspect in Kratzer's system is an operator that calculates the running time of an event and places it within a topic time. In the system I am proposing, the interval in this inclusion relation (*situation time included in topic time*) is introduced by the denotation of the verb.

I assume that the role of *–ed* is to introduce the precedence relation into the semantic computation; it is therefore neither past tense nor perfect aspect, but an important ingredient of both. My proposed denotation for *–ed* is given in (14).

(14) $[[\textit{-ed}]] = \lambda Q_{<e<i<wt>>>} \lambda e_e \lambda t_i'' \lambda w_w \exists t_i' \, [\, Q(e)(t')(w) \,\&\, t' < t'']$

In past perfectives, *-ed* contributes the precedence relation to past tense (*topic time precedes utterance time*) and the topic time is an argument of the verb phrase[8]. In present perfect constructions, *–ed* interacts with a null present tense morpheme, the denotation of which is given in (15). Under present tense *–ed* contributes the precedence relation to perfect aspect (*situation time precedes topic time*), which is arrived at through the following means: a time which includes the situation time precedes the topic time; thus, the situation time precedes the topic time.

(15) $[[\text{PRES}]] = \lambda Q_{<e<i<wt>>>} \lambda e_e \lambda t_i'' \lambda w_w \exists t_i' \, [Q(e)(t')(w) \,\&\, t' \subseteq t'']$

6. SAMPLE COMPUTATIONS

The sample computations in Figure 1 and Figure 2 make use of the following types, variables and constants. Types: i = time intervals, t = truth values, e = eventualities, w = worlds; variables: t = times (t_0: utterance time), w = worlds (w_0: actual world); constants: j = John, r = rutabagas. In both figures, I simplify the denotation of the definite description *the rutabagas* to a proper name for expository purposes only.

The computation for "John ate the rutabagas" on its present perfect reading is given in Figure 1. Once the actual world, w_0, is contextually supplied, the resulting formula, $\exists e \exists t'[\exists t[\text{eat}(j)(r)(e)(t)(w_0) \,\&\, t < t'] \,\&\, t' \subseteq t_0]$, says that there is a time which includes an event of John's rutabaga eating; this time precedes the topic time; and the topic time is included within the utterance time.

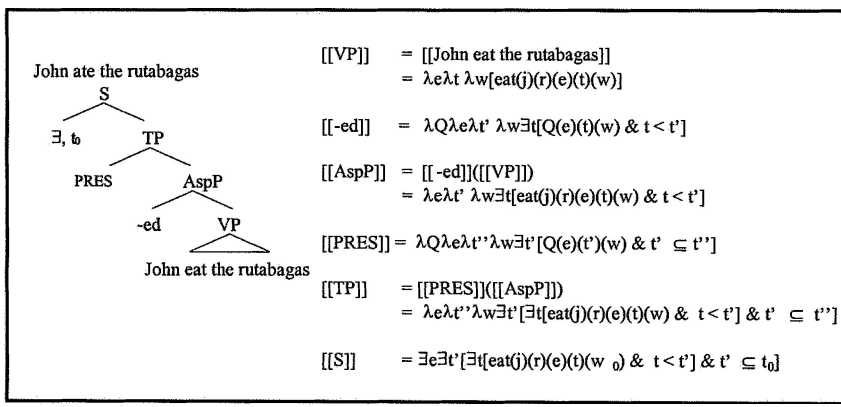

Figure 1. "John ate the rutabagas" (Present Perfect Version)

[8] As Angelika Kratzer (p.c.) has pointed out to me, there is a potential problem here; the *–ed* morpheme existentially closes the topic time, making it difficult to see how the topic time can be fixed by context. A plausible solution is to have *–ed* and present tense treat topic times as free variables, giving them the denotations $\lambda Q \, \lambda e \lambda t' \, \lambda w[Q(e)(t_{Top})(w) \,\&\, t_{Top} < t']$ and $\lambda Q \lambda e \lambda t'' \lambda w \, [Q(e)(t_{Top})(w) \,\&\, t_{Top} \subseteq t'']$, respectively. In these denotations, t_{Top} is a free variable.

The computation for "John ate the rutabagas" on its past perfective reading is given in Figure 2. Once the actual world, w_0, is contextually supplied, the resulting formula, $\exists e \exists t'$ [eat(j)(r)(e)(t')(w_0) & t' $< t_0$], says that there is a time which includes an event of John's rutabaga eating and that this time precedes the utterance time. In this formula, there is no distinct topic time. The time about which the sentence makes an assertion (the topic time) is set up directly as an argument of the verb phrase, without the mediation of an additional aspectual operator.

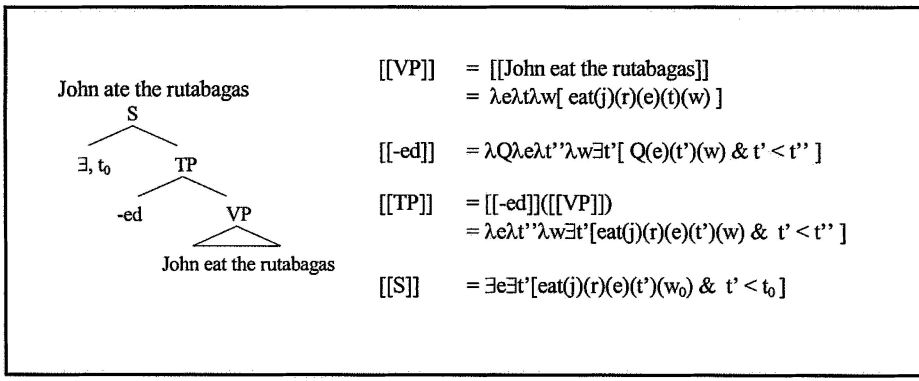

Figure 2. "John ate the rutabagas" (Past Perfective Version)

7. SEQUENCE OF TENSE AND –ED MORPHOLOGY

In separating the utterance time from tense/aspect morphology, my proposal is in the spirit of Zagona (1990) and Stowell (1996), both of whom advocate the separation of the referential and relational parts of tense operators. In fact, my proposal that AAE *–ed* morphology carries precedence, the relational part of past tense, is very similar to an analysis of SAE *–ed* rejected by Stowell in favor of a more abstract view of the role of SAE tense morphology. While a full description of the differences between our two proposals and a complete defense of the 'revival' of the idea that *–ed* carries precedence are beyond the scope of this paper, in this section, I address Stowell's principal argument against such an analysis and sketch a possible solution to the problem he presents. In what follows I apply Stowell's argument to AAE sentences, as there is no relevant distinction between the AAE sentences I present and their SAE equivalents.

In his argument against a precedence-denoting *–ed,* Stowell reasons that if *–ed* denotes precedence, it should do so in main and complement clauses alike. The role of *–ed* in *Mary ate the rutabagas* should, then, be the same in (17) as it is in (16); it should place the time of Mary's eating the rutabagas before some other reference time.

(16)	Mary ate the rutabagas.	(AAE)
	'Mary ate the rutabagas.'	(SAE)
(17)	John said that Mary ate the rutabagas.	(AAE)
	'John said that Mary ate the rutabagas'	(SAE)

As Stowell notes, eventive verbs such as *eat* in (16) and (17) pose no real problem for the *–ed* as precedence approach. In (16) the reference time supplied to *–ed* is, as has been discussed, the utterance time, and a plausible case can be made that in sentences like (17), the reference time of the subordinate clause is the situation time of the main clause. In (17), this would mean that *–ed* places the time of Mary's eating before the time of John's saying. Given such an analysis, (17) could be paraphrased as follows: 'at some time before now, there was a saying event the agent of which was John, and that saying event reported that at some time before the saying event itself, there was a rutabaga eating event the agent of which was Mary.' That is, (17) says that John said something to the effect of "Mary ate the rutabagas".

The problem Stowell points out arises when we consider stative verbs like *want* in the subordinate clauses of sentences such as (18). Here we encounter the well-known phenomenon of sequence of tense, where a "past tense" in indirect discourse may correspond to a present tense in direct quotation.

(18)	John said that Mary wanted the rutabagas.	(AAE)
	'John said that Mary wanted the rutabagas.'	(SAE)

Like its SAE counterpart, the AAE sentence in (18) has two readings. In the first, the situation time of the subordinate clause (the time of Mary's wanting a plate of rutabagas) is taken to be a time prior to the time of John's saying time. That is, (18) can be used as a report of John's having said, "Mary wanted the rutabagas". In the second reading (the sequence of tense reading) the time of Mary's wanting a plate of rutabagas is interpreted as being simultaneous with the situation time of the main clause. In this case, (18) can be used to report John's having said, "Mary wants the rutabagas."

Based on the belief that a precedence denoting *–ed* cannot account for the sequence of tense readings of sentences such as (18), Stowell rejects the *–ed* as precedence hypothesis. In his system, *-ed* is a temporal polarity item and precedence is carried by a syntactically distinct and phonologically null phrase. While I agree with Stowell's assessment that positing a homophonous *–ed* that only attaches to stative verbs, and that has present tense meaning is an ad hoc move that does not really solve the sequence of tense problem, I think his rejection of the *–ed* as precedence hypothesis is premature. The temporal framework introduced in

section 2 and formalized in 5 provides a way for a single precedence denoting *–ed* to play a role in both readings of (18)[9].

Until now, I have, following Stowell, assumed that the reference time of *–ed* in the subordinate clause of a sentence such as (17) or (18) is always fixed as the situation time of the main clause. But what happens if the subordinate clause is allowed to project its own assertion operator and the utterance time acts as *–ed*'s reference time in both main and subordinate clauses? For sentence (17), this results in a sentence whose meaning can be paraphrased as 'at some time before now, there was a saying event the agent of which was John, that saying event reported that at some time before now, there was a rutabaga eating event the agent of which was Mary.'

At first this paraphrase seems to underdetermine what John could have said, as Mary's eating time is not directly ordered with respect to John's saying time. If, however, we pragmatically constrain interpretations of what John said to a set of more or less reasonable options, a different picture emerges. If John said "Mary will eat the rutabagas", he would have been making a statement about a possible event; to report that John said an actual event occurred would be false. If John said "Mary is eating the rutabagas", he would have been making a statement about an in progress event, and to report that John said a completed event occurred would be false. Reasonably speaking, for (17) to be true John must have reported that at some time prior to his saying event there was a rutabaga-eating event the agent of which was Mary. John could have only said something to the effect of "Mary ate the rutabagas". Of course, John might have made a statement such as "In the future there is a actual completed event rutabaga eating event of which Mary was the agent" but it is not clear to me how to judge (17) in this situation as the statement is not only pragmatically odd, it may even be self-contradictory.

Because it contains a stative verb in its subordinate clause, sentence (18) yields a wider range of possible interpretations than (17). Recall that in the system I am proposing, the situation time of a state reduces to a moment at which the state holds. When the reference time of the *–ed* on *want* is fixed as the utterance time, the meaning of (18) can be paraphrased as at some time before now, there was a saying event the agent of which was John, that saying event reported that at some moment before now, Mary was in a state of wanting the rutabagas. Sentence (18) cannot be used to report John's having said "Mary will want the rutabagas." It cannot be used to report John's statements about times in his future for the same reason sentence (17) could not. And like (17) there is no problem with (18) reporting John's statement about times in his past. It can be used to report John's having said "Mary ate the rutabagas." Sentence (18) differs from (17), however, in that it allows the sequence of tense reading. It can be used to report a statement by John about his present; John could have said "Mary wants the rutabagas". Had he done so, he

[9] What I present here is only a sketch of an analysis. While I address Stowell's problem, I leave many aspects of the sequence of tense phenomenon unaccounted for. A full analysis would among other things have to address the intensionality of the verb *say* in *John said that Mary ate the rutabagas*.

would have been making a statement about a moment, his moment of utterance. As (18) says that John said something about a moment that temporally precedes the now, there is nothing that prevents this interpretation of the sentence.

The account of the sequence of tense phenomenon outlined in the section provides a way to maintain a single precedence denoting *–ed.*

8. CONCLUSION

In this paper I put forward a compositional account of the past perfective/present perfect ambiguity of AAE simple V*–ed* sentences such as *John ate the rutabagas*. I argued that this ambiguity can be traced to the presence of a covert present tense operator found in the present perfect (but not past perfective) versions of such sentences, and the interaction of this operator with *–ed*, the morphology that turns the verb *eat* into *ate*. The denotation of *–ed* in (14) allows it to interact with present tense and a sentence assertion operator in the following way. When it combines with null present tense, which in turn combines with the assertion operator, *-ed* indirectly relates a situation time to a topic time, and thus is interpreted as perfect aspect. When *–ed* is the highest tense/aspect marker in the sentence, it combines directly with the assertion operator and is interpreted as past tense. Because it relates to arbitrary times *–ed* is neither a tense nor an aspect marker. Rather, it is an important ingredient of both past tense and perfect aspect.

9. ACKNOWLEDGMENTS

I would like to thank the many linguists who have contributed to this paper through their thoughtful questions and comments. I have gained much from presenting early versions of this work as a part of the New York University 2001 Spring Colloquium Series, at the 2001 Semantics of Under-Represented Languages conference at the University of Massachusetts, and at the Perspectives on Aspect Conference at the Utrecht Institute of Linguistics OTS. I am particularly indebted to Ana Arregui, Lisa Green, Masako Hirotani, Angelika Kratzer, Paula Menéndez-Benito and Barbara Partee for their invaluable comments on the previous drafts of this paper.

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JANICE E. JACKSON & LISA GREEN

TENSE AND ASPECTUAL *BE* IN CHILD AFRICAN AMERICAN ENGLISH

Abstract. Adolescent and adult African American English (AAE) is characterized by well-defined tense and aspect patterns; however, the stages of development in which child AAE speakers acquire these patterns have not been identified. For instance, aspectual *be* functions as a habitual marker in adolescent and adult AAE, but the extent to which child AAE speakers use it in this way has not been explained. This paper presents an overview of properties of aspectual *be* and describes the way the marker is distinguished from the copula and auxiliary *be* along syntactic and semantic lines. For example, the copula and auxiliary *be* occur in C° in questions and license V'-ellipsis, but aspectual *be* does not. In addition, verbs naming states do not generally occur in the progressive (with auxiliary *be*), but state verbs in their *-ing* form can occur with aspectual *be.* In this account, predicates in aspectual *be* constructions are argued to take an eventuality argument. Data from comprehension and production experiments show that child AAE speakers distinguish auxiliary *be* and aspectual *be* semantically and syntactically. For instance, children as young as 4 years respond to auxiliary *be* and aspectual *be* scenarios as if they depict different types of activity, recognizing that aspectual *be* refers to habitual situations. In addition, AAE speaking children distinguish auxiliary *be* and aspectual *be* by using appropriate negation strategies for each form. The ability to negate aspectual *be* constructions appropriately using *do* insertion increases with age.

Keywords. Acquisition, African American English, Aspect, Semantics, Syntax, Tense.

1. INTRODUCTION

Adolescent and adult African American English (AAE) is characterized by well-defined tense and aspect patterns; however, the stages of development in which child AAE speakers acquire these patterns have not been identified. This paper focuses on the copula, auxiliary *be* and aspectual *be* in AAE. Aspectual *be*, which occurs with all types of predicates, marks the recurrence of an eventuality. The first part of this paper provides a description of aspectual *be* and shows that it is distinguished from the copula and auxiliary *be* along syntactic and semantic lines. In addition, a characterization is given of aspectual *be* sentences in which a habitual operator binds variables over eventualities. It is explained that aspectual *be* coerces predicates indicating permanent properties into transitory readings. The second part of this paper discusses results of different experiments that were designed to determine the extent to which 3- to 10-year-old AAE speakers have developed the ability to distinguish auxiliary *be* and aspectual *be*. The results show that by age 4, child AAE speakers begin to treat auxiliary *be* and aspectual *be* differently. They distinguish the two *be* forms in syntactic contexts by correctly using *do* to support aspectual *be* and by allowing auxiliary *be* to occur in I°. According to the

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 233 - 250.

developmental data, the ability to negate aspectual *be* constructions using *do* insertion increases with age.

2. THE COPULA, AUXILIARY *BE* AND ASPECTUAL *BE*: SOME DIFFERENCES

AAE falls in line with other languages such as Irish, Scottish Gaelic and Spanish, in which two *be*'s are distinguished. (See Doherty (1996) for a discussion of *be* in Irish and Ramchand (1996) for an analysis of *be* in Scottish Gaelic.) In some languages, these two *be*'s are referred to as copula *be*, which is used with individual-level predicates, and substantive *be*, which is used with stage- and individual-level predicates. In AAE, the *be*'s are referred to as the copula (1a), auxiliary *be* (1b) and aspectual *be* (2). The description of aspectual *be* presented in this paper is based on Green (2000). As indicated by the glosses, aspectual *be* sequences have a habitual interpretation that is not necessarily associated with copula and auxiliary *be* constructions.

(1) a. Dee is in the house.
b. Dee is running.

(2) a. Dee be in the house.
'Dee is usually in the house'
b. Dee be running.
'Dee is usually running' or 'Dee usually runs'

As shown in (1), copula *be* and auxiliary *be* are treated as a single element. It is important to note that further distinctions can be made between copula *be*, which occurs with non-verbal predicates, and auxiliary *be*, which occurs with verbs that end in *–ing*; however, the distinctions do not bear any important consequences for this paper and will not be discussed. From now on, auxiliary *be* examples will be used in the first part of this paper to illustrate the differences between the copula and auxiliary *be,* on the one hand, and aspectual *be*, on the other, unless otherwise noted.

2.1. Syntactic Properties: Tense Marking and Do *Support*

Aspectual *be* occurs with both non-verbal predicates (like the copula) and verbal predicates (like auxiliary *be*); however, the copula, auxiliary *be* and aspectual *be* can be distinguished in a number of ways. The first difference is that the copula and auxiliary *be* are not required to occur on the surface when they precede a predicate (3a, b), and in this environment, they are represented as ∅; however, the *be* form is obligatory at the end of the sentence in relative clause constructions, as shown in (3c):

(3) a. Dee ∅ in the house.
b. Dee ∅ running.
c. That's the way Dee is/*∅.

On the other hand, aspectual *be* must occur on the surface. The copula and auxiliary *be* surface when they have a pitch accent (*Dee Ís running*.) and when they occur in C° in questions (*Is Dee running*?).[1] Also, they occur obligatorily as a clitic on first person singular (*I'm/*I running*.) and third person neuter singular (*It's/*It running*.) pronominal forms.

A second difference is that while the copula and auxiliary *be* can inflect for person, number and tense (4), aspectual *be* cannot (5):[2]

(4) a. Dee ∅/Ís running.
b. Dee was running.
(5) a. *Dee bes/is running.[3]
b. *Dee beed/was running.

Aspectual *be* cannot be used to talk about habits in the past. In AAE, the form *use*(*d*) *to* is used in that environment (e.g., *Bruce use(d) to run*.).

Thirdly, aspectual *be* requires *do* support in negative constructions (6b), questions (7b) and V'-ellipsis (8b), but the copula and auxiliary *be* must occur in those environments without *do* support:

(6) a. Sherry ∅/is not running. (also: Sherry ain't running.)
b. Sherry don't be running. (*Sherry ben't running.)
(7) a. Is_i Bruce t_i running? (also: Bruce running?)
b. Do Bruce be running? (also: Bruce be running?/*Be Bruce running?)
(8) a. Sherry ∅/is running, and Bruce is, too.
b. Sherry be running, and Bruce do, too. (*Sherry be running, and Bruce be, too.)

The auxiliary *be*, in the a) sentences, occurs in I° at some level of the derivation, but aspectual *be*, in the b) sentences, does not. Furthermore, the copula and auxiliary *be*

[1]Note that the copula and auxiliary *be* form *is* is not required to occur when Neg (*not*) is present. The sentences *He not here*/*He not running* are acceptable.

[2] In AAE, a distinction is not always made between first, second and third person singular and plural forms of the copula and auxiliary *be*. The third person singular form is often used in all person and number contexts (if the *be* form appears on the surface) except first person singular. *Am* ('*m*) is invariably used in first person singular contexts.

[3]Some speakers use sentences such as *Her daddy bes there for her* ('Her daddy is usually there for her') and *It bes that way* ('It is usually like that'), but there is evidence to suggest that the verbal *-s* may be a redundant habitual marker. Also, even when *bes* is used, it never refers to the present moment.

are morphological heads that license V'-ellipsis, but aspectual *be* is not. As a result, aspectual *be* requires *do* support in negative constructions, questions and V'-ellipsis. This view of aspectual *be* is consistent with an analysis in which the marker is generated in and remains in Asp(ect) P(hrase) or VP, a position lower than IP.

2.2. The Progressive and Aspectual Be V-ing Sequences

The final differences between auxiliary *be* and aspectual *be* are related to their occurrence with V-*ing* forms. The readings resulting from the combination of auxiliary be and V-*ing* (the progressive) and aspectual be and V-*ing* differ in a number of ways. The first is that verbs describing states cannot occur in the progressive (with auxiliary *be*), but they can occur in aspectual *be* constructions. This is shown in (9) and (10):

(9) a. *She ∅/Ís having a lot of cars.
b. She be having a lot of cars.
'She usually has a lot of cars'

(10) a. *She ∅/Ís knowing the phone numbers.
b. She be knowing the phone numbers.
'She usually knows the phone numbers'
Literally: It is usually the case that she shows that she knows the phone numbers (e.g., by reciting them, dialing them, etc.).

Secondly, only one reading is available with the progressive construction (11):

(11) The children ∅ running and playing when the train pass by.[4]
'The children are already in the process of running and playing when the train passes by'

On the other hand, there are two possible readings of aspectual *be* V-*ing* constructions, as given in (12):

(12) The children be running and playing when the train pass by.
Reading 1: 'It is usually the case that the children are already in the process of running and playing when the train passes by'
Reading 2: 'It is usually the case that the children start to run and play when the train passes by'

The reading in (11) is the in-progress reading, in which the running and playing events are already taking place when the train passes. But compare (12), the

[4]In AAE, the verb does not always reflect singular number agreement with the subject (e.g., …*when the train pass*).

aspectual *be* V-*ing* construction, in which the running and playing events can already be in progress (Reading 1), or they can start after the train passes (Reading 2). According to Krifka, Pelletier, Carlson, ter Meulen, Link and Chierchia (1995), there is a correlation between a characterizing property and aspectual distinctions in that "progressive and perfect sentences show at least a strong tendency toward a particular, noncharacterizing interpretation" (p. 6), as in their example:

(13) John is smoking/has smoked a pipe.

The progressive in AAE (14a) also shows this strong tendency, but aspectual *be* V-*ing* (14b) does not. The sentence in (14b) has a habitual interpretation or characterizing reading, not a particular, non-characterizing interpretation:

(14) a. John smoking a pipe.
b. John be smoking a pipe.
'John is usually smoking a pipe'

In summary, in general terms, the copula, auxiliary *be* and aspectual *be* can be distinguished along syntactic and semantic lines.

3. CHARACTERIZATION OF ASPECTUAL *BE* CONSTRUCTIONS

In the preceding section, aspectual *be* was distinguished from the copula and auxiliary *be* by syntactic properties and its occurrence in V-*ing* sequences. In this section, aspectual *be* sentences are compared to simple tense sentences, which refer to general properties.

3.1. Aspectual Be *Constructions and Simple Tense Sentences*

Aspectual *be* constructions are distinguished from simple tense generics that are ambiguous between habitual/generic and capacity readings. The eventuality indicated by the predicate is established as a regular or habitual occurrence. The sentence in (15a) is ambiguous between a habitual/generic reading and capacity reading, but the habitual sentence in (15b) is unambiguous:

(15) a. This bus carry/hold over seventy children.
b. This bus be carrying/holding over seventy children.

(15b) cannot just mean that the bus has the capacity to carry/hold over seventy children; the bus has to carry/hold that number of children on different occasions. The sentences in (15) can be compared to those in (16), in which (16a) is a report about a specific event or fact and (16b) refers to a general rule.

(16) a. Andrea handled applications from the foreign language education department.
b. Andrea usually handled applications from the foreign language education department.

The sentence in (16a) can have a reading in which Andrea was responsible for processing applications from the foreign language education department even if she did not receive applications from that department, or it can mean that she handled particular applications from there. The adverb *usually* can cause a shift in the specific event or fact reading in (16a) to a general rule or quantificational statement (as in (16b)). Aspectual *be* constructions have the latter reading; the eventuality expressed by the predicate has to be well-established or entrenched by having occurred on a number of particular occasions.[5]

3.2. Tripartite Representation of Aspectual Be *Constructions*

Aspectual *be* constructions, which indicate the recurrence of an eventuality, can be represented in a tripartite construction such as the following:

(17) a. The children be running and playing when the train pass by.
b. HAB_e [(the train pass by, e)] [run and play (the children, e)]

In (17b), the habitual operator (HAB) binds variables over eventualities and has the function of relating an eventuality expressed by the predicate to an occasion. The representation expresses that habitually on occasions when the train passes, the children run and play then. The eventuality argument proposed here is along the lines of that in Kratzer (1995). Kratzer argues that stage-level predicates have an extra, Davidsonian event argument (Davidson 1967) but individual-level predicates do not. She also notes that when spatiotemporal arguments occur with individual-level predicates, these predicates become stage-level. A similar situation occurs in AAE, in which aspectual *be* coerces predicates with more permanent properties into taking stage-level readings. In this way, predicates expressing permanent properties that occur in aspectual *be* constructions also take an eventuality argument. This means that predicates such as *have* and *know* take an occurrence of an eventuality argument in aspectual *be* constructions. Consider the sentences in (18a, b, c):

(18) a. Sue be having two or three cars.
'Sue usually has two or three cars'
b. Sue be knowing the different parts of cars.
Literally: It is usually the case that Sue shows that she knows the different parts of cars (e.g., by naming them, putting them in their proper places, etc.).

[5]Goodman (1983) uses the term *entrenchment* to refer to the record of past projections of a predicate.

c. How do they be knowing that?
'On those occasions, how do they know that?'

When predicates that express static or more permanent properties occur in aspectual *be* constructions, the resulting reading is one in which the eventuality is understood as holding on different occasions. The verbs *have* and *know* indicate states, but when they occur in aspectual *be* constructions, they are interpreted as being more transitory.[6] For instance, it is certainly the case in (18b) that once Sue learns the parts of cars, she knows and does not forget them; however, the reading of the sentence is that she shows that she knows the parts information on certain occasions and not on others. Predicates in these constructions, including static eventualities, are interpreted as if they are dynamic.

4. KIND REFERRING NP'S IN ASPECTUAL *BE* CONSTRUCTIONS

In Green (2000), it is shown that both transitory as well as more permanent states described by verbal predicates are interpreted as having transitory properties or being dynamic when they occur in aspectual *be* sequences. Aspectual *be* can also occur in construction with kind referring NP's that are interpreted as being in a permanently stable state.[7] Given the nature of the NP's, they are characterized as being in some permanent state or location although the predicate may not be inherently individual-level. For instance, *those airbags* in (19a) are permanently located on the passenger side in cars until they are removed by some force or impact, but given the animate property of *Bruce/those people* in (19b), they are not permanently located on the passenger side.

(19) a. Those airbags be on the passenger side.
b. Bruce/Those people be on the passenger side.

As indicated by the aspectual *be* construction, being on the passenger side is a general property of *Bruce/those people*, and the subject is interpreted as being in that location on different occasions. However, although *those airbags* occurs in the same aspectual *be* construction, the subject cannot literally be interpreted as if they are on the passenger side on one occasion and then somewhere else on another. Those airbags are in a permanently stable state, but as the subject of an aspectual *be* construction, they receive a kind of iterative reading. The view is that while aspectual *be* cannot coerce the permanently stable property of *those airbags* into a reading of occurring in one place on particular occasions and then in another place

[6] This process is along the lines of the type of coercion discussed in Moens and Steedman (1988), Pustejovsky (1995) and Smith (1995).

[7] These sentences are referred to as 'bicycle sentences' in Green (2000) because the example taken from Fasold (1972) is about bicycles:
(i) Some of them be big and some of them be small.

on others, it does give them a type of pseudo-iterative reading. The meaning is that the airbags are found from time to time in different cars on the passenger side.

Aspectual *be* constructions indicate regularities; the eventuality indicated by the predicate occurs or holds on particular occasions. Aspectual *be* forces a similar type of reading on permanently stable subjects, although the reading is not taken in the literal sense.

5. AUXILIARY *BE* AND ASPECTUAL *BE* COMPREHENSION

In the following sections, data from experiments that focus on the developing ability of AAE speaking children to distinguish auxiliary *be* and aspectual *be* semantically and syntactically are presented (Jackson, Dickey, Ramos, Hall, Coles, Broderick, Hollebrandse, and Seymour (1996) and Jackson (1998, 2000[8])). The experiments explore two basic questions: 1) When do AAE speaking children begin to distinguish auxiliary *be* and aspectual *be* by associating the correct tense and aspect properties with them? 2) Do AAE speaking children use *do* to support aspectual *be* in negative constructions? These data help to characterize AAE speaking children's developing semantic and syntactic knowledge of auxiliary *be* and aspectual *be.*

Critical to the correct interpretation of aspectual *be* is the understanding that the described event is not necessarily occurring presently for the habitual interpretation to hold. For example, John might not be fighting at the moment, but one could still correctly say *John be fighting.* Jackson (1998) designed a comprehension task intended to make this tense/aspect distinction salient. The task was specifically designed for use with younger children. The objective of the experiment was to examine young AAE speaking children's ability to distinguish auxiliary *be* from aspectual *be.* The experiment used depictions of characters from the popular children's television show *Sesame Street.* The characters were ideal for use because they are well known by American children, and certain characters engage in particular behaviors habitually. For instance, the character known as Cookie Monster habitually eats cookies. The character known as The Count habitually counts things. It was hypothesized that children who understood auxiliary *be* and aspectual *be* would be able to demonstrate such knowledge by choosing the picture that corresponded to the appropriate verb form.

5.1. Subjects and Stimuli

The experiment was conducted with 37 AAE speaking children and 18 Standard American English (SAE) speaking children who served as controls. All subjects had

[8] Jackson (2000), "Difference versus disorder in AAE: The role of linguistic theory," is an unpublished paper which was presented at the annual convention of the American Speech-Language, Hearing Association, Washington, DC, November 2000.

working class backgrounds and resided in two northeastern states.[9] Subject groups were designated by primary language/dialect (AAE or SAE). Although not a selection criterion, all SAE subjects were Caucasian and all AAE subjects were African American. The groups consisted of 30 boys and 25 girls. Thirty-four subjects were 6 years old and 21 were 5 years old.

The stimuli consisted of story pictures depicted in four foils, which were presented to subjects using a structured dialogue. Each picture foil depicting a story portrayed a different verb: *eat, count, fuss, laugh.* Test foil 1 featured Cookie Monster, who habitually eats cookies; foil 2 featured The Count, who habitually counts; foil 3 featured Oscar the grouch, who habitually fusses; and foil 4 featured Elmo, who habitually laughs (based on the *Tickle me Elmo* doll that laughs when squeezed). Each story foil presentation was followed by six test questions. The story foils each depicted a *Sesame Street* character clearly not performing the behavior he typically performed, while another character was engaging in that behavior at the moment. Each foil also depicted two other characters, one of which was described as engaging in the habitual activity once in a while and the other as never having engaged in the habitual activity. An illustration of story foil 1 is presented in Figure 1 below. The structured administration dialogue and accompanying task questions for the story foil are shown in Table 1.[10]

Figure 1. Story Foil 1.

[9] The children were determined to be typically developing, following speech/language and hearing screenings and reviews of school records.

[10] Multiple answers were possible in 3-6; however, only questions 1 and 2 are discussed here.

Table 1. Administration Dialogue and Task Questions.

Dialogue	Task Questions	Correct Responses
Cookie Monster is sick and not eating cookies today. Elmo is eating cookies. Ernie only eats cookies on his birthday when his mom lets him. Cat has never had a cookie. Cats can't eat cookies.	1.Who be eating cookies?	1.Cookie Monster (CM)
	2.Who is eating cookies?	2.Elmo
	3.Who eats cookies?	3.CM, Ernie, Elmo
	4.Who don't be eating cookies?	4.Cat, Ernie, Elmo
	5.Who doesn't eat cookies?	5.Cat, Ernie
	6.Who isn't eating cookies?	6.CM, Ernie, Cat

Task questions 1 and 2 specifically examined aspectual *be* comprehension and auxiliary *be* comprehension, respectively. Task question 3 examined understanding of the generic form (e.g., *eats, counts, fusses, laughs*), and task questions 4-6 examined the corresponding negative forms. Questions 1 and 2 are discussed here.

5.2. Results

A Multivariate Analysis of Variance (MANOVA) revealed that AAE speaking children and SAE speaking children differed statistically with only one of the six question types, the aspectual *be* form presented in task question 1 ($F(1,53), = 7.087$ $p<0.05$). AAE speaking children correctly interpreted the habitual meaning of aspectual *be* significantly more often than SAE speaking subjects. The data are depicted in Figure 2.

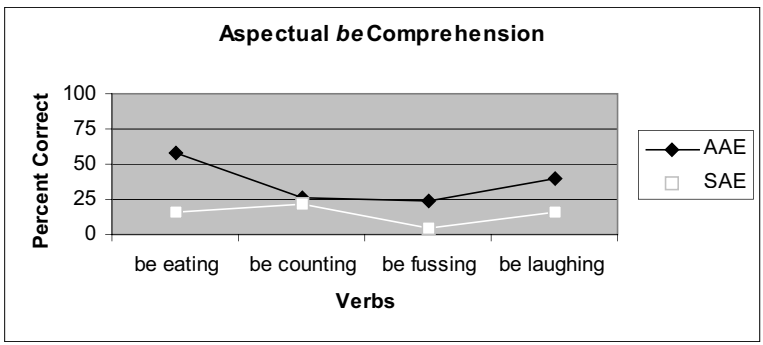

Figure 2. AAE & SAE Performance with Aspectual be.

Statistical differences were found among the four picture foil stimuli, indicating that the actual picture affected performance. Children responded correctly more

often to the Cookie Monster (be eating cookies) picture foil and Elmo (be laughing) picture foil than to The Count (be counting) and Oscar (be fussing) pictures. This statistically significant trend ($F(3,159) = 3.145$, $p = 0.027$) was judged to be related to a priori variation in familiarity with the characters and behaviors in which they habitually engage. The results, however, did show a clear distinction between the way AAE and SAE speaking children respond to aspectual *be*. When presented with aspectual *be* questions, SAE children were being asked to respond to ungrammatical sentences in their variety. Because aspectual *be* does not occur in SAE, it was expected that SAE subjects would, in large part, treat it like auxiliary *be.*

Overall, auxiliary *be* (*is*) comprehension was higher than aspectual *be* comprehension for both groups. Accuracy for auxiliary *be* comprehension ranged from 100%-83% for both groups, as shown in Figure 3, compared to

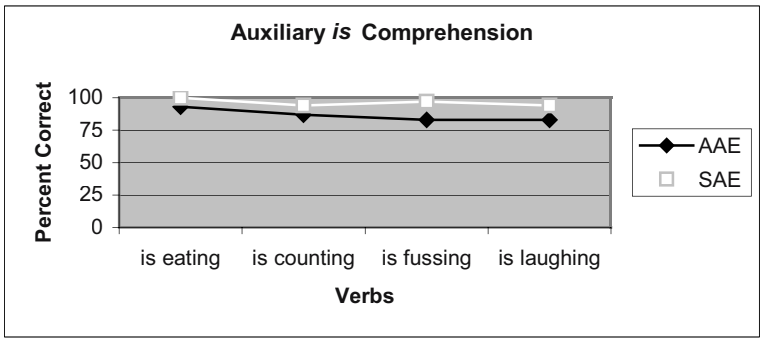

Figure 3. AAE & SAE Performance with Auxiliary be.

a range of 58%-05% for aspectual *be.* The data suggest that, at least in some contexts, 5- and 6-year-old AAE speaking children respond to auxiliary *be* and aspectual *be* as if they are distinct forms.

Given that children responded correctly in some contexts and not in others, variation in performance could indicate that the ability to distinguish the two *be's* is developing and not yet fully achieved or that auxiliary *be* and aspectual *be* readings are ambiguous at this age. No statistically significant difference was found between groups on task question 2 (auxiliary *be* comprehension). In summary, AAE and SAE children responded similarly to auxiliary *be* questions but differently to aspectual *be* questions.

Lastly, given the effect found for different characters depicted in the 4 picture foils for aspectual *be* questions, it remains unclear whether performance was a result of actual skill with the forms, an indicator that the child was or was not familiar with the character's usual activities or a combination of these factors. As a result, it was concluded that task design in subsequent studies should attempt to minimize this effect.

6. Ø *BE* AND ASPECTUAL *BE* COMPREHENSION

In a follow-up task to Jackson (1998), the researcher conducted a study to determine the ability of AAE speaking children to distinguish auxiliary *be* (as marked by Ø) and aspectual *be* (Jackson 2000). Additionally, a larger sample with a broader age range was investigated so developmental trends might be studied. Possible effects related to familiarity with characters and their habitual activities were minimized by using novel characters (unlike the *Sesame Street* characters in the earlier study) and providing equal exposure to characters and their activities.

6.1. Subjects and Stimuli

Subjects consisted of 69 typically developing AAE speaking children from a southwestern state, ranging in age from 3 to 10 years. The 69 subjects were unevenly distributed across eight ages. Age groups ranged in size from 4 to 14 subjects. Table 2 shows the number of subjects in each age group. Subject inclusion criteria were identical to those found in Jackson (1998).

Table 2. Number of Subjects in Each Age Group.

Age	3	4	5	6	7	8	9	10
N	6	12	7	14	14	7	4	5

Five novel characters, a baby, a lady, a bird, a girl, a man, were portrayed to exemplify habitual behavior. Each character was depicted as habitually engaging in a particular activity. Subsequently, each character was shown in a group story picture not engaging in the habitual activity while another character was engaging in the activity. For example, in task picture (1a) (Figure 4), the lady character is portrayed and described as habitually climbing. Next, in the group story picture (1b), she is portrayed and described as not currently engaging in the habitual activity previously shown, while the boy is shown and described as engaging in the lady's habitual activity at the moment.

The remaining characters in the group picture serve as controls that are described (Table 3) as engaging in the habitual activity occasionally or never.[11] Subjects had equal exposure to each novel character's habitual behavior and received two additional interspersed distracter questions (not shown in Table 3) about other characters and activities in the picture (e.g., *Who has skates?*) to avoid a forced choice response between the two *be* questions.

[11] Habitual pictures like (1a) and story foils like (1b) were not displayed at the same time. Story foils were only presented after subjects had been shown pictures depicting characters habitually engaging in activities. The pictures were put away before story foils were presented.

Figure 4. Ø be/*Habitual* be *Task Pictures 1a & 1b.*

Table 3. Administration Dialogue and Task Questions.

Dialogue (picture 1a)	Dialogue (picture 1b)	Task Questions (picture 1b)
This lady likes to climb. She climbs all the time, see, here, here, here, and here.	This lady climbs. She climbs all the time, but look at her now with the dishes. This girl only climbs on her birthday. Look at this boy climbing now. This flower never climbs. Flowers can't climb.	1. Who Ø climbing? 2. Who be climbing?

For the purposes of this experiment, only one answer is assumed to be correct for each question. The correct response for a Ø auxiliary question (e.g., *Who Ø climbing?*) is the character depicted as engaging in the activity (e.g., the boy) at the moment. The assumed correct response for an aspectual *be* question (e.g., *Who be climbing?)* is the character shown in (1a) as habitually climbing (e.g., the lady), although she is not engaging in that activity at the moment (1b). However, note that this is not the only possible response. For example, in Figure 4, nothing rules out the boy as a response to *Who be climbing?* although the targeted response is the lady. The lady, not the boy, is depicted in the initial foil as climbing habitually, but given what is known about boys, it might also be true that the boy climbs habitually. As such, children who made this inference would also be said to have understood aspectual *be* and responded appropriately. However, only the clearly habitual response (the lady) was accepted as "correct."

6.2. Results

Statistical analysis was used to determine whether subjects distinguished auxiliary *be* and aspectual *be* and, if so, the extent to which they responded correctly by

associating the correct form with the appropriate picture context. Differences were examined across and within groups. Given the small number of task items (five per form), mean scores would not provide an adequate representation of performance, so in order to provide accurate representation of their performance, responses were categorized into two summary scores. Only subjects who responded correctly to all five questions per form (100% accuracy) received a summary score of 1 point; subjects who did not received a 0. This way, it was possible to examine the percentage of subjects in each age group whose performance indicated a clear pattern of associating auxiliary *be* and aspectual *be* with appropriate scenarios. These data are presented in Table 4.

Table 4. Percentage of Age Group with 100% Performance per Form.

Age	3(N=6)	4(N=12)	5(N=7)	6(N=14)	7(N=14)	8(N=7)	9(N=4)	10(N=5)
Aux	17	58	86	85	93	71	50	100
Hab	0	33	57	50	36	57	50	60

Following the calculation of the summarized performance scores, statistical analyses were performed to determine the extent to which children distinguished auxiliary *be* and aspectual *be*. To ensure proper analysis, data were collapsed into two large age groups (3- to 5-year-olds and 6- to 10-year-olds), as small cell size across groups can lead to skewed data points. A chi-square analysis of variance was performed. Findings revealed that subjects performed significantly differently on habitual *be* questions than on auxiliary *be* questions ($X^2(1, N = 69) = 19.22$, $p < .0001$). Specifically, subjects chose the correct picture for auxiliary *be* more often than for aspectual *be.* Also, older subjects generally outperformed younger subjects on both auxiliary *be* and aspectual *be* questions (X^2 (1, N = 69) = 5.40, p = .02). A Fisher Exact Test was performed to examine the nature of this effect on the individual, not collapsed, age groups. Findings revealed a significant individual age effect for auxiliary *be* questions but not for aspectual *be* questions (p =.0082). Older children scored higher than younger children; that is, as subject age increased, so did scores for auxiliary *be* but not for aspectual *be.* In order to see individual group variation and response trends, mean group performance was calculated to compare how often subjects pointed to an auxiliary *be* response picture when asked the two task questions (Table 5) and how often they chose an aspectual *be* response picture when asked the two task questions (Table 6).[12]

[12] The mean percent correct was calculated by adding correct scores for the five responses per form within each age group and dividing them by the number of subjects in the group.

Table 5. Percent of Auxiliary be *Responses.*

Age	3	4	5	6	7	8	9	10
Aux	80	90	97	96	96	91	90	100
Hab	70	43	29	29	33	23	10	28

Table 6. Percent of Aspectual be *Responses.*

Age	3	4	5	6	7	8	9	10
Aux	20	10	3	4	4	9	10	0
Hab	30	57	71	71	67	77	90	72

Data in Tables 5 and 6 show variability across groups and a preference for auxiliary *be* responses regardless of question form. For instance, the 10-year-olds in the study chose auxiliary *be* response pictures for auxiliary *be* questions 100% of the time, and they chose auxiliary *be* response pictures for aspectual *be* questions 28% of the time. So that means, as Table 6 shows, 10-year-olds never chose aspectual *be* response pictures for auxiliary *be* questions. Generally speaking, auxiliary *be* responses were given more frequently than aspectual *be* responses. Although the statistical significance of these performance differences cannot be stated with accuracy given the limited number of task questions and small number of subjects in some groups, they are presented here for comparison. Because data in Table 4 give the percentage of each group that responded to all questions correctly, these data best reflect the degree to which subjects clearly distinguished auxiliary *be* and aspectual *be.*

Finally, true performance ability in aspectual *be* contexts may be suppressed in these data given that no allowance was made for error responses that were actually the result of a correct semantic inference. As noted, 'the boy' was a possible response for (1b) *Who be climbing?* although it was not the targeted response. Were the experiment designed to take such responses into account, higher performance levels might be revealed, but as it stands, there are no instances in which more than 60% of subjects in any age group were 100% accurate. The highest proportion was found in the small group of 10-year-olds, of whom 60% had 100% accuracy. In summary, while proficiency for auxiliary *be* increases significantly with age, the data do not reflect the same trend for aspectual *be.* In general, though, the data do show that AAE speaking children treat auxiliary *be* and aspectual *be* differently.

7. ASPECTUAL *BE* AND NEGATION

Child AAE speakers distinguish auxiliary *be* and aspectual *be* with respect to meaning, so one question is whether they treat them differently syntactically. One way to begin to answer this question is by determining how child speakers negate the two *be* forms. It was predicted that child AAE speakers would negate the two forms differently by providing *do* support for aspectual *be* constructions, while child

SAE speakers would negate them in the same way because they do not distinguish the two forms with respect to meaning.

7.1. Subjects and Stimuli

This experiment was conducted with 36 AAE speaking and 18 SAE speaking children. All children were typically developing and between 5 and 6 years old. In five task items, children were shown pictures depicting two characters engaging in an activity several times and one character not engaging in that activity on three different occasions (picture 3). A structured dialogue was used to describe the repeated activity of the first two characters and to call attention to the third character who never engaged in the activity. The examiner then summarized the activities of the first two characters and, pointing to picture 3, drew attention to the character who never engaged in the habitual activity by saying, "but this girl…" and inviting the child to complete the contrasting utterance. The correct response was one in which *do*(*n't*) support was used to negate aspectual *be.* That is, the child would complete the statement by replying *don't* (*be jumping*). An example is given below:

Table 7. Negation Task Dialogue and Task Question Example.

Picture 1 dialogue	Picture 2 dialogue	Picture 3 dialogue	Task Question dialogue	Correct Response
This boy be jumping rope everyday. Here he is, here he is again. Here he is on another day.	This girl also be jumping rope all the time. See, here she is, and again and again.	Look at this girl though, see this? Here, here, here again.	So this boy be jumping, and this girl be jumping, but this girl…	Don't (be jumping).

7.2. Results

A one-way ANOVA revealed a significant difference between groups ($F(1,41) = 10.67$, $p < 0.001$). AAE speaking children performed *do* insertion some of the time in negating aspectual *be* constructions, but SAE speaking children never did. Performance of AAE speaking subjects revealed that they were partially aware that aspectual *be* was not in I° and, therefore, required *do* support in negative contexts. In contrast, as expected, SAE subjects treated aspectual *be* as though the form were inflected and in I° and negated it accordingly, *isn't*. Figure 5 below depicts the performance of the two groups. The AAE speaking subjects only had 37.4% accuracy, which may indicate that this point in development is the beginning of syntactic knowledge for aspectual *be.*

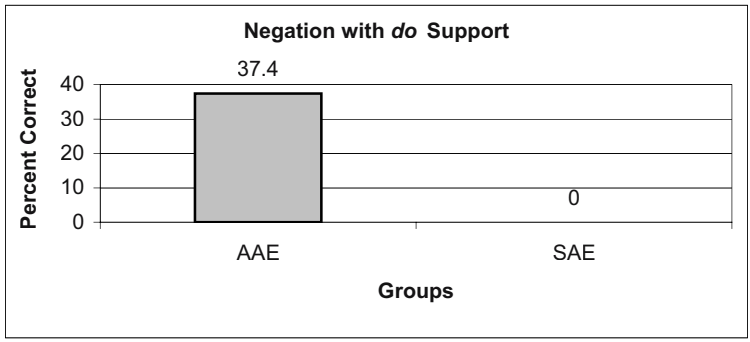

Figure 5. AAE & SAE Performance Negating Aspectual be *using* do *Support.*

Findings from this experiment support the findings of Jackson et al. (1996), in which it was shown that 10- and 11-year-old 5th grade AAE speaking students support aspectual *be* with *do* in negative tags. A developmental trajectory is also indicated by the reduced performance of the younger AAE speaking children in the later experiment. Although the children recognized the need for *do* support in some instances, they did not have the higher ability level demonstrated by the older children in Jackson et al. (1996). While the older AAE speaking children in the first experiment demonstrated performance of 78% accuracy, the younger children in this subsequent experiment demonstrated performance of 37% accuracy. The favored error response for younger AAE children was either a negative item (e.g., *not*, *none*) or a negated auxiliary form (e.g., *is not/isn't/ain't jumping, don't jump*).

8. CONCLUSIONS AND FURTHER RESEARCH

Adult speakers of AAE distinguish auxiliary *be* and aspectual *be*, yet little has been explained about the way child AAE speakers treat these forms. Experiments presented here show that by age 4, AAE speakers begin to associate the correct tense and aspect properties with these *be* forms. The data indicate a pattern in which 3-year-olds treat aspectual *be* as though it has the same tense properties as auxiliary *be*, but by 4 years old, children are able to make some distinction between Ø auxiliary *be* and aspectual *be*. Performance with Ø auxiliary *be* is consistently higher than performance with aspectual *be*. The data show that Ø auxiliary *be* performance continues to improve systematically with age, but this pattern was not significant for aspectual *be.* While the results suggest that children know that the forms are distinct, experimental design flaws may suppress true performance ability in aspectual *be* scenarios because the experiment did not take into consideration correct multiple responses based on inferences drawn by the subject. This, along with small sample size, may explain why there is no significant age effect for comprehension of aspectual *be*. Therefore, future research must be based on data from a larger number

of subjects in carefully constructed tasks in which there is only one possible answer, or some accommodation must be made for multiple correct responses.

The data also show that AAE speaking children have knowledge about a syntactic property of aspectual *be.* Children as young as 5 years demonstrate some capacity to perform *do* insertion when negating aspectual *be*. Although their performance is low, it is significantly different than the performance of their SAE peers, who never used *do* support in aspectual *be* contexts. Additional research with younger children and the negation task will help to determine if children younger than five have acquired this syntactic pattern.

In conducting studies on developmental patterns, it would be useful to examine possible correlations between performance with auxiliary *be* and aspectual *be* comprehension and syntactic abilities like *do* support in negative constructions. Future research topics should include child AAE speakers' use of *do* support in other aspectual *be* constructions such as questions. Finally, further research should also consider developmental data on the use and interpretation of aspectual *be* with predicates other than verbs and with kind referring NP's.

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VIVIENE FONG

UNMARKED *ALREADY*

Aspectual expressions in two varieties of English

1. INTRODUCTION

Colloquial Singapore English (CSE) allows more ways of expressing a given temporal meaning than Standard English (StE).[1] The main reason for this is that tense/aspect, person, and number marking on verbs is optional. For example, the habitual present can be expressed in two ways in CSE: with tense marking on the verb as in (1a), or without tense marking but with an adverbial (*every day*) to express the habitual meaning as in (1b):

(1) a. He goes to office at twelve o'clock. (adapted from GSEC[2])
'He goes to the office at twelve o'clock.'
b. He go to office at twelve o'clock every day.
'He goes to the office at twelve o'clock every day.'

Apart from employing temporal adverbials in the absence of verbal inflections, CSE also uses aspectual markers such as *already*/ *still*/ *always* to express various types of aspectuality (see Platt and Weber 1980, Alsagoff 2001).

This paper examines the use of one such aspectual marker in CSE: the morpheme *already*. The morpheme *already* is interesting for two reasons. Firstly, a sentence with *already* is compatible with more than one aspectual meaning. While the meaning of *already* has been discussed extensively in the semantics literature (e.g. Löbner 1989, 1999, Mittwoch 1993, Michaelis 1992, 1996), its behavior in CSE invites a closer look: in particular, we will need to identify the core meaning of *already* to explain its compatibility with a range of aspectual meanings in CSE. Secondly, the use of *already* is but one variant in CSE for expressing a given aspectual meaning. The question is how linguistic theory should deal with the CSE-

[1] The variety of CSE described here is one that educated speakers of English use in casual conversation, in informal contexts. These speakers have command of Standard English.

[2] GSEC = Grammar of Singapore English Corpus database, developed under the National University of Singapore Academic Research Grant R-103-000-003-112 for the project, *Towards a Reference Grammar of Singapore English* (Lisa Lim, Joseph A. Foley, Vivienne Fong, Ni Yi-Bin, and Lionel Wee).

H. J. Verkuyl, H. de Swart & A. van Hout (Eds.), Perspectives on Aspect, 251 - 267.

internal variation patterns, as well as cross-linguistic variation patterns (e.g. CSE versus StE).

The exploration of these two issues will be structured as follows. Section 2 illustrates the range of interpretations that a sentence with *already* permits in CSE (ambiguity), and the range of expressions available for a given aspectual meaning (variation). In section 3, I propose a core meaning for *already* that accounts for its compatibility with a range of aspectual meanings in CSE. In section 4, I derive the language-internal and cross-linguistic variation in the expression of the Perfect meaning using Optimality Theory (OT) (Prince and Smolensky 1993) with partial ordering (Kiparsky 1993a, Nagy and Reynolds 1997, Anttila 1997, among others). From this analysis, we will see that *already* is the emergent unmarked aspectual operator for expressing change of state. Section 5 presents a cross-linguistic aspectual typology predicted by the re-ranking of the proposed constraints. Section 6 concludes the paper.

2. *ALREADY* IN CSE

2.1. The ambiguity of already

Already exhibits a range of interpretations in CSE. Bao (1995) claims that *already* marks what he terms an 'inchoative' reading (2i) and also a 'perfective' reading (2ii), and is a direct translation of the Chinese aspectual marker *le*:

(2) My baby speak already. (Bao 1995, with his glosses)
i. 'My baby has started to speak.'
ii. 'My baby has spoken.'

In fact, three distinct readings are attested (Lim 2001). This is illustrated in (3). To facilitate the discussion, I give each reading in (3i)–(3iii) an informal label: 'near future', 'just started', and 'ended' respectively. Notice that in (3iii), the 'ended' reading is that of the meaning denoted by the English Perfect.

(3) She beat the eggs already. (Lim 2001, glosses mine)
i. 'She is (already) going to start beating the eggs.' (*near future*)
ii. 'She has (already) started to beat the eggs.' (*just started*)
iii. 'She has (already) beaten the eggs.'[3] (*ended*)

The contexts to illustrate the readings in (3) (adapted from Lim 2001) are given below:

[3] The 'already' meaning in the glosses is optional (hence the parantheses). This will be discussed shortly.

(4) a. Hurry up and break the eggs into this bowl. **She beat the eggs already**.
'…She is going to start beating the eggs.'
b. You stop hurrying me, can or not? **I beat the eggs already**, wait you make me spill the egg out of the bowl, then everything gone!
'Can you stop hurrying me? I have started beating the eggs, if you make me spill the egg, then everything is finished!'
c. Okay. **I beat the eggs already.** Finally! All the ingredients are ready!
'…I have beaten the eggs.'

This is a case of ambiguity. One form – in this case the verb *beat* plus *already* – has three possible interpretations: NEAR FUTURE, JUST STARTED, ENDED.

Further, *already* occurs with eventualities of any aspectual type – processes, events, and states.[4] Again, multiple interpretations for each are available (see (5)–(7)).

(5) She sing already. [Process]
i. 'She is (already) going to sing.' (*near future*)
ii. 'She has (already) started to sing.' (*just started*)
iii. 'She has (already) sung.' (*ended*)

(6) I break the vase already. [Event]
i. 'I am (already) going to break the vase.' (*near future*)
ii. 'I have (already) started breaking the vase.' (*just started*)
iii. 'I have (already) broken the vase.' (*ended*)

(7) I love her already.[5] [State]
i. 'I have (already) come to love her.' (*just started*)
ii. 'I have (already) loved her.' (*ended*)
Unavailable reading: 'I am (already) going to love her.' (*near future*)

With states, *already* is usually found with a change of state reading. In a sentence like (8), the speaker did not find the Wax Museum boring before:

(8) Wax Museum quite boring already lah, now. (GSEC)
'The Wax Museum is quite boring (by) now.'

Apart from its use as a marker of aspectual meaning, *already* in CSE otherwise retains the properties familiar from StE. For example, as pointed out by Michaelis (1992: 326) '*already* not only encodes the existence of a given state of affairs at

[4] The term *event* subsumes the Vendler (1957) classes, achievements and accomplishments.

[5] For some reason I do not yet understand, *already* does not have a 'near future' reading with states. This puzzle will be left for future work.

reference time, but also presupposes the *anteriority* [emphasis mine] of that state of affairs to an interval of a specific type.' (9) below illustrates that the state of having curly hair obtains prior to any procedure (e.g. a permanent wave) designed to bring about that state. An example from GSEC with a similar effect is given in (10).

(9) Why would you need a permanent? You already have curly hair. (Michaelis 1992)

(10) B: Seeds or soil? [*B asks A whether A wants to buy seeds or soil.*]
A: I already have the seeds, you damn idiot!
B: Then you want the soil? (GSEC)

I adopt Michaelis' (1992, 1996) view that a full account of *already*'s function must refer to its ANTERIORITY PRESUPPOSITION (ANTP). What is striking, however, is that the anteriority interpretation may be suspended when *already* functions as an aspectual marker in CSE. Consider a context where a couple has been waiting for a very long time for their baby to wake up. When the baby does at last wake up, it is felicitous for the couple to utter (11), but not (12), in both StE and CSE:

(11) Finally! **The baby has woken up!** Now we can leave.

(12) #Finally! **The baby has woken up already!** Now we can leave.

If we assume that *already* carries an ANTP in both StE and CSE, the contrast between (11) and (12) is predicted under Michaelis' analysis: in this context, the baby waking up is not any earlier than expected, and the ANTP encoded by *already* proves infelicitous. But in contrast to (12), (13) turns out to be felicitous in CSE:

(13) Finally! **The baby wake up already!** Now we can leave.
'…The baby has woken up!...' [no ANTP]

(13) reveals an important property of *already* when it functions as an aspectual marker in CSE. Even in contexts where there is no ANTP, the use of *already* is countenanced when the morpheme is the only available means of encoding the Perfect meaning. Of course, in contexts compatible with an ANTP, this meaning has no problems surfacing. Therefore, out-of-context CSE examples with V+*already* are interpreted as optionally carrying an anteriority presupposition. For example:

(14) I no more tuition. **Stop my tuition already**. (GSEC)
i. 'I no longer have tuition. I have stopped my tuition.' [no ANTP]
ii. '…I have already stopped my tuition.' [with ANTP]

2.2. Variation in the expression of the Perfect meaning

Consider the meaning expressed by the Perfect construction (*have* V-*en*) in StE. It is generally assumed within the Reichenbachian (1947) tradition that the Perfect has a meaning where event time (E) precedes reference (R) time (i.e. E_R), and that a state results from the occurrence of that event (see e.g. Moens and Steedman 1988, Herweg 1991, Kamp and Reyle 1993, de Swart 1998).[6] For ease of reference, I will call this the 'Perfect meaning'. The Perfect meaning finds different forms of expression in CSE:

(15) a. Something evil has happened. (GSEC)
b. She beaten the eggs. (Lim 2001)
'She has beaten the eggs.'
c. You return the books already? (GSEC)
'Have you (already) returned the books?'

(15a) shows that CSE has the option of expressing the Perfect meaning using the StE form (*have* V-*en*). The Perfect meaning can also be expressed with the main verb retaining its past participle form as in (15b), or with *already* together with the main verb in the base form as in (15c) (Lim 2001; Fong 2003). Note that while (16a) can express the meaning 'she has beaten the eggs', (16b) cannot.

(16) *Intended meaning*: 'She has beaten the eggs.'
a. She beat the eggs already.
b. *She beat the eggs.[7]

The rest of this paper sets out to (i) identify the core meaning of *already* that explains its compatibility with the various aspectual meanings described in 2.1 ('just started', 'ended', or 'near future'); and (ii) derive the variation in the expression of the Perfect meaning within CSE, and cross-linguistically, following the theory of form-meaning mapping laid out in Anttila and Fong (2000, 2003). In particular, I will show how CSE and StE differ.

3. THE MEANING OF *ALREADY*

Recall Michaelis' claim that *already* 'presupposes the anteriority of [a] state of affairs to an interval of a specific type' (1992: 326). In section 2.1, we saw that in StE and CSE, *already* carries the anteriority presupposition. We now need to establish what makes *already* compatible with the various aspectual meanings ('just started', 'near future', 'ended') that we have observed in CSE. Here, I first consider

[6] The semantics of the Perfect is not uncontroversial. Kiparsky (2002) argues that the perfect is polysemous (cf. the references therein for different views), and proposes enriching the tense semantics, while retaining the Reichenbachian view of the temporal ordering E_R.

[7] This sentence is well-formed as an expression of the past tense, 'She beat the eggs.'

Michaelis' (1992, 1996) analysis in more detail, focusing now on the 'interval' mentioned in the quote above. I also compare her proposal with those by Löbner (1989), and Mittwoch (1993)[8] (for other proposals, see for example Traugott and Waterhouse 1969, Abraham 1980, and van der Auwera 1993). It should be noted that the observations about StE examples below apply also to CSE.

In earlier work, Löbner (1989, see also 1999) claims that German *schon p* 'already p', presupposes a previous state *not-p*. For example 'the light is already on' in (17) presupposes a previous state of the light not being on.

(17) Das Licht ist schon an.
'the light is already on'

Michaelis (1992, 1996) makes the opposite claim, and says *already p* presupposes that the inception of *p* is anterior to a Reference Interval (RI). RI includes within it the inception of a state *p'* of the same situation type as the state denoted by *already p*. In (18), the RI is the interval during which the addressee gets a permanent wave to acquire curly hair; the addressee is attributed with having curly hair prior to getting the permanent wave.

(18) Why would you need a permanent? You already have curly hair.
(Michaelis 1992)

Michaelis treats the RI as being lexically underspecified. The upshot is that *already* is pragmatically ambiguous (in the sense of Horn 1985); the variety of uses *already* exhibits are derived from interpretation in context.[9] Mittwoch (1993) makes a similar argument in questioning Löbner's treatment of *already*. If *already p* presupposes a previous state *not-p*, then why does it not behave like *stop*, which has the same type of presupposition? The contrast in presupposition between the two is illustrated in (19).

(19) a. He is already American, for he was born in America.
b. *John has stopped eating meat, for he has always been a vegetarian. (Mittwoch 1993)

Mittwoch (1993: 75) points out that the preceding phase of *not-p* 'derives solely from the pragmatic meaning of *schon/already*…which involves temporal comparison of some kind.' In an example like (20), the baby being rich is compared

[8] Mittwoch (1993) and Michaelis (1992, 1996) assume that Löbner's (1989) claims about German *schon* generalize to English *already*.

[9] The reader is referred to Michaelis' discussions of various examples involving temporal, as well as non-temporal types of RIs.

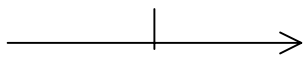
to a norm where people take time to attain riches, and the baby is depicted as being rich earlier than the norm.

(20) The baby is already rich. [*Of a baby who gets an inheritance at birth.*]

From Michaelis' and Mittwoch's discussions, we distill the following points. One, the eventuality that *already* depicts is a state. Two, *already* introduces a meaning of CONTRASTING PHASES: two distinct phases separated by a transition point. In sentences like *The mice have already eaten the cheese*, the first phase is one where the mice have not yet eaten the cheese; in the second phase they have. In (18), (19a), and (20) above, the sentences assert states that do not involve any change, but the RI contains the notion of contrasting phases. Take for instance the example in (20), which Mittwoch says involves a comparison of some kind. When we make comparisons, we have in mind points on a scale (Cresswell 1976). In (20), the RI is a 'richness' scale where, from an arbitrary point on, one is depicted as being (increasingly) rich; prior to that point, one is not rich. In the context of (20), to talk about attaining riches is to introduce a temporal dimension to the scale. So the baby is rich at a point earlier than the point within RI depicting the time people usually take to become rich.

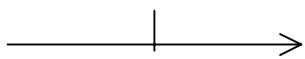
Turning now to CSE where *already* also functions as an aspectual marker, we note that the situation types associated with *already* ('just started', 'ended', 'near future') also have structures with contrasting phases. These situation types differ only in the way the phases are ordered with respect to each other. An eventuality E described as having 'just started' highlights the change from not-E to E (not-E<E). This is illustrated in (21) below (I use the Reichenbachian 'R' to indicate the reference time):

(21) 'Just started':



An 'ended' situation type (i.e. the situation type of the Perfect) comprises an event E that ends, and is followed by a state not-E (E<not-E):[10]

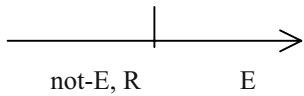
(22) 'Ended':



[10] More accurately, this should be E<S for the Perfect, but I use E<not-E here to parallel the illustrations in (21) and (23).

When referring to an eventuality E that is expected to start in the near future, the reference point is within a state not-E before the expected start of E (not-E<E):[11]

(23) 'Near future':



Based on the above observations, I propose the following generalization:

(24) In both StE and CSE, *already* encodes the meaning of contrasting phases, but entails nothing about the ordering of phases.

What fixes the ordering of phases in eventuality descriptions must come from elsewhere. For English, I assume that temporal and aspectual meanings expressed by verbal morphology determine the exact ordering of phases. Ambiguity arises in precisely those contexts where verbal morphology is dropped, an option available in CSE.

We can now describe the function of *already* as an aspectual operator in CSE. Aspectual operators impose a viewpoint on the eventuality denoted by the eventuality description (Bach 1986, de Swart 1998). Like other aspectual operators, *already* imposes a certain viewpoint on the eventuality denoted by the eventuality description. Let us first consider an example of how the Perfect aspectual operator works. According to de Swart, the Perfect is a function that maps any kind of eventuality onto a state. It introduces the consequent state that starts when the eventuality ends (in Kamp and Reyle (1993), this is expressed as e⊃⊂s: e and s abut). The viewpoint that the Perfect imposes is an interval containing two contrasting phases (E versus S), plus the condition that the two phases are ordered E<S.

I will refer to an interval containing two contrasting phases as a DIPHASIC interval. A diphasic interval is defined as follows:

(25) An interval *I* is diphasic if and only if it starts with a phase of not-p and is monotone in terms of p; i.e., starting with points t for which p(t)=0, it must extend to later points t' with p(t')=1, but must not contain any yet later points t'' with p(t'')=0 again. (Adapted from Löbner 1989: 178)

[11] In addition to the CSE examples, the futurate in StE (e.g. *We leave tomorrow*) also has the 'near future' structure. Smith (1991: 247) describes the futurate as a situation type that is heterogenous, involving a preliminary stage and a final stage that is different from it.

In addition to the Perfect event structure, there are many other examples of diphasic structures in the domain of aspectuality.[12] At the level of inner aspectuality (Verkuyl 1993, 2005),[13] accomplishments and achievements have diphasic event structures: both aspectual classes specify an achieved state (Rappaport Hovav and Levin 1995), that is, a change from one state to another. At the level of outer aspectuality, we have seen examples of situation types such as 'just started', 'ended', and 'near future'.

In the CSE data above ((5)–(8)), eventuality descriptions of states, processes and events are all given diphasic viewpoints when they occur with *already*, giving rise to interpretations of 'just started', 'ended', or 'near future'. The operator *already* and the Perfect operator are similar in that they both restrict the situation type to having a diphasic structure. They are different in that *already* does not specify the ordering of the two phases within that interval, while the Perfect operator does. For this reason, I analyze *already* as a function that maps sets of eventualities *E* to sets of diphasic situation types, without imposing a condition on the ordering of the phases.[14] The truth condition for a proposition with the aspectual operator *already* is given below:

(26) *already*(E) is true if and only if there is an diphasic interval containing E and not-E.

Notice then that the range of the Perfect function is a proper subset of the range of the *already* aspectual function. This means that under certain circumstances, *already* can perform the same operation as the Perfect, and more. What remains to be explained is how exactly the interpretations of 'just started', 'ended' (the Perfect), or 'near future' get associated with the aspectual operator *already*. This will be addressed in section 4 below.

If this approach is correct, and *already* entails a diphasic viewpoint, we would then expect it not to occur with inalterable states. This turns out to be a correct prediction, as the examples in (27) show:

---

[12] The notion of phases appears also in the description of the 'event nucleus' in the work of Moens and Steedman (1988) (see also Steedman 1997, and Verkuyl's (2005) discussion of Moens and Steedman). See also Fong 2001 and Fong to appear for further linguistic motivation for a diphasic interval in event semantics.

[13] The level of inner aspectuality is also called the level of 'atomic eventuality decription' by de Swart (1998), the level where the verb has all its argument positions filled.

[14] In fact, not specifying the ordering of phases predicts four possibilities: 'just started', 'ended', 'near future' and a fourth type E,R<not-E, call it 'egress', which is unattested in CSE. This fourth structure is a viewpoint that focuses on 'egress from an event, the final endpoint of a situation' (Smith 1991: 79). According to Smith, this viewpoint seems to be cross-linguistically unavailable when the verb under-determines the situation type. Apparently, a verb cannot refer to both beginning and end-points (see also Talmy 1985), and 'a general principle blocking such forms has been proposed as a universal constraint.' (Smith 1991: 79) I will assume that this fourth type is ruled out by an independent constraint. Unfortunately, we cannot explore the nature of this constraint any further here.

(27) a. #A square already has four sides. [StE, CSE]
b. #A square has four sides already [CSE's preferred word order]

To sum up, we have analyzed *already* as an aspectual operator that gives a diphasic viewpoint to an eventuality description. We have also seen that *already* carries with it an anteriority presupposition. Interestingly, the morpheme can appear in contexts that do not license this presupposition if that is the only means of expressing the Perfect meaning. In what follows, we will need to compare the semantic contribution of the morpheme *already* with the semantic contribution of other verbal morphemes. To facilitate the discussion, I will use the feature representation in (28) as a short-hand for the core meaning of *already* in both StE and CSE:

(28) *already* [DIPHASIC; ANTERIORITY]

4. EXPRESSING THE PERFECT MEANING

This section addresses the question of how exactly the aspectual operator *already* gets a particular aspectual interpretation. Consider the meaning components in the Present Perfect. As discussed above, the Perfect is a state S that results from the occurrence of a certain event E, and thus has an event structure comprising contrasting phases (E versus S) – depicted as DIPHASIC below. In addition, E and S are ordered in a particular way: E<S. The Present tense is treated as having the FINITE feature.

(29) [PRES[PERF[she beat the eggs]]]
PERFECT = [DIPHASIC; E<S]
PRESENT = [FINITE]

In what follows, I will propose an OT analysis that derives a typology of possible expressions of the Present Perfect meaning. Given a semantic input like (29), the analysis will show how the *have* V-*en* form is the optimal expression of that meaning in StE, and how three different expressions of that meaning are possible in CSE. Once we assume that *already* specifies the [DIPHASIC] feature, it can be shown to emerge as an unmarked aspectual operator in CSE.

Following Bresnan (2001), I assume that the input is the language-independent content in the multidimensional space of possible grammatical and lexical contrasts, and the output comprises language-specific lexical items that carry with them their own interpretation of that content. The relationship between input and output is regulated by ranked and violable constraints. For a given content (e.g. (29)), different linguistic expressions in English can express that meaning to different

extents. In (30), I present the lexical specifications for morphemes in English (CSE and StE) (cf. Halle and Marantz 1993).

(30) Selected lexical entries:[15]

a.	*-n* [DIPHASIC; E<S]	(e.g. *beaten*, *sewn*)
b.	*-ing* [PROG]	(e.g. *beating; sewing*)
c.	*-Ø$_{past}$, -t, -d* [FINITE; PAST]	(e.g. *beat; sewed*)
d.	*-z* [FINITE; 3SG]	(e.g. *beats; sews*)
e.	*-Ø* [FINITE]	(e.g. *beat; sew*)
f.	*beat* [ ]; *sew* [ ]	(base form)
g.	*already* [DIPHASIC; ANTERIORITY]	

In addition to input and output, we need constraints. In OT, there are two types of constraints that are in inherent conflict: (i) MARKEDNESS constraints that exert pressure towards unmarked output structures, obliterating input contrasts; (ii) FAITHFULNESS constraints that require the expression of semantic content. Ranking is the OT way of resolving conflicts among constraints. By hypothesis, systematic variation among languages reduces to different constraint rankings. In addition, I will assume that variation within a language reduces to different constraint rankings as well (see e.g. Anttila and Fong 2000, 2003). I assume the following constraints:

(31) Markedness constraints:
*VSTR: Avoid verb structure (verbal morphology, structural complexity in the verb phrase, e.g. recursive VP structure).

(32) Faithfulness constraints:
MAX: Express input features.
DEP: Do not express features not present in the input.

The two faithfulness constraints are in fact families of constraints. The special cases in the MAX ('M' for short) family of constraints that are crucial for our purposes are given in (33):

(33) a. M(ASP): Express input aspectual contrasts.
b. M(TNS): Express input finiteness contrasts.
c. M(AGR): Express input agreement features.

A ranking that generates the correct Present Perfect output for StE with *have* V-*en* morphology is given in the tableau in (34). The tableau is simplified, with the harmonically bounded[16] candidates omitted.[17] In (35), I provide a summary of how violation marks are assigned in the tableau.

[15] (a)–(e) are inflectional suffixes.
[16] Harmonic bounding is defined as follows:

(34) Standard English *has* V-*en*
The input: [FINITE[DIPHASIC; E<S[she beat 3SG the eggs]]]
Ranking: DEP » M(ASP) » M(TNS) » M(AGR) » *VSTR

Table 1. Standard English *has-en*

	[FIN[DIPHASIC; E<S[she beat 3SG the eggs]]]	DEP	M(ASP)	M(T)	M(AGR)	*VSTR
1 →	She [has [beaten …]]					***
2	She beat …		**!	*	*	
3	She beat … already	*!	*	*	*	
4	She beats …		**!			*
5	She beats … already	*!	*			*
6	She beaten …			*!	*	*

(35) What counts as a violation in the tableau:
a. any type of verbal affixation (e.g. *-en*, *-z*) incurs a mark under *VSTR;
b. any recursive VP structure (auxiliary+V , e.g. *have*+V) incurs a mark under *VSTR;
c. introducing any feature not given in the input incurs a mark under DEP (e.g. *already* incurs a mark for introducing ANTERIORITY);
d. failing to express an aspectual, tense, or finiteness feature given in the input incurs one a mark under each relevant MAX constraint (e.g. the base form *beat* fails on all counts).

How is CSE different from StE? The most obvious difference is that verbal morphology can be completely absent. In (36), this is achieved by ranking *VSTR above all other constraints, thereby punishing any output with verbal morphology (outputs 2-5).[18] Yet since the Perfect meaning is waiting to be expressed, *already*, which expresses part of that meaning (namely DIPHASIC), steps in. On the other

The mapping /A/ → B harmonically bounds the mapping /A/ → C if and only if the /A/ → B mapping incurs a proper subset of the constraint violations incurred by the /A/ → C mapping. (McCarthy 2002: 23)

[17] I assume GEN generates only candidate structures that respect X' theory (see e.g. Legendre 2001), and ignore candidates of the following type: *has beats* (two finite verbs in the VP), *have beats* (non-finite auxiliary, finite main verb), etc. The rankings in (34) and (36) were discovered by the Constraint Demotion Algorithm (Tesar and Smolensky 2000) implemented in OTSoft (Hayes, Tesar and Zuraw 2000).

[18] Again, the tableau in (36) is simplified, with the harmonically bounded candidates omitted.

hand, an output without *already* (output 6) does not express any aspectual information, and is thus sub-optimal.

(36) CSE V+*already*
Ranking: *VSTR » M(ASP) » M(TNS) » M(AGR) » DEP

Table 2. CSE V+*already*

	[FIN[DIPHASIC; E<S[she beat 3SG the eggs]]]	*VSTR	M(ASP)	M(T)	M(AGR)	DEP
1 →	She beat … already		*	*	*	*
2	She [has [beaten…]]	***!				
3	She beats	*!	**			
4	She beats … already	*!	*			*
5	She beaten …	*!		*	*	
6	She beat …		**!	*	*	

Note that the winning expression V+*already* is less than fully faithful to the input meaning. *Already* is able to express part of the Perfect meaning, namely the DIPHASIC feature, but it does not express the requisite ordering of phases, which results in a MAX violation. Moreover, it introduces a superfluous ANTERIORITY feature, which results in a DEP violation. Nevertheless, V+*already* wins. The high-ranking *VSTR rules out all the more faithful structures, and *already* emerges as the unmarked aspectual operator.[19] The OT analysis thus reveals how a new variety of English such as CSE utilizes the latent availability of unmarked forms in its grammar, a characteristic that has also been observed in pidgins (Bresnan 2000). As such, the analysis captures a central observation of Jakobson's (1984) that the meaning of the unmarked form is not statically dependent on its inherent feature specifications, but is determined dynamically based on its relation to other elements in opposition to it (Bresnan 2001: 12). The variation in the expression of aspectual meanings in CSE can thus be seen as a competition of different forms to satisfy two requirements that are in inherent conflict: the faithful expression of a given semantic input on the one hand, and the reduction of marked verbal structures on the other.

The partial ordering of constraints that characterizes CSE is given in (37). In a total order, all constraints are ranked with respect to one another; in a partial order, some constraint rankings may remain unspecified, which yields a set of possible total orders. Three sample total rankings that generate the three distinct CSE expressions are given in (38).

(37) Partially-ordered grammar for CSE:
M(ASP) » M(AGR)
M(ASP) » DEP

[19] The Perfect particle also has the (basic) interpretation 'already' in Yoruba (Dahl 1985).

(38) a. M(ASP) » M(AGR) » DEP » *VSTR : *She has beaten the eggs.*
b. M(ASP) » *VSTR » M(AGR) » DEP : *She beaten the eggs*.
c. *VSTR » M(ASP) » M(AGR) » DEP : *She beat the eggs already*.

5. AN ASPECTUAL TYPOLOGY

The interaction of constraints gives a typology of possible expressions of the Perfect meaning. With 4 constraints,[20] we have a factorial typology of 4! (=24) total rankings. This typology yields only six outputs, as shown in (39). The other eighteen outputs are harmonically bounded.[21]

(39)

Outputs	**No. of total rankings**
a. *She has beaten the eggs*. (StE, CSE)	8
b. *She beat the eggs already*. (CSE)	3
c. *She beaten the eggs*. (CSE)	4
d. *She beat the eggs*.	5
e. *She beats the eggs*.	3
f. *She beats the eggs already*.	1

Of the six outputs, three (39a–c) are attested. (39d–f) are predicted to be universally possible expressions of the Perfect meaning, but so far I have not found languages that realize this prediction. While we clearly need to look at more languages to check this prediction, there are independent reasons for assuming that this gap is in fact systematic. It has been observed that affixes tend to be ordered from the stem outward according to the hierarchy in (40) (see Bybee 1985, Halle and Marantz 1993, Kiparsky 1993b).

(40) [[[[[…]TENSE/ASPECT] MOOD] NUMBER] PERSON]

Several asymmetries have been noted: for example, central categories are more likely to be expressed by stem suppletion than peripheral categories; peripheral categories neutralize morphological distinctions more readily than central categories (Kiparsky 1993b).

Now, notice that (39e) and (39f) have verb forms that express agreement features, but not aspectual features. These types have one thing in common: they presuppose the ranking M(AGR) » M(ASP). Suppose we propose that the ranking in (41) is universal:

[20] For this particular input (see (34)), M(TNS) is unnecessary, and ignored here.
[21] These results were checked using OTSoft.

(41) Universal ranking: M(ASP) » M(AGR)

(41) defines the grammars that prefer the expression of aspect over the expression of agreement. If the ranking in (41) is fixed, then morphemes of central categories (e.g. aspectual affixes) will be expressed at the expense of morphemes in peripheral categories (e.g., agreement affixes like number/ person) when they are in competition, other things being equal. With this ranking fixed, only the outputs in (42) remain. In other words, the output types (39e) and (39f) are excluded from the typology.

(42)	**Outputs**	**With M(ASP) » M(AGR) fixed**
	a. *She has beaten the eggs*. (StE, CSE)	4
	b. *She beat the eggs already*. (CSE)	2
	c. *She beaten the eggs*. (CSE)	4
	d. *She beat the eggs*.	2

6. CONCLUSION

This paper has argued that (i) *already* encodes the meaning of contrasting phases, and (ii) the Perfect also encodes a similar meaning of contrasting phases, plus a particular ordering of these phases. From these two assumptions and OT with partial ordering, we have derived the variable expressions of the Present Prefect within a single language (CSE), including a variant that involves *already* as an unmarked aspectual operator. In addition, we have derived a cross-linguistic typology of possible expressions of the Present Perfect. This typology remains to be validated by future work.

7. ACKNOWLEDGEMENTS

I am grateful to Arto Anttila, K.P. Mohanan, Lionel Wee, the participants of my Spring 2003 seminar on Singapore English at New York University, and two anonymous reviewers for valuable comments on an earlier version of this paper. I also wish to thank Chng Huang Hoon and Lionel Wee for discussions on the CSE data. This paper developed from the conference paper presented at Perspectives on Aspect, and I thank the members of the audience for helpful discussion.

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