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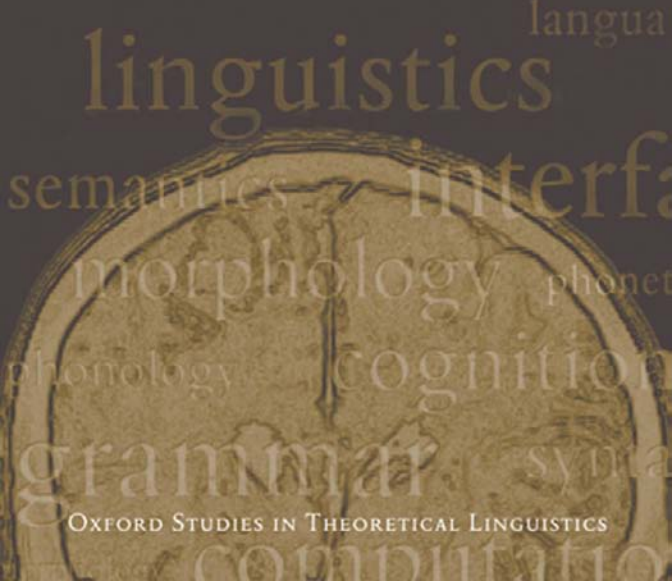

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General Preface

The theoretical focus of this series is on the interfaces between subcomponents of the human grammatical system and the closely related area of the interfaces between the different subdisciplines of linguistics. The notion of 'interface' has become central in grammatical theory (for instance, in Chomsky's recent Minimalist Program) and in linguistic practice: work on the interfaces between syntax and semantics, syntax and morphology, phonology and phonetics etc. has led to a deeper understanding of particular linguistic phenomena and of the architecture of the linguistic component of the mind/brain.

The series covers interfaces between core components of grammar, including syntax/morphology, syntax/semantics, syntax/phonology, syntax/pragmatics, morphology/phonology, phonology/phonetics, phonetics/speech processing, semantics/pragmatics, intonation/discourse structure as well as issues in the way that the systems of grammar involving these interface areas are acquired and deployed in use (including language acquisition, language dysfunction, and language processing). It demonstrates, we hope, that proper understandings of particular linguistic phenomena, languages, language groups, or inter-language variations all require reference to interfaces.

The series is open to work by linguists of all theoretical persuasions and schools of thought. A main requirement is that authors should write so as to be understood by colleagues in related subfields of linguistics and by scholars in cognate disciplines.

In this volume, the editors have collected a series of papers which explore the nature of event structure (broadly construed so as to include lexical semantic class, aspect, and tense) and specifically how the architecture of the grammar divides the labour between the lexicon, morphosyntax, and semantics in this domain.

David Adger
Hagit Borer

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Notes on Contributors

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1

Introduction

MALKA RAPPAPORT HOVAV, EDIT DORON, AND IVY SICHEL

1.1 Overview

The chapters in this volume are based on talks presented at a workshop entitled 'Syntax, Lexicon, and Event Structure' that was held in 2006 at the Hebrew University of Jerusalem, honouring Professor Anita Mittwoch on her eightieth birthday. The themes of the workshop were related to Professor Mittwoch's lifelong work on the linguistic representation of temporality and its interaction with the lexical semantics of verbs and the syntax and semantics of arguments and modifiers. The topics covered at the workshop and in this volume range from the basic ingredients lexicalized by roots to the formation of morphologically derived verbs and the morphosyntactic encoding of lexical aspect, viewpoint aspect, and modality. Despite the broad array of topics covered, the chapters all address aspects of the same basic research programme: determining the division of labour between the lexicon, (morpho)syntax, and compositional semantics in the encoding of what can broadly be construed as event structure, encompassing event participants and the temporal properties associated with the linguistic representation of events.

1.2 Linguistic representations of event structure

One of the basic functions of language is to segment the flux of happenings in the world into units which speakers refer to as events. This view is intuitively appealing to ordinary speakers; its significance for the logical representation

The workshop from which the chapters in this volume have emerged was funded by a grant from the Israel Science Foundation. We thank Beth Levin for helpful comments on the draft of this introduction, and Yehudit Stupniker for outstanding help with the practical aspects of editing.

of sentences was recognized in the work of Reichenbach (1947) and Davidson (1967), which stimulated the development of event semantics (Bach 1986; Kamp 1979; Krifka 1989; Link 1987; Parsons 1990). The new metaphysics of events provided useful insights for the study of the semantics of verbs and their arguments within formal semantics, converging with work independently developed in the tradition of lexical semantics (Croft 1990; Fillmore 1968; Gruber 1976; Ostler 1979; Jackendoff 1983, 1990; see Levin and Rappaport Hovav 2005 for overview).

In the framework of event semantics, verbs are taken to be predicates of events; however, the linguistic units which describe specific events include the verb, its arguments, and various types of VP modifiers. The ultimate semantic properties of the event description encoded in particular sentences are determined by a complex interaction between the lexical semantics of the verb, the referential properties of arguments and their morphosyntactic expression, and properties of temporal and locative adjuncts. Many of the linguistically significant properties of events emerge from the study of the ways in which these factors combine to produce the internal structure of the event. Much current research is devoted to determining which of these properties are lexically encoded, which arise from semantic composition or as a result of particular morphosyntactic encoding strategies, and what the impact of cross-linguistic variation in grammatical encoding of these properties is. The chapters in the volume address many of the questions currently at the focus of this research. Here we briefly review the components which give rise to the properties of event descriptions as encoded in natural language.

While happenings in the world can be characterized by infinitely many properties, research focused on the linguistic representation of events has revealed that only a subset of these properties is linguistically significant. These linguistically relevant properties define the templates for the linguistic representation of events, referred to as EVENT STRUCTURE (Borer 2005; Croft 1990; Jackendoff 1990; Rappaport Hovav and Levin 1998; Rothstein 2004; Van Valin and LaPolla 1997; Levin and Rappaport Hovav 2005). The grammatical relevance of these semantic properties can be detected by grammatical processes and representations which are sensitive to them.

First, events involve various temporal dimensions. The grammatically relevant semantic properties of event descriptions having to do with internal temporal properties of events give rise to a typology, often referred to as AKTIONSART, which differentiates between event types according to features such as eventivity, durativity, and telicity (Kenny 1963; Vendler 1967; Dowty 1979). Telicity, which is the concept that has received the most attention in the recent literature, involves associating an endpoint, or TELOS, to an event. Some

verbs lexically entail a telos for the event they describe. Yet endpoints to events can be derived through an interaction between the referential properties of certain kinds of arguments and the lexical semantics of the verb. The way in which the lexical properties of verbs and the referential properties of these arguments, often called INCREMENTAL THEMES, interact, has been intensively studied (Dowty 1991; Jackendoff 1996; Krifka 1998; Tenny 1994; Verkuyl 1989). Telicity can also be introduced by elements not selected by the verb, including result phrases and cognate objects (Dowty 1979; Levin and Rappaport Hovav 1995; Wechsler 2005). Languages differ in terms of how telicity is lexically encoded, and in the morphosyntactic means available for constructing telicity (Borer 2005; Filip 2005; Ramchand 2007).

Second, event structure varies depending on the way in which the verb grammatically relates to its arguments, and in particular to its external argument. The nature and syntactic encoding of the external argument determines different classifications of the event; these are the different voices associated with a verb, whose most common instantiations are: active, passive, and middle. We find variation between languages in the different voices available, and their morphosyntactic encoding. Interacting with the voice system is the system of marking different forms of verbs related by various kinds of causative relations. While it has become accepted by many that at least some external arguments are introduced syntactically, and that some morphological marking involving the encoding of the external argument has syntactic significance, what exactly can be gleaned from the patterns of morphology regarding the contribution of syntax and the lexicon in introducing the external argument is the topic of much recent debate (Alexiadou *et al.* 2006; Doron 2003; Harley 2005; Haspelmath 1993; Kratzer 2004; Pylkkänen 2008; Reinhart 2002).

Next, an event may be presented from a variety of temporal perspectives, often referred to as VIEWPOINT ASPECT, whose most common instantiations are PERFECTIVE and IMPERFECTIVE, encoding whether the event is presented from an external or internal perspective, i.e. as ongoing or completed (Comrie 1976). Not all languages appear to make a clear distinction between the viewpoint aspects. Accordingly, viewpoint aspect can be shown to be distinguished semantically from aktionsart. While aktionsart deals with eventivity, durativity, and telicity, which are ways of characterizing events, viewpoint aspect is defined in terms of relations between temporal intervals spanning the event and the perspectives from which it is viewed (Klein 1994; Kratzer 1998). Though viewpoint aspect and aktionsart are to be distinguished, there are well-known interactions between them. For example, in many languages, perfective viewpoint is sensitive to the eventivity/stativity of the event. The

relation between the presence of morphologically encoded viewpoint aspect and the availability of various telicity-inducing constructions has recently begun to be explored (Smith 1991; Filip 2000).

Finally, the described event must be temporally anchored in relation to the discourse, via tense systems, and may be evaluated with respect to circumstances distinct from those holding in the actual world, expressed via the modal system. It is usually assumed (at least since Dowty 1977) that the imperfective viewpoint may take into account hypothetical completions of the event which are not in fact actual. This in turn depends on the aktionsart classification of the event as requiring completion. Thus it seems that the conflict between imperfective viewpoint and telic aktionsart results in the introduction of non-actualized events. Non-actualized events are also constitutive of HABITUALITY. Part of the characterization of habituality involves disposition to act, which is a modal notion. Here too, modality seems to stem from an aspectual conflict, this time between the stativity of habituals, and the dynamicity of their episodes.

What emerges, then, is a complicated dependency between event structures and verbs and their modifiers/arguments, on the one hand, and between event structures and both viewpoint aspect and tense/modality options on the other hand. The next section turns to the overall organization of the volume. It lays out the particular current issues arising from the dependencies mentioned above as addressed by the chapters in the volume.

1.3 Specific issues and the structure of the volume

The chapters in this volume focus on the interaction of the lexicon, derivational morphology, syntax, and semantics, in the production of event structure. As already mentioned, much of the research on event structure in the last two decades has been devoted to observed correlations between semantic properties of the event descriptions, and syntactic and morphological properties of the constituents forming these descriptions. These correlations raise the question of whether the structural properties determine or merely reflect the semantic properties. For example, there is a clear propensity for incremental themes to be expressed as direct objects, and predications including a perfective-marked verb are usually telic. The question of whether structure determines or reflects semantic variation is brought sharply into focus when we look at particular verbs that have a range of possibilities for the expression of their arguments, appearing in different morphosyntactic environments, with concomitant variation in semantic properties. Do the shifts in grammatical properties effect the semantic change, or are they merely a

reflection of varying semantic properties? Chapters in this volume address some issues involved in resolving these questions: do the lexical entries of verbs include the information which determines how the arguments of a verb are to be realized? When a verb has more than one such option, are there different lexical entries for such verbs? Or are lexical entries much sparser in their specification, with arguments of verbs projected freely onto syntax and syntactic position determining semantic properties of arguments, so that a single lexical entry is associated with a verb in its different syntactic frames? Is there any difference when the relation between different uses of the verb is morphologically mediated or not? What is the role of linguistic modality (spoken vs. signed) and syntactic category, if any, in determining the configuration of argument structure? There is a range of views on the core semantic characterization of the various components of temporality and the exact distribution of labour between the lexical specifications of the verb, the contribution of the structure-building processes, both morphological and syntactic, in the representation of temporality, including aspect, tense, and modality. Accordingly, this volume is divided into three parts, each focusing on the elements contributing to the composition of event structure: at the level of minimal lexical specification, the morphologically derived word, and the compositional semantics.

Chapters in part I of the volume address the question of which semantic properties are lexically specified, whether they are constrained in any way, and how the lexically specified information relates to lexical aspectual properties and argument expression. How core verbal meanings determine argument structure and syntactic projection is addressed in part II, along with the role of morphology, syntactic category (verb vs. adjective), and linguistic modality (spoken vs. signed). These chapters focus in particular on the composition of the external argument as observed in a variety of cross-linguistic alternation phenomena involving the external argument. Part III turns to the compositional semantics of temporal operators such as aspect and modality, and the contribution of particular argument and modifier choices to the interpretation of the sentence as a whole.

1.3.1 *Lexical representation*

In their chapter, Malka Rappaport Hovav and Beth Levin (RH&L) lay out the notion of LEXICALIZATION: what is entailed in (almost) all uses of a verb, as opposed to what can be inferred from the use of that verb in a particular context. The ROOT is the element which specifies the idiosyncratic properties of the verb in all its uses. They scrutinize two categories which are often

invoked in the classification of roots: manner and result. They suggest a lexicalization constraint, taken to be a constraint on the complexity of lexicalized meaning, which allows a verb to lexicalize manner or result, but never both. The size of the unit on which the constraint operates depends on the particular language: in some it is a bound root, in others it is a word. The notion of result cannot be equated with telicity, since the latter is usually compositionally derived, and there are cases where verbs are not basically telic but they still show manner/result complementarity. The observed complementarity is found in the domains of change of state and motion (where motion verbs lexicalize either manner or direction). Change of state and directed motion verbs together form the class of result verbs and share the property of a lexically encoded scale. Result verbs are then verbs which encode a scalar change, while manner verbs encode a non-scalar change. A verb lexically encodes a scale if it is associated with a single simple attribute with ordered values. The idea that change of state verbs and directed motion verbs are alike in being scalar finds support in several parallels in their scale structure, and in the way telicity arises from this parallel scalar structure. RH&L briefly look at apparent counterexamples to the lexicalization constraint: verbs like *climb* and *cut* which appear to lexicalize both a manner and a result. They show that there is no single, constant element of meaning which appears in every use of these verbs. These verbs have independent manner and result senses, with the complementarity still observed for individual uses of the verb.

Adele Goldberg argues against the position articulated by RH&L, suggesting that the only constraint on what can be packaged into the meaning of a verb is that it must refer to an established semantic frame: this is the Conventional Frame Constraint. She argues against suggested constraints on what a root can lexicalize. In particular, distinct subevents (defined as independently distinguishable facets of the predicate that don't entirely overlap temporally) do not have to be causally related. She also argues against the constraint proposed by RH&L that verbs cannot lexicalize a manner and a result. Her counterexamples are verbs like *schuss* and *fry*. Most uses of a verb involve the meaning lexicalized in the verb combined with meaning contributed by an argument structure construction. Therefore, in many instances, the verb lexicalizes one event, and the argument structure construction another event (what is lexicalized by the verb remains constant across different argument structure constructions, while what is contributed by the argument structure construction remains constant across different uses of a verb). For example, the double object construction denotes an event of transfer, which can be combined, in English, with the verb *kick*. The most

common relation between the event denoted by the verb and that denoted by the argument structure construction is causal: means or instrument. But there are also non-causal relations. For example, the verb can denote an event which serves as a precondition for the event in the argument structure construction as in *She freed the prisoner into the crowd*, in which the event of freeing is a precondition for the caused motion event contributed by the construction. But while events lexicalized in a verb's meaning are constrained by the Conventional Frame Constraint, there is no such constraint on the combination of events contributed by a verb and an argument structure construction.

Nomi Erteschik-Shir and Tova Rapoport (ES&R) share with RH&L the idea that it is possible to isolate an invariant meaning to a verb in all its grammatical contexts, which has an influence on the argument realization possibilities of that verb. They isolate the atomic components of manner (M), state (S) and location (L), each with a range of instantiations. Each of these components also has a plural version (a property that allows the projection of scalar and iterative constructions). Each atom ranges over the same set of concepts as an equivalent morphosyntactic category. M is equivalent to adverbials (manner, means, instrument), S to adjectives, and L to the full range of prepositions. ES&R agree with RH&L that (transitions to) state and location are kinds of results. They suggest that a verb is constrained to specify at most a manner and a result, so only two of the three kinds of categories can be specified at once in a single verb. In this they differ from RH&L, who claim that only one such component can be lexicalized. ES&R articulate an ambitious research goal, which does away with any specification of argument structure. They argue that the range of syntactic structures that can be associated with each kind of verb follows directly from the elements of meaning that are lexicalized in the verb. Thus, while the verb projects into a range of syntactic structures, each verb has only one constant representation, and the range of syntactic contexts follow from the elements of lexicalized meaning and the principles which determine how these elements of meaning can be associated with syntactic structure. Projection possibilities are constrained by Full Interpretation, so all lexicalized elements must be given expression. Their theory is illustrated through an analysis of verbs of contact.

Martin Everaert attempts to integrate what we know about idioms into current conceptions of the lexicon. One central characteristic of idioms is their 'conventionality', defined with respect to a speech community. This property of idioms places them in the realm of E-language (Chomsky 1995). Idioms are 'actual phrases', accepted as such by a speech community if used above a certain frequency threshold. The encyclopedia as conceived of in

Distributed Morphology (Halle and Marantz 1993, 1994) is a natural host for this aspect of idiomatic meaning, as it is the place where conventions are listed, and factors such as frequency, register, collocation, and non-linguistic knowledge play a role. Setting conventionality aside, Everaert asks whether there is any purely linguistic knowledge associated with idioms that would place the study of idioms in the realm of I-Language. He argues against the commonly accepted notion that non-compositionality determines the status of lexical combinations as idioms since not all are non-compositional in the same sense. Furthermore, without a clear definition of the semantic relation 'is a function of', it is impossible to determine which collocations are compositional. In fact, all idioms, whatever the nature of their (non)-compositionality, exhibit some degree of syntactic flexibility in the appropriate context. Instead, Everaert suggests that (i) in idioms, all lexical items and their combinations retain their original, 'ordinary', morphosyntactic properties (irregular inflectional forms, lexical aspect and adverb selection, auxiliary selection), and (ii) idioms are always headed. These properties suggest that idioms are integrated into the lexical entries of the words comprising them. Everaert suggests that the theory of relations encoded in the (narrow) lexicon be enriched to include L(exical)-selection, that is, selection for a particular lexical item. An idiom, then, is a syntactic constituent in which one word at least is L-selected by the head. An idiomatic meaning is just one among many possible subsenses of a word; the subsense of 'kick' which means 'die' selects for 'the bucket' rather than a generic NP.

1.3.2 *Argument structure and the compositional construction of predicates*

The chapters in this section shed light in various ways on the nature of argument structure, how the argument structures of verbs are derived and the relation of argument structure to morphology.

The relationship between event structure, argument structure, and grammar is brought into sharp relief in the chapter by Irit Meir. Meir focuses on the development of argument structure marking in two young Sign Languages, Israeli Sign Language (ISL), and Al-Sayyid Bedouin Sign Language (ABSL), from their early stages to the present fourth generation of speakers. In both languages, prior to the emergence of grammatical devices for the systematic identification of event participants, signers tend to limit themselves to single argument expressions. This strategy is often used when both participants are human and world knowledge is insufficient to tell who did what to whom. To express, for example, the situation in which a man pushes a woman, signers prefer utterances such as 'Man push woman fall', breaking

down, in effect, what would usually be conceived of as a single event into two predicates, each associated with a single argument. Over the years, the languages developed devices for distinguishing theta-roles: an agreement system in ISL and systematic constituent order in ABSL. At this point a mapping became established between predicates and events, so that a single event, as conceived by speakers of the now mature languages with fully developed argument structure, is systematically associated with a single predicate, and a single predicate may show up with multiple arguments in a single utterance. These young languages demonstrate that the linguistic packaging of information into event-sized units is not an absolute cognitive necessity, and that the linguistic conception of events and event structure depends upon the development of grammatical devices to distinguish among multiple participants. Argument structure, understood as the association of multiple roles with a predicate, is, then, a grammatical construct.

The remaining chapters in this section are concerned with the relationship between argument structure and the structural ingredients which enter into predicate composition, and consider the possibility that the external argument may, in at least some contexts, be introduced via a predicative head separate from the verb. Chapters in this section focus on a variety of alternations related to the external argument, typically associated with a morphological marking on the verb, and consider the relationship between morphological marking and structure in word formation. The chapter by Elizabeth Ritter and Sara Rosen (R&R) makes an important contribution to the debate surrounding the possibility that the external argument is always introduced via a separate, dedicated head. R&R provide morphological evidence for a little v (Chomsky 1995; the functional projection which introduces the external argument) associated with all verbs that have external arguments in Blackfoot, an Algonquian language. The chapter develops an analysis of a kind of morpheme called a 'final' in the Algonquianist literature. The finals in Blackfoot classify the verb stem as belonging to one of four categories, determined by two features, transitivity and animacy, producing a four-way typology: intransitive animate (subject is animate), intransitive inanimate (subject is inanimate), transitive animate (object is animate), and transitive inanimate (object is inanimate). R&R argue that in fact what the finals determine is whether the verb licenses a DP object (as opposed to an NP or CP) and whether there is an external argument. There is evidence that the finals are not a form of agreement with the subject and reflect, rather, the semantic requirement of a verb for an external argument, conceived of as semantically animate. Each final is analysed as a light verb as it seems that they have properties of both functional categories and lexical categories. Like

functional categories, they license direct objects (DPs as opposed to NPs and CPs), but like lexical categories they assign a theta-role and have independent lexical content.

Blackfoot appears to be special in the generalized morphological distinction it draws between verbs with and without external arguments. Many languages tend to restrict special morphology to subclasses of transitive and intransitive verbs, as in the case of causative verbs. The next two chapters, by Julia Horvath and Tal Siloni (H&S), and by Artemis Alexiadou, focus on different kinds of causative verbs and consider more specific issues in the debate over the division of labour between syntax and the lexicon in the introduction of the external argument and word formation. H&S work within a framework which assumes the traditionally simple VP, the projection within which all arguments are realized; on this view, lexical categories enter the syntactic component with all their semantic and phonological ingredients in place and project the full array of arguments directly, within the basic VP (Koopman and Sportiche 1991; Levin and Rappaport Hovav 1995; Siloni 1997). Alexiadou, in contrast, adopts the position mentioned above in which the external argument is introduced by a functional head, and is not part of the argument structure of the verb, following work by Kratzer (1996); Harley (1995); and Pylkkänen (2008).

H&S and Alexiadou focus on different kinds of causatives, and so it is not surprising that many of their conclusions diverge. They do, however, agree that there is no simple correlation between causative morphology and syntax, and the views they present on the relationship between syntax and causative morphology can be taken to be complementary. According to H&S, two languages may both use regular causative morphology, yet the underlying syntax may be distinct, depending on whether the causative is biclausal or monoclausal. According to Alexiadou, regular causative morphology may be available or not across languages, yet the underlying syntax of lexical causatives is universal.

H&S focus on productive causatives, and argue that while both Japanese and Hungarian feature systematic causative morphology, and both allow causatives to be formed from transitives and unergatives, they nevertheless show a fundamental difference, related to the syntactic structures which underlie them. Japanese causatives are biclausal (and, concomitantly, support indirect causation), and the 'causer' argument is introduced syntactically, via a CAUS head, while Hungarian causatives are monoclausal, and formed in the lexicon via an operation which adds an Agent and modifies the base verb's own agent, if there is one.

Alexiadou argues that the presence of anti-causative morphology correlates, cross-linguistically, with the structural presence of a detransitivizing

Voice head. All causative subjects are introduced syntactically via a Voice head, whether morphologically marked or not. There are, however, two anticausative structures available in principle. One corresponds to a simple VP, lacking any representation having to do with the external argument, and another includes a Voice head specified for the absence of an external argument. This is the 'detransitivizing' exponence of Voice. Alexiadou suggests that this detransitivizing morphology and its concomitant syntactic representation is obligatory on verbs of external causation in languages like Greek and Hindi. In English, in contrast, the anti-causative variant is not available for these verbs. The correlation between the absence of special detransitivizing morphology and the non-availability of anti-causative variants of verbs of external causation, suggests, in turn, that the classification of root semantics underlies the syntax of anti-causativization. Alexiadou makes another important claim that differences in productivity of the alternation may be attributed to differences in the size of the root inventory and the functional category inventory in different languages. Languages such as Japanese with productive causativization have a relatively large functional vocabulary and a relatively small root list. Different meanings come about by combining functional elements with a small set of roots. English, on the other hand, has a relatively large root list and a small functional vocabulary.

The last chapter in this section, by Landau, enters the debate on the introduction of arguments from a surprising empirical direction, the relatively sparsely studied adjectival alternations found with evaluative adjectives, as in *John was very generous (to Mary)* vs. *That tribute was very generous (of John) (*to Mary))*. While it is widely assumed that argument suppression, often analysed in terms of lexical saturation, applies only to the external argument, the chapter argues that in fact it is unselective, applying to all argument slots of a predicate, hence the ungrammaticality of the original goal in the derived adjective. Constructions which appear to suppress only the external argument (verbal passive and nominalization, for example) are simply those in which a separate predicative head introduces the external argument. Indirectly, then, the analysis of lexical argument saturation supports an asymmetry in the introduction of arguments, where only the external one is separately introduced. The chapter also contributes to our understanding of cross-categorial similarities and differences in the introduction of arguments, in contrast to the majority of work which focuses, for obvious reasons, on verbs. Adjectives derived from adjectives show an interesting resemblance to derived nominals rather than to verbs. Landau suggests, in the spirit of Williams (1981) and Grimshaw (1990) on the external argument in nominals, that the external argument in the derived adjective

realizes the R relation, previously thought to be associated exclusively with nominals. He re-interprets the R of the R role to stand for reification, or realization, of the property or set denoted by the adjective or noun.

1.3.3 *Syntactic and semantic composition of event structure*

The chapters in this section discuss the contribution of arguments and adjuncts, as well as auxiliary verbs, to the temporal/modal dimension of the clause.

The chapter by Fred Landman and Susan Rothstein (L&R) and the one by Anita Mittwoch are both concerned with the nature of (a)telicity. The two chapters rely on different characterizations of the semantic distinction between atelic predicates (modifiable by *for*-adverbials) and telic predicates (modifiable by *in*-adverbials). L&R adopt the traditional notion of homogeneity, previously used in accounts of this distinction (starting with Bennett and Partee 1972) extending it to a weaker notion of INCREMENTAL HOMOGENEITY, while Mittwoch replaces homogeneity with MEASURABILITY.

The homogeneity account of atelicity is based on the intuition that the meaning of *for an hour* requires the modified predicate to go on at all parts of the hour. But it has often been emphasized (beginning with Hinrichs 1985) that pauses are nonetheless allowed, and as shown by L&R, pauses may actually take up most of the hour. *Dogs howled for an hour* can be true in a scenario where there is only occasional intermittent dog-howling over the course of the hour. Accordingly, L&R weaken the notion of homogeneity to what they call incremental homogeneity, where different instances of an event (e.g. dog-howling) are viewed as stages of the same process, what has been called by Landman (2008) 'incremental preservation of cross-temporal identity' between events. L&R then ask how different arguments contribute to the composition of incremental homogeneity in the clause. For example, the sentence *John ate an apple* is not incrementally homogeneous, and this property does not change when *an apple* is replaced by *three apples*, *at most three apples*, *many apples*, *the apples*, or any noun phrase of the form *DET apple(s)*, since in all these examples the object argument is a member of the set of singular (or plural) apples, which does not induce incremental homogeneity. The object argument in *John ate apples*, on the other hand, is the kind k_{APPLE}, which ensures the incremental homogeneity of the events described by the sentence; and because the sentence is episodic, any event it describes also entails the realization of what is defined as an 'event witness', i.e. an event of eating specific apples. Crucially, the number of specific apples eaten does not necessarily have to increase as the stages of k_{APPLE}-eating expand; this accounts

for the large pauses allowed in the interpretation of a sentence like *John ate apples for two weeks*. Even inherently telic verbs, e.g. *arrive*, license *for*-adverbials with a kind subject (such as $k_{\text{ENGLISH TOURIST}}$): *English tourists arrived for an hour*. The felicity of a kind subject in other examples may depend on including an operator which iterates events in an incrementally homogeneous way: *Girls drank a glass of juice #(every twenty minutes) for two hours*.

Anita Mittwoch's chapter formulates a different characterization of the telic/atelic distinction. This characterization is based on asymmetries in the semantics of the two types of adverbials which are most often used to diagnose the telic/atelic distinction: *for*- vs. *in*-adverbials. Mittwoch proposes that when events are described as atelic, their temporal dimension is a priori open-ended, and therefore measurable. This is precisely the function of *for*-adverbials, which are expressions interpreted as measure functions. But when events are described as telic, their temporal length is predetermined, and there is thus no open-ended temporal dimension to measure. This predetermined temporal length explains why telic event descriptions cannot be modified by measure functions, i.e. by *for*-adverbials, but rather are modified by *in*-adverbials, which are not measure functions at all, but denote container intervals. The characterization of the semantics of *for*- as opposed to *in*-adverbials is based on differences between them which Mittwoch uncovers. First and foremost is the scale reversal in the informativity of the two types of adverbials. The informativity of *for*-adverbials is proportional to their temporal length, but it is inversely proportional in the case of *in*-adverbials. Thus, *She walked for an hour and a half* is *more* informative than *She walked for an hour* (assuming of course that both are true), but *She walked five miles in an hour and a half* is *less* informative than *She walked five miles in an hour*. These facts help motivate the semantic distinction between *for*-adverbials and *in*-adverbials, which Mittwoch takes as the basis for the dichotomy between atelic and telic eventualities, whereby the former but not the latter can be characterized by measurability. Other properties of *in*-adverbials are shown to follow from their characterization as denoting container intervals. For example, since measure functions preserve summation but container intervals do not, there is a contrast between *She worked on the book for a year* and *She wrote the book in a year*. The former is true if she worked on her book for the first six months in 2002 and then for the last six months in 2003, but the latter is not.

Christopher Piñón's chapter is concerned with the denotation of the object argument of verbs of creation. Problems in characterizing this denotation have emerged in the past in the context of the so-called imperfective paradox (Dowty 1979), which has led certain scholars (e.g. Bennett 1977; Zucchi 1999; von Stechow 2000) to conclude that the object of verbs of creation cannot in

general denote ordinary individuals. Piñón argues for the same view, yet from an original perspective. His argument is based on an examination of a special subclass of verbs of creation—verbs of depiction such as *draw*. He demonstrates that the objects of such verbs often do not denote ordinary individuals, but are coerced to denote properties (or descriptions) of depictions. In particular, Piñón argues for three different readings of *draw a house*, depending on the denotation of the object. Thus, not only ordinary individuals or images of ordinary individuals satisfy the predicate *house*, but abstract individuals such as house-depictions and house-descriptions, which are not necessarily related to ordinary individuals. He distinguishes two different 'relational' readings of *draw a house*, which involve the depiction either of a particular house or of a particular house-description, from the 'notional' reading which involves a general house-depiction, but no house or house-description in particular. The argument is based not only on the semantic differences between the three readings, but also on the fact that in some languages (Piñón describes Hungarian) these three readings correspond to three different verbs.

Geoffrey Horrocks and Melita Stavrou (H&S) argue for a cross-linguistic correlation between morphologically marked viewpoint aspect and the availability of a particular kind of cognate object construction (henceforth, CO) which induces an aspectual shift to telicity, as found in English. They claim that in languages, such as English, Hungarian and Japanese, which lack morphological viewpoint aspect, verbs are not inherently specified for lexical aspect, and therefore, these languages have aspect-shifting COs. When the lexical aspect of the verb is not fixed, the VP is open, in principle, to aspectual shifts induced by syntactic context, such as the range of result-type phrases. Languages such as Greek, Italian and French, in contrast, mark viewpoint aspect morphologically. In these languages, verbs are inherently specified for lexical aspect, as evidenced by the fact that the interpretation of the combinations of lexical and viewpoint aspect are completely systematic. The prediction, then, is that the presence of aspect-shifting COs correlates with the presence of resultative phrases and no morphological marking for viewpoint aspect. Indeed, COs in Ancient and Modern Greek, and in Hebrew, are not aspect-shifting as they are in English. They contrast with COs in English in another crucial feature: they are associated with all verb classes, while in English COs are restricted to unergatives (with apparently the single unexplained counter-example *die*).

Hagit Borer's chapter relates two questions concerning bare noun arguments: (i) the contrast between the acceptability in Hebrew of sentence initial V-S with bare noun subjects where V is unaccusative, and its unacceptability where V is

unergative; (ii) the telicity in Hebrew and English of achievements with bare noun arguments, in contrast to the atelicity of accomplishments with bare noun arguments. The argument that the two contrasts are related relies on the observation that both disappear under the presence of a 'locale' (an indexical adverb of the sort found as subject of existential constructions). The major claim made in the chapter is thus about the central role locatives play both in forcing existential interpretations and in allowing telic readings with non-quantity arguments. The proposal departs from standard syntactic theories which tie existential interpretation to LF position, and instead ties existential readings to the presence of a binding locale, overt or covert. On the syntactic approach to event structure pursued in the chapter, a quantity event includes *two* event variables which must be bound: an event variable associated with subjects and an event variable associated with direct objects. A locale can existentially bind both variables, indeed must when these are associated with bare nouns. A locale in a V-S configuration in Hebrew thus licenses weak subjects with unergatives and transitives, making an existential interpretation available. This type of interpretation also makes available a telic reading for achievement verbs with non-quantity arguments.

Nora Boneh and Edit Doron's (B&D) chapter analyses habituality as the output of a covert modal VP-adverb *Hab* which maps iterations of events to states. B&D argue that the modality involved in habituality is the same modality found in dispositionality, but not the same as the modality found in the progressive aspect; they thus argue for the dissociation of habituality from imperfectivity. Though it is true that languages, such as French and Italian, with a morphological perfective/imperfective contrast, typically apply the imperfective operator to the output of *Hab*, the chapter demonstrates that this is not necessarily the case, and that it is possible to find habits as the input to the perfective aspect. The chapter mainly discusses languages which do not morphologically encode perfective/ imperfective viewpoint aspect, though they might encode lexical aspect (Polish), or other aspectual contrasts, such as progressive and perfect (English). Hebrew does not morphologically mark perfective/ imperfective contrasts altogether. Yet these languages have more than one formal means to express habituality. Though the output of *Hab* does not show morphological contrasts of perfectivity, a different viewpoint aspect, the RETROSPECTIVE aspect, is periphrastically constructed by past-tense auxiliaries such as *zvykl* in Polish, *haya* in Hebrew, *used to* and *would* in English. B&D argue that the disjointness from speech-time which characterizes retrospective aspect can be derived as a scalar implicature.

1.4 A tribute to Professor Anita Mittwoch

The chapters in this volume are unified in another way: the connection of the authors to Professor Anita Mittwoch. The editors of this volume have had the privilege of being colleagues of Mittwoch's, most of the authors have interacted with her over the years, and all involved in the volume have been influenced by her work. Anita Mittwoch has been endowed with linguistic astuteness and a keen eye for identifying linguistic problems which have challenged the linguistics community over many years. She has never been drawn to the technicalities of any trendy linguistic theory; she uses theoretical devices sparingly, only as a tool to deepen our understanding of the linguistic phenomenon she analyses. Therefore, her work has stood the test of time: many of the chapters in this volume address issues and questions that were formulated by Mittwoch over the years.

Mittwoch's interest in lexical semantics, aspect, semantic composition, and their interaction with syntax dates from her unpublished 1971 SOAS dissertation entitled *Optional and Obligatory Verbal Complements in English*. That work is devoted to the formal treatment of the omission of complements of verbs. Anticipating much influential work in linguistics, Mittwoch appreciated both the significance of the lexical semantics of verbs in the determination of argument realization, and the complex interactions between the realization of arguments and temporal modifiers for the aspectual classification of events; these are insights that have come to be taken for granted in generative linguistics. In that work, she was the first to challenge the idea that the semantics of object omission involves nothing other than existential quantification of the object position. This work appeared in published form in her 1971 and 1982 articles, where she points out that *John ate* is aspectually different from *John ate something*. The former is an activity, and can only be modified by *for*-adverbials, whereas the latter is an accomplishment, and can be modified by *in*-adverbials. Twenty-five years later, this interaction between aspectual class and temporal modification is still in need of explanation. Landman and Rothstein re-examine this puzzle in the present volume, and propose that though there is indeed a missing object in *John ate*, it is not existentially quantified but rather has a kind interpretation, a solution actually already anticipated in Mittwoch (2005). The idea that homogeneity in the domain of objects and events is crucial for understanding the way in which the referential properties of DPs influence the aspectual properties of a sentence has been dominant since Tenny (1987); Krifka (1989); Verkuyl (1993), among others. However, Mittwoch (1998) contains the crucial observation that 'the widely accepted

assumption that count nouns always refer heterogeneously is untenable. Many mathematical concepts refer homogeneously' (p. 250). This observation presents a serious puzzle for the widely held belief that a count noun as an incremental theme in direct object position turns an activity into an accomplishment because it is non-homogeneous (Zucchi 2001 and Rothstein 2004 suggest solutions to this puzzle).

The appropriate characterization of aspectual classes and their interaction with temporal modifiers has continued to occupy Mittwoch, who in her 1988 article drew attention to the oddity of *Jane was walking five miles when I saw her.* There have been several attempts in the literature to solve this puzzle, for example Glasbey (1996); Naumann and Piñón (1997); de Swart (1998); Jayez (1999); Zucchi (1999); and Schmitt (2001). Mittwoch herself returns to it in the present volume. She relies on the well-known intuition that the progressive in English is felicitous if it applies to a process. She suggests that, though there is a process of walking, there is no process of walking five miles, since the time span of walking five miles is not variable and thus not measurable, whereas processes are by definition measurable.

The notion of an incremental theme, and the role it plays in both the compositional semantics and in argument realization was anticipated in Mittwoch's dissertation, where she pointed out that for a core class of verbs which allow object deletion 'when an object is present the temporal relationship between verb and object is such that at the beginning the process applies to only part of the object and not till the process is complete does it embrace the whole of the object' (p. 37). Mittwoch also pointed out in her dissertation the parallels between the telicity-determining properties of DP objects of incremental theme verbs, verbs of change of state, and the telicity-determining properties of goal phrases with verbs of motion, anticipating much of the most influential work done on lexical aspect (Hay, Kennedy, and Levin 1999; Krifka 1998; Ramchand 1997; Tenny 1994; Verkuyl 1989).

The influence of the omission of direct objects on the interpretation of sentences has continued to occupy Mittwoch, and in her more recent 2005 chapter, she notes that some habitual sentences with missing indefinite objects are most naturally interpreted as professions: *He builds*, *She writes.* Building on this observation, Boneh and Doron argue in the present volume that habitual sentences do not in general entail the actualization of their basic episodes.

Another observation due to Mittwoch, in her 1991 article, is the split between accomplishments and achievements regarding the effect of bare plural and mass arguments. Such arguments normally transform accomplishments into activities, but this is not the case with achievements. With the latter, the described event remains telic. This observation has generated

serious discussion in the literature (Piñón 1997; Rothstein 2004), and it has been suggested that the difference lies in the failure of arguments of achievements to be incremental themes. Borer reexamines this issue in the present volume, and correlates it to an additional peculiarity of achievements, which looks at first sight as a word-order phenomenon but is actually dependent on the semantics of verb-argument composition.

The emergence of event semantics has put the role of events and the relation of arguments to events in the centre of linguistic theorizing. Mittwoch (1998) capitalized on this theory and developed her widely accepted analysis of cognate objects as predicates of the event argument of verbs. In the present volume, Horrocks and Stavrou adopt this view of cognate objects, and further discuss their ability to change the aspectual class of verbs in some languages but not others.

The editors and authors are pleased to have produced this volume, which brings together research connected to Professor Mittwoch's work. We are deeply indebted to Anita for her friendship and inspiration over the years and hope this volume conveys some of the impact her work has had on our own work and that of others.

Part I
Lexical Representation

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2

Reflections on Manner/Result Complementarity

MALKA RAPPAPORT HOVAV AND BETH LEVIN

Non-stative verbs from various lexical fields are often classified as either manner or result verbs—a distinction implicated in language acquisition (Behrend 1990; Gentner 1978; Gropen *et al.* 1991), as well as in argument realization. Intuitively speaking, manner verbs specify as part of their meaning a manner of carrying out an action, while result verbs specify the coming about of a result state. Verbs of each type are listed in (1). As the lists illustrate, the manner/result distinction crosscuts the transitive/intransitive distinction.

(1) a. MANNER VERBS: nibble, rub, scribble, sweep, flutter, laugh, run, swim . . .
b. RESULT VERBS: clean, cover, empty, fill, freeze, kill, melt, open, arrive, die, enter, faint . . .

The distinction is grammatically relevant, as manner and result verbs differ in the patterns of argument realization they display (Fillmore 1970; Rappaport Hovav and Levin 1998; 2005, despite questions raised by Goldberg 2001 and Mittwoch 2005). For example, while manner verbs are found with unspecified and non-subcategorized objects in non-modal, non-habitual sentences, result verbs are not.

(2) a. Kim scrubbed all morning.
b. Kim scrubbed her fingers raw.

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(3) a. *The toddler broke.
b. *The toddler broke his hands bloody.

A further indication of the grammatical relevance of this distinction comes from an observation made in Levin and Rappaport Hovav (1991, 1995) that manner and result are often in complementary distribution: that is, a given verb tends to be classified as a manner verb or as a result verb, but not both. This generalization presupposes a distinction between what a verb LEXICALIZES—i.e. what it lexically encodes as part of its meaning—and what can be inferred from a particular use of that verb in context. For instance, though the verbs in (1a) lexicalize manners, some of them denote events that are often associated with prototypical results. So while *wipe* and *scrub* lexically specify manners involving surface contact and motion, these actions are typically used with the intention of removing stuff from a surface, and in particular contexts, this removal will be strongly implicated; however, since it can be explicitly denied, it is not lexically encoded—or lexicalized—in the verb.

(4) a. I just wiped/scrubbed the counter; it hasn't been so clean in days.
b. I wiped the table, but none of the fingerprints came off.
c. I scrubbed the tub for hours, but it didn't get any cleaner.

Likewise, the result verbs *clean* and *clear* encode states that often (but not always) result from actions normally carried out to remove stuff from a surface or container. In a particular context, a specific action will be strongly implicated, as in (5a), but again no particular action is lexically specified, as shown by the possibility of providing various continuations explicitly specifying the action involved, as in (5b).

(5) a. I cleaned the tub; as usual, I used a brush and scouring powder.
b. I cleaned the tub by wiping it with a sponge/by scrubbing it with steel wool/by pouring bleach on it/by saying a magic chant.

When a verb lexically specifies either manner or result, the other component can be expressed outside the verb, as in (6).

(6) a. Pat wiped the table clean.
b. Pat cleaned the tub by scrubbing it with steel wool.

Lexicalized components of meaning can be considered lexical entailments in the sense of Dowty (1991), often involving what Dowty (1989) calls individual thematic roles. The notions of manner and result are generalizations over particular kinds of individual thematic roles. If they are grammatically

relevant, they can be considered what Dowty (1989) calls L-thematic roles. In order to distinguish lexicalized meaning from inferences derived from particular uses of verbs in sentences, we take lexicalized meaning to be those components of meaning that are entailed in all uses of (a single sense of) a verb, regardless of context.[1]

This chapter focuses on the observed complementarity of manner and result and examines two issues which arise in this context. First, we ask whether the complementarity reflects an actual constraint on the meanings that can be lexicalized in verbs, and if so, what the nature of the constraint is. In section 2.2, we propose that manner/result complementarity does reflect a real constraint which arises from the way in which lexicalized meanings are related to event schemas. In section 2.5, we suggest that, properly understood, the constraint regulates how much meaning can be lexicalized in a verb. The second issue concerns the precise characterization of the lexicalized meaning components. Previously, these notions have only been identified intuitively; however, any attempt to understand the relation between the classification of verbs as manner and result and their grammatical behaviour must begin with an understanding of the semantic basis of the classification itself. As a prerequisite to validating the complementarity hypothesis, then, we devote sections 2.3 and 2.4 to a precise characterization of the notions of manner and result. With this preamble, we begin in the next section by elucidating the representations of verb meaning that we assume.

2.1 Roots and event schemas

Following much current work (e.g. Borer 2005; Goldberg 1995; Hale and Keyser 2002; Jackendoff 1990; Marantz 1997; Pesetsky 1995; Pinker 1989; Rappaport Hovav and Levin 1998), we adopt the distinction between an idiosyncratic component of verb meaning, often called the 'root', and a structural component representing an event type, which we refer to as an 'event schema'. There is a limited inventory of event schemas, representing the types of events available for linguistic encoding. Each root has an ontological categorization, chosen from a fixed set of types, including state, result state,

[1] We assume each verb we treat has a single sense, unless there is strong evidence for positing polysemy. As we discuss in work in progress (Rappaport Hovav and Levin 2007; see also section 2.7), a handful of result verbs shows the behaviour of manner verbs in restricted circumstances, and concomitantly no longer lexically entail a result; similarly a few manner verbs behave like result verbs in certain contexts, in this instance no longer lexically entailing a manner. We take such verbs to be polysemous since there is no element of meaning which is constant in all contexts; however, a wide range of data can be handled without assuming polysemy.

thing, stuff, surface/container, manner, instrument (cf. Jackendoff 1990; Rappaport Hovav and Levin 1998).[2] A root's ontological categorization determines its association with an event schema.

Rappaport Hovav and Levin (1998:109) formulate 'canonical realization rules' as in (7)–(11), to express the ways in which the ontological category of the root determines its integration into an event schema. Sample canonical realization rules are given below; the right-hand side of each rule provides a possible predicate decomposition instantiation of the event schema associated with a root whose ontological category is specified in the left-hand side of the rule.[3]

(7) manner → [x $ACT_{<MANNER>}$]
(e.g. *jog, run, creak, whistle, . . .*)

(8) instrument → [x $ACT_{<INSTRUMENT>}$]
(e.g. *brush, chisel, saw, shovel, . . .*)

(9) container → [x CAUSE [y BECOME AT <*CONTAINER*>]]
(e.g. *bag, box, cage, crate, garage, pocket, . . .*)

(10) internally caused state → [x <*STATE*>]
(e.g. *bloom, blossom, decay, flower, rot, rust, sprout, . . .*)

(11) externally caused, i.e. result, state →
[[x ACT] CAUSE [y BECOME <*RESULT-STATE*>]]
(e.g. *break, dry, harden, melt, open, . . .*)[4]

Roots are integrated into event schemas as arguments (e.g. (9)–(11)) or modifiers (e.g. (7)–(8)) of predicates in the event schemas. Roots are italicized and in angle brackets; they are notated via subscripts when functioning as

[2] We assume that a given root can only have a single ontological categorization despite the existence of a handful of apparently polysemous denominal verbs such as *string*. Such verbs take their names from artifacts with multiple functions. A string can be conceptualized either as stuff (e.g. *string a guitar*) or as a one-dimensional location (a surface in an extended sense; e.g. *string pearls*). Without committing ourselves to a complete analysis of such verbs, we suggest that the different functions of string and comparable artifacts would lead to distinct ontological categorizations, with only one being relevant in a given use of the verb. See Clark and Clark (1979) for discussion of the factors which give rise to denominal verbs such as *string*.

[3] For the purposes of investigating manner/result complementarity, the specific type of predicate decomposition representation does not matter. The representations could be recast along neo-Davidsonian lines, as in Rothstein (2004), or as minimalist syntactic structures, as in Borer (2005); Embick (2004); Ramchand (2008); and Zubizarreta and Oh (2007).

[4] Change of state verbs are typically differentiated via their associated state, as this canonical realization rule suggests; however, considerable recent work on the semantics of gradable adjectives and change of state verbs suggests that this picture needs refinement; see section 2.4.1. Decompositions such as (11) must then be modified accordingly, perhaps as in Kennedy and Levin (2008).

modifiers. We do not necessarily take these associations to be steps in a derivation; rather, they express regularities which need to be captured.

With this background, we ask how best to formulate the constraint against lexicalizing both manner and result. Grimshaw (2005:85), in answer to the question 'How complicated can a verb meaning be?', suggests that there are no constraints on what is lexicalized in a root:

> On the one hand, it seems that the answer is: as complicated as you want. For example, suppose there is a manufacturing process that involves pulverizing something, then mixing it with molten plastic, allowing it to harden and then encasing it in steel. Of course, we can label the entire process with one verb: to *smolt*, for example.

Grimshaw goes on, however, to propose that there are constraints on the complexity of verb meaning, suggesting that the unlimited complexity in meaning she refers to is confined to the root, with the event schema 'rigidly constrained'. She continues the quote above, 'however, looked at from a different perspective, such a verb [i.e. *smolt*] is semantically no more complex than any other: it is either a causative or an activity predicate' (2005:85).

Manner/result complementarity, however, involves the root. Therefore, we rephrase our question: Are there constraints on what can be lexicalized in a verb root? Our key claim is that there is a constraint on how roots can be associated with event schemas, which in turn constrains the meaning that a root can lexicalize.

2.2 The lexicalization constraint

There is a generalization implicit in the canonical realization rules in (7)–(11), which leads us to formulate a lexicalization constraint.

(12) The lexicalization constraint: A root can only be associated with one primitive predicate in an event schema, as either an argument or a modifier.[5]

This constraint is similar in spirit to the constraint with the same name in (13) proposed by Kiparsky (1997) in a study of denominal verbs, in that semantic roles are often taken to be labels for positions in an event schema (Jackendoff 1972).

[5] Ramchand (2008) argues that a single root may be attached to multiple positions in an event structure; therefore, if our formulation of this constraint is justified, some adjustment to her theory may be needed.

(13) The lexicalization constraint: A verb can inherently express at most one semantic role (theme, instrument, direction, manner, path). (Kiparsky 1997:30)

Assuming the event schemas of (7)–(11), and assuming that manner roots modify the predicate ACT and result roots are arguments of BECOME, a root can modify ACT or be an argument of BECOME in a given event schema. A root cannot modify both these predicates at once without violating the lexicalization constraint. Thus, there can be no root which expresses both manner and result, and manner/result complementarity follows.

The lexicalization constraint is precisely that: a constraint on material that is lexicalized—whether as a word, a stem, or an affix. In English, most words are morphologically simple as there is no developed notion of stem; thus, manner/result complementarity is manifested in words. In contrast, in languages in which verbs are productively formed from stems and affixes, manner/result complementarity holds of the pieces of words, rather than the words themselves. In such a language verbs can combine manner and result meanings, if each is expressed in a distinct part of a word. Precisely this is observed in so-called bipartite verb languages, such as Lakhota (Foley and Van Valin 1984:40–5, based on Boas and Deloria 1939) and Washo (Jacobsen 1980:91). In Lakhota many verb stems describe states which are permanent results of actions, such as *–blečha* 'be shattered (said of brittle material)' or *–blaza* 'be ripped open', while there is a set of prefixes which describe manner or means, such as *ya–* 'with the mouth', *na–* 'with the foot or leg', or *wa–* 'by a sawing motion, with a knife'. Prefixes and stems combine to form verbs, as in *yablečha* 'break or cut with the teeth' or *nablečha* 'break by kicking or stepping on'. However, for the lexicalization constraint to have real empirical content, the criteria which determine whether a root's type is manner or result must be made explicit.

2.3 Refining the notions of manner and result

We turn next to the question of what semantic, lexically encoded notion of result is relevant to manner/result complementarity. An obvious move is to equate the notion of result with telicity, a notion which has been intensively investigated and has received careful semantic explication (e.g. Filip 2000, 2005; Hay, Kennedy, and Levin 1999; Krifka 1992, 1998; Rothstein 2004; Verkuyl 1993). Telicity is often said to involve a result state (e.g. Dowty 1979, based on Kenny 1963; Pustejovsky 1991), and some result verbs are necessarily telic. There is reason, however, to believe that the two notions should not be equated.

First, the relevant notion of result should be lexically encoded, yet as much recent work makes clear, telicity is lexically encoded only for a very small part of the English verb inventory (Kratzer 2004; Filip 2005; Filip and Rothstein 2006; Rappaport Hovav 2008); more often, telicity is compositionally determined (Filip and Rothstein 2006; Hay, Kennedy, and Levin 1999, Kennedy and Levin 2008; Krifka 1998). More importantly, lexical telicity fails to appropriately distinguish manner and result verbs. Although the verbs that these studies reveal to be lexically telic are result verbs (e.g. *arrive, reach, die, crack, find*), many result verbs are not lexically telic. For example, degree achievements are result verbs (see section 2.4.1), yet show both telic and atelic uses, as shown in (14).

(14) a. The chemist cooled the solution for three minutes.
b. The chemist cooled the solution in three minutes; it was now at the desired temperature.

Many current analyses of degree achievements (Filip 2008; Kennedy and Levin 2008; Rappaport Hovav 2008) consider neither the telic nor the atelic use basic. Moreover, some instances of telicity cannot be analyzed in terms of a result state since verbs such as *read* and *peruse* have telic uses that do not involve an obvious result state (Levin and Rappaport Hovav 2005; Rappaport Hovav 2008).

In order to identify an alternative to telicity, we turn from the change of state domain, which has been our focus so far, to the motion domain, which shows a comparable complementarity of meaning components. Classifications of motion verbs in terms of the conflation—or lexicalization in our terms—of distinct semantic components (Talmy 1985, 2000) distinguish between verbs which conflate motion and path and verbs which conflate motion and manner. Inherently directed motion verbs such as *arrive, ascend*, and *enter* conflate motion and path. For example, *ascend* specifies a direction of motion (upward), but not the manner in which the motion is effected. In contrast, manner of motion verbs such as *amble, dance, jog, run*, and *swim* conflate motion and manner. For example, *amble* specifies a manner of motion (a slow, leisurely walk), but is neutral with respect to the direction of motion. Although Talmy does not state this explicitly, motion verbs appear to fall into either one class or the other, and this observation, therefore, suggests that there is a manner/direction complementarity akin to manner/result complementarity. In fact, Levin and Rappaport Hovav (1992) take directed motion verbs to be a type of result verb.

To better understand the notion of result, we examine what direction of motion has in common with result state. We identify a common semantic

property that justifies subsuming both result state and direction of motion under the notion of result and distinguishing them both from manner.

2.4 Manner and result as scalar and non-scalar changes

Manner and result verbs are dynamic, and all dynamic verbs involve change (Dowty 1979). There is a fundamental distinction, however, between two types of change which are lexicalized by verbs: scalar and non-scalar changes (McClure 1994; Rappaport Hovav 2008). We suggest that all result roots specify scalar changes, while all manner roots specify non-scalar changes. These two types of change are in complementary distribution: a root may only lexicalize one type. This restriction holds even though we will show that both kinds of change may themselves be internally complex.

2.4.1 *Scalar changes*

Verbs denoting events of scalar change lexically specify a scale, where a scale is a set of degrees—points or intervals indicating measurement values—on a particular dimension (e.g. height, temperature, cost), with an associated ordering relation (Kennedy 2001; Kennedy and McNally 2005). The dimension represents an attribute of an argument of the verb, with the degrees indicating the possible values of this attribute. A scalar change in an entity involves a change in value of this attribute in a particular direction along the scale, with the direction specified by the ordering relation.

Both change of state verbs and directed motion verbs specify such changes, and we discuss each in turn. We illustrate scalar change in the change of state domain with the verbs *warm* and *cool*. Both are associated with a scale of values on the dimension of temperature (i.e. degree Celsius or Fahrenheit), but the ordering of these values differs. For *warm*, the values are in increasing order: a warming event necessarily involves an entity showing an increase in value along the dimension of temperature. For *cool*, the scale has the reverse ordering relation, so a cooling event involves a decrease in value along the dimension of temperature. Many change of state verbs, including *warm* and *cool*, are related to gradable adjectives, which are themselves also lexically associated with a scale; they do not lexicalize a notion of change, but simply a value that either exceeds or falls short of a standard value on the scale—which of the two is determined by the ordering relation. Thus, the adjective *warm* specifies a temperature value above some standard, often room temperature, while the adjective *cool* specifies a temperature that is below this standard.

If directed motion verbs denote events of scalar change, we need to identify the ingredients of scales in the motion domain. We suggest that the relevant attribute whose values make up the scale is the location of a theme with respect to a 'ground'—a reference object. In the motion domain, the predicates which lexicalize such scalar attributes without a notion of change are prepositions like *above, below, far*, and *near*, which also locate a theme with respect to a ground (Jackendoff 1983; Talmy 1983; Vandeloise 1991). Thus, these prepositional predicates parallel those in the change of state domain, such as the adjectives *cool* and *warm*, which also lexicalize a scalar attribute without a notion of change. The points constituting the scale in the motion domain are a set of contiguous locations which together form a path. The scales of change of state and change of location are then parallel in the sense that being at a position on a path is comparable to having a particular value for a scalar attribute with change of state verbs, and movement along the path is comparable to a change in the value of an attribute.

In order for the lexicalized path to constitute a scale, its points must be ordered. English directed motion verbs fall into subtypes according to the way that the ordering relation is established. With one class of verbs, including *ascend, descend, fall*, and *rise*, direction of motion is fully lexicalized by the verb and is with or against an external natural force—generally, the pull of gravity. For example, with *descend* the points on the path are ordered in the direction of gravity, while with *ascend* they are ordered against it.[6] There are other verbs which do not fully lexicalize direction of motion; rather, it must be determined externally from some other constituent in the sentence or from the context. The direction of motion of the theme may be determined deictically with *come* and *go*—a class of verbs which apparently only has two members cross-linguistically. With these verbs, the points on the path are ordered according to whether they get closer to or further from the 'deictic centre', which is often determined by context. Alternatively, the direction is determined with respect to a reference object with verbs such as *advance, arrive, depart, enter, exit, leave, reach, recede*, and *return*. Depending on the meaning lexicalized by the individual verb, the points on the path are ordered according to whether they are closer to or further away from this object; compare *arrive* and *enter* to *leave* and *exit*. The motion domain, then,

[6] The discussion in Levinson (2008) of motion verbs in Yélî Dnye suggests that the ordering relation for motion verbs can be determined by other culturally-relevant external natural forces. In Yélî Dnye *ghîî* 'go down' is also used for motion down a watercourse or with the prevailing ocean winds, while *kee* 'go up' is also used for motion up a watercourse or against the prevailing ocean winds. That is, the two verbs *ghîî* and *kee* are apparently generalized, respectively, to mean motion with or against some force.

contrasts with the change of state domain, where the ordering of the points on the scale is always lexicalized by the verb.

On our account, verbs like *cross* and *traverse*, which are often included in lists of directed motion verbs, are not verbs of scalar change. Although they lexically specify motion along a path defined by a particular axis of the ground, the direction of motion along this path is not lexically specified and, hence, they do not impose an ordering on the points on the path. For instance, the verb *cross* is equally applicable whether a traversal of the English Channel is from England to France or from France to England.[7]

The idea that change of state verbs and directed motion verbs are alike in being scalar finds support in several parallels in their scale structure. Both types of verbs fall into two classes: those associated with two-point scales and those associated with multiple-point scales (Beavers 2008). Two-point scales only have two values as they are associated with attributes that basically encode having or not having a particular property. A change of state verb with an associated two-point scale is *crack* and a directed motion verb with such a scale is *arrive*. Verbs lexicalizing changes involving a two-point scale are true achievements; presumably, the transition from one value to the other is conceptualized as instantaneous (Beavers 2008). Multiple-point scales are associated with attributes which can have many values. Within the class of change of state verbs, verbs with multiple-point scales are called 'degree achievement' or 'gradual change' verbs, and, as mentioned, they are often derived from gradable adjectives. The comparable directed motion verbs describe gradual traversals of a path; they include *advance*, *descend*, *fall*, *recede*, and *rise*. Multiple-point scales fall into two types: those with bounds—closed scales—and those without bounds (unless overtly specified)—open scales. In the change of state domain, this property distinguishes verbs which lexicalize a closed scale, like *empty* and *flat*, from those which lexicalize an open scale, like *cool* and *lengthen* (Hay, Kennedy, and Levin 1999; Winter and Rotstein 2004). In the motion domain, this property distinguishes between verbs that lexicalize a bounded path, such as *come* and *return*, from those that lexicalize an unbounded path, such as *descend* and *rise*.[8]

[7] Nevertheless, *cross* and *traverse* are also not manner verbs. We hope to explore the consequences of this observation in the future, noting simply that it suggests a more refined verb classification is necessary. It is possible that various verb classes can be defined with respect to how much the properties of their members diverge from those characterizing a scalar change and, thus, a result verb. Unlike true directed motion verbs, *cross* and *traverse* only lexicalize a path, but not an ordering along this path, while true manner of motion verbs lexicalize neither; see section 2.4.2.

[8] There are further differences among these verbs which we leave aside. For example, *arrive* and *enter* both involve a two-point scale, but only with *arrive* is one of these points inside the boundary defined by the reference object.

The notion of scalar change as defined here is not equivalent to the notion of gradable change found in discussions of gradable modifiers. Verbs such as *arrive*, *reach*, and *crack*, which are associated with two-point scales, do not lexicalize gradable changes in this other sense (they do not take gradable modifiers). We argue, however, that there is reason to classify verbs lexicalizing two-point scales along with those lexicalizing multiple-point scales since both sets of verbs display the complementarity with manner. The notion of scalar change captures what they have in common.

Further support for subsuming change of state and directed motion under a single notion of scalar change comes from parallels in telicity patterns between change of state and directed motion verbs. Only verbs associated with a two-point scale are necessarily telic, whether in the change of state domain or the directed motion domain (Filip 2008; Rappaport Hovav 2008). Other verbs of scalar change are not necessarily telic, though they tend to be, especially if the scale has a bound (Hay, Kennedy, and Levin 1999; Kennedy and Levin 2008; Levin and Rappaport 1995).

We illustrate this point first with change of state verbs. The verbs in (15), which are necessarily telic, are associated with two-point scales, while those in (16), which show variable telicity, are associated with multiple-point scales.

(15) a. The dam cracked at 6:00 am/*for two months.
b. The pipe burst at 6:00 am/*for two months.

(16) a. We cooled the solution for three minutes.
b. We cooled the solution in three minutes; it was now at the desired temperature.

In the motion domain, the verbs that are comparable to the change of state verbs with a two-point scale are those verbs with a point-like reference object which lexicalize a two-point path, that is, verbs like *arrive, depart, enter*, and *exit*. As the temporal modifiers in (17) show, these verbs are necessarily telic. Specifically, these verbs only allow the 'after X time' reading of an *in* phrase typical of achievements, rather than the 'take X time' reading found with accomplishments; these distinct readings arise because the former, being associated with two-point scales, are punctual, and the latter, being associated with multiple-point scales, are durative.

(17) We will arrive/enter/exit in/*for two minutes.

These verbs contrast with other directed motion verbs, which can show either telic or atelic uses (Levin and Rappaport Hovav 1995:173). Thus, *descend* and

fall show the 'take X time' reading of an *in* phrase, reflecting a telic use, but they may also be modified by a *for* phrase, reflecting an atelic use.

(18) The plane descended in/for 20 minutes.

In addition, *descend* and *fall* can be found with either bounded or unbounded path PPs (Zwarts 2005), while verbs like *enter* cannot take unbounded path PPs.

(19) a. I descended towards a sandy area in the middle of the reef. (http://www.thelivingsea.com/Adventures/wilddolphins3.php)
b. A shooting star fell towards the city's crown of lights. (BNC:FS8)
c. *We will enter/arrive towards the house.

Those directed motion verbs that lexicalize a deictically determined direction are also not necessarily telic, as shown in (20), though they tend to be used telically.

(20) One of them came towards us and spotted that we were machine gunners. (http://www.aftermathww1.com/interviews1.asp)

Summarizing, we have argued that directed motion and change of state both fall under a semantic notion of scalar change. This unified analysis receives two types of support. First, verbs lexicalizing either directed motion or change of state never lexicalize manner, conforming to manner/result complementarity; second, both types of verbs show similar patterns of telicity.

2.4.2 *Non-scalar changes*

An important characteristic of a scalar change is its simplicity: it is a directed change in the values of a single attribute (Tenny 1994). A non-scalar change is any change that cannot be characterized in terms of an ordered set of values of a single attribute. There are a few verbs of non-scalar change such as *cross* and *traverse*, mentioned in section 2.4.1, which like verbs of scalar change involve a change in a single attribute, but unlike them fail to specify a particular direction of change in the values of this attribute. The vast majority of non-scalar changes deviate from scalar changes in another, more significant respect: they involve complex changes—that is, a combination of multiple changes—and this complexity means that there is no single, privileged scale of change.

What we have called manner verbs are verbs that lexicalize non-scalar changes which are complex in this sense; that is, manner verbs do not

lexicalize a scalar change. For example, the verb *jog* involves a specific pattern of movements of the legs, one that is different, for example, from the pattern associated with *walk*. Furthermore, even though there is a sequence of changes specified by *jog*, collectively these changes do not represent a change in the values of a single attribute, nor is any one element in the sequence of changes privileged as being the necessary starting point of motion; that is, one can start jogging by moving one's left leg first or one's right leg first (cf. Dowty (1979:171) on the verb *waltz*). Furthermore, verbs of non-scalar change need not always be so specific about the precise changes they involve. The verb *exercise*, for example, requires an unspecified set of movements, whose only defining characteristic is that they involve some sort of activity, typically physical, but on occasion mental.

This way of characterizing the difference between scalar and non-scalar change and the verbs lexicalizing these two types of change may provide some insight into why manners are so often associated with animates and results with inanimates. Human activities—the type of actions denoted by manner verbs—usually involve many cooccurring changes; these activities, then, do not qualify as scalar changes. Nevertheless, these activities are often carried out by an animate entity with the intention of producing a simple, i.e. scalar change, in a second, typically inanimate entity. Such a change is characteristic of result verbs. Thus, changes that are typically predicated of animates are non-scalar in nature, while those predicated of inanimates are very often scalar. Nevertheless, non-scalar changes may be predicated of inanimates, as with the verbs *flap, flutter,* and *rumble*, and scalar changes may be predicated of animates. Such scalar changes often involve the body, as in *Kim reddened* or *Tracy fainted*; they do not refer to intentional activities, which by their very nature are complex and, thus, non-scalar changes.

In summary, we have identified result verbs as verbs which lexicalize scalar change and manner verbs as verbs which lexicalize non-scalar change (and, specifically, complex change). What we described as a complementarity in the lexicalization of manner and result, then, is more accurately characterized as a complementarity in the lexicalization of scalar and non-scalar change.

2.5 A motivation for the lexicalization constraint

We now ask what motivates manner/result complementarity? We suggest that manner and result are meaning components that contribute to the complexity of a verb's meaning, and the lexicalization constraint which gives rise to manner/result complementarity reflects a constraint on the overall complexity of a verb's meaning.

As noted in section 2.2, by disallowing roots associated with multiple positions in event schemas, the lexicalization constraint only allows simple canonical realization rules such as in (7)–(11): that is, one-to-one associations of roots and positions in event schemas, each determined by a particular ontological categorization. If a root had more than one ontological category, then it would fall under more than one canonical realization rule, resulting in a violation of the lexicalization constraint. Thus, the lexicalization constraint has an important consequence: it ensures that a root has a single ontological category. Thereby, it indirectly constrains what can be a possible root, while keeping a root's meaning 'simple' in some sense.

Thus, our understanding of complexity of meaning ties it to a root's ontological category: a root has only one ontological category even if the meaning components that determine its categorization are themselves very complex. As the existence of verbs like *exercise* attests, a root can involve many meaning components, yet still be associated with a single ontological category. In some sense, the actual 'content' of the root does not matter.

Ontological categorization is only one possible measure of the complexity of verb meaning. Another possibility involves the number of lexical entailments and yet another the extent of real world knowledge associated with a verb. However, as we now show, these forms of potential 'complexity' do not seem to be the issue.

Consider first measuring complexity in terms of the number of lexical entailments associated with a verb. The manner verb *tango*, which refers to the performance of a specific dance, must be associated with more detail—and, hence, more lexical entailments—than the verb *dance* itself. But from the perspective of the lexicalization constraint, *tango* is no more complex than *dance*: both are manner verbs. There seems to be no constraint on how detailed the content of the manner component can be.

An alternative way to measure complexity is in terms of the real world preconditions associated with the event denoted by a verb, which Goldberg (1998, this volume) refers to as 'presuppositions'. These can be extremely complex; for example, a felicitous use of the verb *appeal* requires 'the existence of a previous complex event involving a trial which resulted in a guilty verdict, and asserts a subsequent act of filing legal papers for the purpose of a retrial' (Goldberg 1998:43; also this volume). Yet it appears that such preconditions do not contribute to complexity from the perspective of the lexicalization constraint. We are unaware of any constraint on how complex the set of preconditions can be.

2.6 The lexicalization constraint in a larger context

As noted at the outset, in English manner/result complementarity is a lexicalization constraint. Both notions can be expressed in a VP, as shown in (21), with examples from both the change of state and change of location domains.

(21) a. Marie sponged the table clean.
b. An old woman hobbled in from the back.

However, as Levin and Rappaport Hovav (2006) point out, some languages contrast with English in enforcing manner/result complementarity with respect to a verb and its complements. Thus, Romance languages do not allow telic path phrases with manner of motion verbs (Aske 1989; Green 1973; Talmy 1975, 1985, 1991, 2000), nor do they allow a result phrase with other types of manner verbs; Greek is the same (Giannakidou and Merchant 1998; Horrocks and Stavrou 2003). The intended content of such sentences must be expressed periphrastically, as the following translations into French of the examples in (21) illustrate.

(22) a. Marie a nettoyé la table avec une éponge.
Marie has cleaned the table with a sponge
'Marie cleaned the table with a sponge.'
b. Une vieille femme arriva en boitant de l'arrière-boutique.
an old woman arrived in limping from the back-store
(Vinay and Darbelnet 1958:105)

Here, too, there is a constraint that is shared by verbs in both the change of state domain and in the motion domain, suggesting that it may be related to manner/result complementarity. In Levin and Rappaport Hovav (2006), we speculate that perhaps there is a constraint on how complex a meaning can be encoded in a linguistic unit, with languages differing as to what the unit is.

Interestingly, another constraint that has been noted at the VP-level in English also appears to have a counterpart at the lexical level. This constraint involves the temporal structure of a clause: the event described in a clause can only have one measure—i.e. one scale in the context of our discussion—(Goldberg 1991:368; Tenny 1987:183–4, 1994:68; Filip 1999; Levin and Rappaport Hovav 1995). A variety of data has been adduced in support of this constraint. We exemplify it by showing that a secondary predicate cannot be combined with a verb to create a change that is instantiated in terms of both motion and state. Consider (23), which involves a directed motion verb and an XP denoting a state.

(23) The bag came open.

(23) cannot mean that the bag arrived and as a result of arriving became open—a reading that involves two changes—one a change of state and one a change of location. This sentence has two readings. On one, *open* is understood as a result state and *come* has been bleached of any directional sense; on the other, the verb retains its directional sense and *open* must be understood as a depictive predicate.

A similar constraint appears to hold at the lexical level. We are not aware of any verbs that can be analyzed as simultaneously describing a change of state and a change of direction. The question is whether this constraint follows from a constraint on the temporal structure of an event or whether it can be reduced instead to our lexicalization constraint? Previous work addressing the VP-level constraint has assumed that an event by its very nature can only have one measure, and there is no reason to think that the same should not hold of the lexical level. Nevertheless, it is possible that the lexicalization constraint provides an alternative explanation for why an event cannot have more than one measure lexically. As noted in section 2.4.1, a given scale must be defined over some dimension; thus, it must involve either a change of state or a change of location. Assuming that these are two subtypes of result, then they would count as distinct ontological categories; thus, a root could not simultaneously lexicalize both types of change. The result is the observed lexical constraint.

2.7 Concluding remarks

We have presented evidence in support of positing manner/result complementarity and tried to explicate why such complementarity might arise. However, there are a handful of verbs which appear to lexicalize both manner and result. We mention several examples from the literature, sketching why we believe these dual characterizations are in error.

The verb *cut* has been said to lexicalize a manner component which specifies motion and contact (Guerssel *et al.* 1985). Two facets of *cut*'s behaviour have been attributed to the manner component: it is found in the conative construction, and it cannot participate in the causative alternation, as shown in (24). Nevertheless, *cut* does appear to lexicalize a result, as (25) is a contradiction.

(24) a. she got the blade pulled out and started cutting at the tape on Alex . . .
(www.authorhouse.com/BookStore/ItemDetail?bookid=28127.aspx)
b. *The bread cut.

(25) Dana cut the rope/paper/cake, but it stayed in one piece.

Turning to the motion domain, as Fillmore (1982:32–3), Jackendoff (1985), and Kiparsky (1997:490) note, the verb *climb* apparently expresses both manner and direction in uses such as *Kelly climbed the tree* (clambering manner, upwards direction), contra manner/result complementarity.

We show that these two verbs are not actual counterexamples to manner/result complementarity in work in progress. Here we sketch the form our solution takes. We suggest that verbs that appear to lexicalize both manner and result actually only lexicalize one in any given use. Close scrutiny of the behaviour of *cut* and *climb* reveals that there is no single, constant element of meaning which appears in every use of these verbs. Rather, problematic verbs are polysemous and have independent manner and result senses. In particular, when a manner has a conventionally associated result, the result may get lexicalized in some uses of the verb, but only if the manner component drops out. Thus, with *climb* in precisely those uses in which the upward motion is lexicalized, such as *The plane climbed to 9000 feet*, the clambering manner is absent, as shown by the wider range of permitted subjects.[9]

In contrast, we propose that *cut* is basically a result verb; it does not lexicalize a specific manner as the following quote from Bohnemeyer (2007:159) shows: 'Cut verbs, too, are rather flexible about the action performed and the instrument used (I can *cut* an orange using anything from a knife or axe to a metal string or laser beam, and I can do it by bringing the blade to bear on the fruit or by dropping the fruit onto the blade from sufficient height).' However, when a result verb has a conventionally associated activity, as *cut* does, the associated activity may get lexicalized in some uses of the verb, but only if the result drops out. For this reason, the conative use of *cut* as in (24a), which requires a lexicalized manner, does not entail the result.

A further potential counterexample to manner/result complementarity is posed by verbs such as *brush*, *chop*, *comb*, *grind*, and *mow*, which specify the activity of the agent, while entailing a change in the entity denoted by the direct object. For example, *mow* requires that the agent use a particular

[9] The verbs *dive*, *plunge*, and *soar* also show the same type of polysemy as *climb*. Interestingly, these verbs appear to maintain a 'manner' residue in their directed motion uses; that is, examples such as *The prices soared/dove/plunged* suggest a quick rate of change in what is clearly not a true manner use of these verbs, given the inanimate subject. What matters, though, is that in the directed motion use, the perceived manner elaborates on a clearly scalar change; there is no sense of a complex change as in the true manner uses of these verbs. We believe that the rate of change is not lexicalized, but rather inferred because these verbs specify large changes along a scale in very short, almost instantaneous, periods of time.

instrument (a manner), but it also entails a change in the patient as a result of the use of the instrument (a result). These verbs, then, specify changes in the entities denoted by both the subject and the object, but we argue that these changes are not scalar so that these verbs do not counterexemplify manner/result complementarity. They describe complex interactions between the entities denoted by their two arguments, so that the change in the object can be characterized only by concomitant reference to the subject's activity. For example, while both grinding and chopping meat may lead to the same result, they are different activities. For evidence that languages do not treat these verbs like verbs of scalar change, see Rappaport Hovav and Levin (2007).

Manner/result complementarity, then, provides a productive framework for explorations of what the meanings of verbs like *climb, cut*, and *mow* actually are. Thus, as this brief discussion of potential counterexamples reaffirms, manner/result complementarity is a significant observation about the lexicon with consequences for continued investigations of both individual verbs and classes of verbs.

3

Verbs, Constructions, and Semantic Frames

ADELE E. GOLDBERG

In what ways can events combine to form a single predication? In the simple case, the question becomes, what combinations of subevents can a single verb refer to? This chapter argues that the only constraint on the combination of events designated by a single verb is that the events must constitute a coherent *semantic frame*. A verb can designate subevents that are not causally related, and a verb can specify both manner and result, but it must constitute an established semantic frame.

When a verb meaning is combined with a meaningful argument structure construction, the resulting combination also forms a single predication. This chapter emphasizes an important difference between the two cases, however: the *combination* of verb and construction can designate a one-time predication that does not correspond to an established frame. We address the slippery issue of what can count as semantic frame in the sense of Fillmore (1975, 1977a, b, 1982a,b, 1985) or Lakoff (1987) in section 3.1.3.

3.1 Semantic frames: profile and background frame

As Fillmore (1977a) wrote, 'Meanings are relativized to frames.' He defined a *frame* to be an abstraction (an 'idealization') of a 'coherent individuatable perception, memory, experience, action or object' (Fillmore 1977b). To count as 'coherent' and 'individuatable', the situation or experience must be

I would like to thank Jean-Pierre Koenig for discussion on this topic, and Sarah Berson, Malka Rappaport Hovav, Ray Jackendoff, and Beth Levin for very helpful comments on an earlier draft. Some of the issues addressed here are discussed in compact form in Goldberg (1995:61–5). An earlier analysis has also appeared as Goldberg (1998). The analysis here supersedes those analyses.

construable as a unit. Frames are relevantly the same as Lakoff's (1987) *idealized cognitive models* (ICMs). See Petruck (1996) for an excellent overview of frame semantics.

As discussed below in section 3.2, each word sense evokes an established semantic frame. Within the frame, it is useful to distinguish a word sense's *profile* (Langacker 1987:118) from the rest of the frame, and we can refer to the non-profiled aspect of a frame as the *background frame* (or *base* in Langacker's 1987 or Croft's 1991 terminology). A word's profile is what the word designates or asserts (if we may use 'assert' to describe non-propositional meaning); its background frame is what is taken for granted or presupposed. Examples help clarify the point. *Diameter*'s profile is the line that is designated by *diameter*; *diameter* also requires reference to a background frame that consists of a circle. The meaning of *diameter* thus refers to the frame consisting of a line through the center of a circle, where the line itself is singled out as the profile of the word (Langacker 1987:185). The background frame, particularly in the case of verbs, may involve complex events that are spread out over time; for example, the verb *divorce* presupposes a previous marriage event as part of its background frame, while it profiles or asserts a legal dissolution of the marriage.

(1) a. A word sense's **semantic frame** (what the word 'means' or 'evokes') = **profile** + **background frame**
b. A word sense's **profile**: what the word designates, asserts
c. A word sense's **background frame**: what the word takes for granted, presupposes

A test for whether an aspect of meaning is profiled or part of the background frame is the traditional test for assertion vs. presupposition. Only background frames (or presuppositions) are constant under (non-metalinguistic) negation. For example, the following negated sentences leave the background frames intact:

(2) They didn't divorce. (They are still married.)

(3) That's not the diameter. (It is the circumference.)

The test indicates that being married is part of the background frame of *divorce*, and a circle is part of the background frame of *diameter*. A background frame (or presupposition) can only be negated using metalinguistic negation, signaled by heavy lexical stress on the word that evokes that frame:

(4) They didn't DIVORCE, they weren't even married.

(5) That's not the DIAMETER, it's not even a circle!

3.2 Verbs

In the case of verbs, we can say that an (underived) verb sense corresponds to a semantic frame of predication where such a frame can be defined as follows: **A semantic frame of predication**: a generalized, possibly complex state or event that constitutes a cultural unit.[1] Certain aspects of the semantic frame are profiled; the rest constitutes the background frame.

Consider verbs that profile that a human is somehow taken away from a situation or place. That might seem to be a very specific scenario, unlikely to warrant more than one or two dedicated lexical items, but there are actually an abundance of English verbs for variations of this scenario. Consider the surely incomplete list shown in Table 3.1.

Several of these words imply that the removed person has somehow transgressed; they differ from one another in various ways, for example, in terms of which organization or place the person is removed from. To *banish* is to remove a person from society; to *expel* (in one sense of the word) is to remove from a school; to *deport* is to remove from a country; to *fire* is to remove a person from their job.

Lay off differs from *fire* in that there's no impugnation of the person who has to leave their job. A person who is *blacklisted* is barred from some type of work, often unfairly and for political reasons. People can be *ousted* only if they are political figures.

One way to view the relationships among this set of verbs is that all of them share the same basic profile (removing a person from a location), but each differs in the particulars of the rich background frames involved. As Fillmore (1977) and Langacker (1987) have discussed, reference to frames (again, *bases* for Langacker/Croft) can be used to illuminate meaning relationships

TABLE 3.1 Partial list of verbs that designate the removal of a person from a situation or place

banish	*expel*
blackball	*exile*
blacklist	*extradite*
cast out	*evacuate*
deport	*expatriate*
dismiss	*lay off*
fire	*oust*

[1] For discussion and clarification of the notion of a 'cultural unit' see e.g. Enfield (2002).

between words in this way. Fillmore has cited the examples of *land* vs. *ground* that also seem to share the same profile (area of solid earth) but differ in their background frames since the background frame of *land* involves sea and the background frame of *ground* involves air. *Athlete* vs. *jock*, *lazy* vs. *laid back*, *washroom* vs. *restroom*, and *father* vs. *dad*, are arguably other examples of words that share the same profile but differ in their background frames.

Conversely, other word senses share the same background frame but differ in what they profile. For example, *lease* and *renter* profile different aspects of the same semantic frame, as do *teacher* and *student*, *soccer ball*, and *soccer net* (cf. also Fillmore 1977, 1985).

3.3 Previously proposed constraints on a verb meaning

Are there constraints on what can serve as a semantic frame for a verb sense? Or is the internal complexity of a verb's meaning only constrained by whether the combination of subevents is viewed as a cultural unit? In sections 3.3.1 and 3.3.2 we consider previously proposed constraints, and conclude in section 3.3.3 that only a Conventional Frame constraint seems to be operative.

3.3.1 *Exclusively causally related subevents?*

One proposal for a constraint on the possible semantics of verbs comes from Croft (1991; cf. also 2005). He suggests that 'a possible verb must have a continuous segment of the causal chain in the event ICM [idealized cognitive model, aka *frame*] as its profile and as its base' (1991:20). That is, verbs are claimed to designate only simple events, or complex events in which the subevents are causally related, regardless of whether those events are part of the profile or background frame (base).

Distinct subevents

It is not always easy to decide what should count as distinct subevents in a single lexical item's designation. Should we construe *sauté* as involving a heat-with-a-small-amount-of-fat subevent and separate stirring subevent? We cannot use the fact that the situation can be described by a single word without begging the question we are aiming to address: can a single verb designate two causally unrelated subevents?

For present purposes, I adopt a conservative criterion for distinguishing subevents. A predicate involves two distinct subevents if and only if there are two independently describable aspects of what is designated by the predicate that do not entirely overlap temporally:

(6) Two events e1 and e2 are distinct subevents of an event E designated by a verb V, iff E → e1 & e2, and e1 is not completely within the temporal extent of e2.

According to this definition, heating and stirring do not constitute distinct subevents of *sauté* since they overlap temporally: the stirring is completely within the temporal duration of the heating (the stirring may continue beyond the heating, but it is no longer sautéing once the pan is removed from the heat).

Causal relationship

Another question arises as to what should count as a causal relationship. Does having a predisposition to get cancer cause one to get cancer? It is not clear that we should expect any categorical definition for 'causation' since such definitions are rarely available in any domain (Rosch 1975; Lakoff 1987; cf. also Croft 1991; Espenson 1991 for relevant discussion in the domain of causation in particular). The general issue of causation has been debated for centuries, and we are not likely to get to the bottom of it here. At the same time, it is possible to make some progress on the questions we set out to address by focusing on fairly clear cut cases.

In what follows, I will consider any event that is construed to be sufficient to lead to a new state or event to be a cause.

(7) E1 causes e2 if and only if e1 is sufficient to lead to e2.

According to this definition, being predisposed to get cancer does not strictly speaking cause cancer because, while it may turn out to be a necessary condition, it is by hypothesis not a sufficient condition.

Causally related and profiled subevents

Predicates that designate both an activity and the endstate of that activity—*accomplishments*—satisfy the criteria of involving two subevents that are causally related (Dowty 1979; Vendler 1967). The activity and the resulting state count as two distinct subevents because the resulting state does not completely overlap temporally with the activity. The two subevents are causally related because the activity is sufficient to bring about the change of state. Examples include *smash* 'to direct force on a rigid object with the result that the object breaks into many pieces' and *fill* 'to infuse until full'. This analysis of accomplishments is in accord with longstanding and widespread assumptions about this type of predicate (see e.g. Gruber 1965; McCawley 1968; Dowty 1979; Pustejovsky 1991; Grimshaw and Vikner 1993; Rappaport Hovav and Levin 1998).

Accomplishments are not necessarily telic: they generally allow atelic aspectual uses (e.g. 8a), and even perfective uses do not necessarily result in an end-of-scale endstate (8b) (Filip, 2004, 2008; Goldberg and Jackendoff, 2004; Jackendoff, 1996; Levin, 2000; Levin and Rappaport Hovav, 2005; Rappaport Hovav, 2006; cf. Rappaport Hovav and Levin, this volume, for discussion and analysis of accomplishments in terms of scalarity):[2]

(8) a. The cousins were filling the tub with sand for hours. (atelic use of *fill*; the tub may not be full)
b. Dave cooled the pop-tart so that Odessa could eat it. (the pop-tart may not be cool, just cooler than it was).

We may leave the issue of how accomplishment predicates are best defined aside for present purposes. Clear cases in which verbal meanings involve non-causally related subevents are discussed below.

Verbs that have non-causally related subevents

Croft's (1991) proposed constraint cannot be correct as it stands, since there exist many verbs whose profiled event is not causally related to an event that is part of its background frame. Consider the verb *return* or the verb *appeal* as in (9a,b):

(9) a. Obama and Clinton *returned* from the campaign trail to vote. www.opencongress.org/bill/110-h2381/
b. He *appealed* the verdict. mercury.websitewelcome.com/[3]

To *return* from a place presupposes that the place was travelled to previously, that it was not a point of origin. The subsequent return is not caused by the previous move; the two are not causally related. *Appeal* in (9) presupposes a complex background frame involving a trial which resulted in a verdict of culpability, and profiles a subsequent act of filing legal papers for the purpose of a retrial; the two subevents are not causally related: one does not cause the other, nor vice versa. At the same time, we have as part of our world knowledge the understanding that entities often move away and then back

[2] Further complicating our understanding of accomplishments, in Chinese and Thai the resultant state is often only an implication for many of utterances that would translate as involving entailed endstates in English (Singh 1991; Smith 1997; Talmy 2000; Koenig and Muansuwan 2002).

[3] In what follows, I attempt to use attested examples from the web where possible. At the same time, in order to avoid including irrelevant, lengthy and potentially distracting reading material, I have opted to shave the example sentences down, omitting continuations of various sorts. I have also taken the liberty of inserting periods and correcting spelling where appropriate. I also do include constructed examples when minimally different examples are important to the exposition, or of course, when the sentence in question is ungrammatical.

again, legal decisions that result in verdicts of culpability may be retried; *return* and *appeal* give names to these complex frames of experience, profiling the movement back and filing of legal papers, respectively. Another example is *double-cross* as in (10):

(10) 'Ruthless casino owner Willy Bank . . . *double-crossed* Danny Ocean's friend and mentor Rueben.' videoeta.com/movie/81764

Double-cross profiles an event of betrayal following a state or event of understood cooperation. The betrayal is not caused by the state of trust, nor does the betrayal cause the state of trust. Instead the state of trust is part of the background frame that is presupposed in order for the profiled or asserted act to count as double-crossing.

The verbs *appeal* and *double-cross* (also *divorce*) profile one subevent while their background frames presuppose one or more other subevents, without a causal relation between them. Are there verbs that *profile* two subevents that are not causally related?

Verbs that have non-causally related and profiled subevents

Verbs that profile two or more non-causally related subevents are somewhat harder to find, yet candidates exist. For example, the cooking term, *blanch*, refers to immersing food, such as tomatoes, briefly in boiling water, then in cold water (in order to remove skin or heighten colour). Meat that is *braised* is first browned by being seared with a small amount of fat, and then cooked in moist heat. Two non-causally related subevents are profiled by each of these verbs, insofar as either or both subevents may be negated by (non-metalinguistic) negation:

(11) a. He didn't blanch the tomatoes, he only dipped them in boiling/cold water.
b. He didn't blanch the tomatoes, he peeled them with a knife.

(12) a. She didn't braise the meat, she only steamed it/browned it.
b. She didn't braise the meat, she roasted it.

These cases indicate that subevents involved in a lexical item's profile itself can be non-causally related.

Croft (1991) had offered the example of 'spinning and getting hot' as an impossible meaning for a verb since the two subevents are not causally related. But such a meaning is only impossible if there is no semantic frame that relates these two events. If we can imagine some kind of superstitious ritual in which a ball is spun rapidly on a turntable in an oven until the ball bursts (the time until

bursting taken to indicate, for example, the length of a pregnancy), then it is not hard to imagine giving a name to his process, e.g. *The guru* hotspun *the ball*. In fact there is a verb used in pottery-making, *jiggering*, which refers to bringing a shaped tool into contact with clay while the clay is spinning on a pottery wheel.

To summarize, many verbs designate causally linked subevents (*smash*, *fill*, etc.). Other verbs, however, do not involve a causal sequence of subevents. Some of these cases involve a sequence of subevents in which one or more subevent constitutes part of the background frame for another profiled subevent (e.g. *return*, *appeal*, *double-cross*). The cooking terms *blanch* and *braise* profile two non-causally related subevents.

3.3.2 *Exclusively manner or result/change of location?*

Levin and Rappaport Hovav (2006; Rappaport Hovav and Levin, this volume) suggest a different systematic sort of lexical gap: namely that the specification of both manner, and result or change of location by a single verb is disallowed. Examples of manner and result verbs (culled from Rappaport Hovav and Levin, this volume) are provided below:

Manner verbs (designating a non-scalar change): *amble*, *dance*, *flap*, *flutter*, *laugh*, *nibble*, *rub*, *rumble scribble*, *sweep*, *run*, *swim*, *scrub*, *tango*, *wipe*

Result verbs (designating a scalar change): *advance*, *ascend*, *arrive*, *break*, *clean*, *clear*, *cover*, *crack*, *depart*, *die*, *enter*, *empty*, *exit*, *faint*, *fill*, *freeze*, *kill*, *melt*, *open*, *leave*, *reach*, *recede*, *return*

Rappaport Hovav and Levin (this volume) clarify that result verbs need not be telic; instead, the critical factor is that the predicate be scalar. There must be a single dimension with an ordered series of values in order for a predicate to be considered scalar. Scalarity underlies both change of state verbs and directed motion verbs in a straightforward way. Verbs that lexicalize scales with two points are also considered scalar; this allows achievement verbs (e.g. *crack*, *arrive*) to be assimilated to other result and change of location verbs. Activity predicates are designated as *manner* predicates, and are defined as dynamic verbs that designate non-scalar change (lacking an ordering relation).

In principle a single verb could designate both a scalar change and a different non-scalar relation. Rappaport Hovav and Levin argue that this does not happen.

Their suggested tests for manner and result are grammatical. Only manner predicates are said to allow unspecified and nonsubcategorized direct objects in non-modal, non-habitual sentences (13a,b). Result verbs are said to

obligatorily require their patient arguments (14a,b). Examples (13) and (14) are Rappaport Hovav and Levin's (this volume) examples 2 and 3:

(13) a. Kim scrubbed all morning. (manner)
b. Kim scrubbed her fingers raw.

(14) a. *The toddler broke. (result)
b. *The toddler broke his hands bloody.

As discussed in Goldberg (2005), although result-oriented verbs tend to require their patient arguments except in restricted contexts, while manner-oriented verbs need not, the correlation is not exceptionless.[4] For example, *kill* and *murder* are generally regarded as result verbs and yet they can appear with an unspecified (15a) or non-subcategorized (15b) object in the right contexts, which need not necessarily be modal or habitual. Also, non-scalar activity ('manner') predicates sometimes require their subcategorized objects (16a, b) (see Goldberg 2005, for motivation for the tendency and for the exceptional cases).

(15) a. The tiger killed again. (result)
b. The young man murdered his way into the gang by killing the group's nemesis.

(16) a. *She touched. (manner)
b. *She touched her hands bloody.

Note that if the tests themselves are used to determine which verbs are result verbs and which are manner verbs, then the claim that a verb cannot be both manner and result would be rendered a tautology: a verb either can or cannot be used without a subcategorized object. Therefore in the following, we rely on an analysis of the semantics of the verbs involved to determine whether any verbs can encode both manner (a non-scalar activity) and result (a directed change).

[4] The correlation also must be relativized to English, since many languages allow any argument to be unexpressed as long as it represents given and non-contrastive information. For instance, all three arguments can be omitted in Chinese in the following conversation despite the fact that *give* is generally considered a result (or change of state) verb:

i. gei3
give
'[I] give [you] [some peach]' (Chinese; Mok and Bryant, 2006)

The present discussion, however, concentrates on the extent to which the proposed constraint holds in English.

It seems to be generally true that verbs of motion tend to divide between those that designate manner and those that designate a change of location (cf. also Talmy 1985). One can *walk*, *run*, *jog* in place and one can *ascend*, *descend* without specifying any particular manner. This may typically be true because the manner of motion and the direction of motion are generally very independent: one can walk uphill, downhill, sideways and in place.

However, the generalization is not exceptionless. *Scale* as in *She scaled the mountain* implies moving upward in a particular (full-bodied) manner. The ski term, to *schuss* means to ski straight downhill (directed change of location) intentionally and very fast (manner).[5]

Climb would also seem to violate a constraint against manner and direction co-occurring, since in its prototypical sense, it entails both directed motion (upward) and manner (clambering). RH&L note that *climb* can be used without directed motion (as a manner verb, 17a) or without manner (as a directed motion verb, 17b), and this is true. Still, its third and prototypical sense requires both these entailments (17c) (Fillmore 1982b; Jackendoff 1985). Example (17c) would be false if Kelly were simply hoisted up the tree via a rope without moving in a clambering manner or if she were to descend the tree.

(17) a. The child climbed down the stairs.
b. The plane climbed 1000 feet.
c. Kelly climbed the tree. (RH&L, this volume, example 28)

RH&L (this volume) argue that the upward direction entailed by examples like (17c) is due to the choice of direct object argument. But upward motion is entailed by all transitive uses of *climb* (Jackendoff 1985). In (18a), adapted from RH&L 2007, the fence must be higher than knee deep so that upward motion is possible; the implication that she moves *over* the fence is only an implication, since the sentence is acceptable if she merely perches herself on top of the fence. Likewise, stairs can be ascended or descended, but if one *climbs* the stairs (18b), the motion must be upward. *Non*-transitive uses of *climb* can imply motion in other overtly specified directions (e.g. 18c), but the upward entailment with transitive uses is a fact about *climb.* It is not a fact

[5] Rappaport Hovav and Levin (personal communication, 6/18/08) argue that very fast manner is not a counterexample, because it only contributes an adverbial meaning to a scalar change without specifying a separate non-scalar change. But the manner involved in *schussing* is not just speed, since a person cannot be said to *schuss* a mountain unless the skiing is done in a controlled manner; e.g. it is not *schussing* to head straight down fast because one loses control. *Schuss* also passes the suggested test for being a manner verb:

i. The avid skiier schussed himself silly.

about the transitive construction, since clearly, the transitive construction readily appears without any implication of upward motion (18d):

(18) a. She climbed the fence in high heels.
greylily.wordpress.com/2008/ 06/21/
b. He climbed the stairs to his room.
books.google.com/books?isbn=0140187081
c. A tenth firefighter . . . climbed down the ladder.
www.cdc.gov/Niosh/FACE/In-house/f
d. We descended the wall.
www.seaotter.com/marine/html/daywall.html

It seems manner and change of location are allowed to combine in certain terms because the two facets tend to co-occur as a single culturally recognized unit. In these cases, the manner is often dependent on the type of change of location: one cannot schuss uphill; to move up a steep mountain, one's body is likely to move in particular ways (cf. *scale, climb*).

The constraint against designating both manner and result might appear to hold of verbs like *write* and *scribble*, where *write* requires that something contentful comes to exist while *scribble* designates a manner without specifying a result. But this analysis hinges on what counts as a result. *Scribble* does entail that some sort of written form is created, so perhaps this verb should count as designating both a manner and result. The difference between *scrawl* and *jot down* would seem to involve the fact that the former entails that the writing is done quickly and sloppily (manner), while the latter entails the writing is done quickly but without necessarily being sloppy (different manner); both *scrawl* and *jot down* also imply that written words were created, which would appear to be a result. Thus these verbs also appear to be counterexamples to a constraint against encoding both manner and result.

In fact, verbs of creation generally allow both manner and result, since the creation itself is type of result. The difference between *manufacture* and *create* can be attributed to the fact that *manufacture* entails something about the manner of creation: the entity is created by some sort of machinery or systematic division of labour. The differences among verbs of idea-formation would also seem to involve differences in manner; for example, *concoct*, *contrive*, *scheme*, *invent*, *conceive*, *hatch*, *dream up*, *formulate* differ in whether the process takes time (*concoct*, *scheme*), whether the process is effortful (*scheme*) or not (*dream up*) among other more subtle distinctions. Verbs of cooking also would seem to often designate both a manner and a result. For example, the difference between *sauté*, *roast*, *fry*, and *stew* would seem to involve the manner of cooking and yet there is arguably a directed change as well, as the

concoction becomes sautéed, fried, or stewed. Each of these verbs pass the suggested test for manner verbs in that they may appear without their normal direct object arguments:

(19) The harried housewife sautéd/roasted/fried/stewed herself sick.

Are these verbs in fact scalar? While gradability is not required for scalarity according to Rappaport Hovav and Levin's definition, since two-point achievement verbs are defined to be scalar, verbs that *are* gradable would seem to necessarily be scalar. As food can be more or less fried, *fry* appears to be a counterexample to the claim of manner/result complementarity.

Perhaps additional criteria for counting as manner and result are required. Further clarification of these terms may be needed in order to evaluate the proposal fully (see Rappaport Hovav and Levin 2007, 2008 and this volume for discussion of some other possible counterexamples).

3.3.3 *Verb meanings must evoke established semantic frames*

We have seen that there appear to be exceptions to strong constraints on what can count as a verb meaning, at least as the constraints have currently been formulated. Yet there is, at least, a Conventional Frame constraint:

> **Conventional Frame constraint**: For a situation to be labelled by a verb, the situation or experience may be hypothetical or historical and need not be directly experienced, but it is necessary that the situation or experience evoke a cultural unit that is familiar and relevant to those who use the word.

Clearly one need never be banished in order to use the word, *banish*. But speakers would not use the label unless they were, and expected those they were speaking with, to be familiar with the frame associated with banishing. That is, if a situation were wholly unfamiliar to speakers of a language, then there would be no frame for the situation and no corresponding label for the situation. The conventional frame constraint does not require stipulation, as it follows from principles of cooperative communication (e.g. Grice 1975).[6]

It appears that the only constraint is that a single verb's meaning cannot involve two or more subevents that are not related by a semantic frame, just as Fillmore (1977) had long ago proposed. Any semantic frame offers the *potential* for a lexical label. At the same time, the existence of a frame is not sufficient for the existence of a word meaning.

[6] At the same time, this is not to say that the conceptual categories named by words necessarily name preexisting categories for the learner at the outset of language learning. Recent research suggests that the labels serve to guide the learner's attention, enabling children to learn the conceptual categories that are used in the particular language(s) they are exposed to (Bowerman and Choi 2001).

3.3.4 *The existence of a frame does not entail that a verb exists to label it*

Not all recurrent aspects of experience happen to be labelled. Although we are all aware that people are sometimes forcibly removed from bars, there is no verb that designates this action (although there is a word for the person who performs this action: *bouncer*). Many of these gaps do not appear to have a ready explanation. For example, while we have a verb *dine* that captures the complex event of eating out at a nice restaurant, we have no corresponding verb specifically for eating at a more casual restaurant.

We saw that individual verbs often (although not always) evoke causally linked subevents. But the existence of causally linked subevents is not sufficient for an event to be labelled by a verb, even if the complex situation is a familiar, regularly occurring one. For example, the subevents of feeling warm and opening a window to allow in a cool breeze do not form a scenario that is named by a single verb. (To *air out* is not such a verb because houses are not aired out because their occupants are warm). Some of us regularly miss deadlines, and yet there is no single lexical item that designates this failure. Different languages can be expected to have different lexical gaps, since the gaps are idiosyncratic (see e.g. Majid and Bowerman 2007).

Thus verb meanings correspond to semantic frames of predication, which designate generalized, possibly complex states or events that constitute cultural units. The subevents within a semantic frame need not be causally related, and at least occasionally designate both a manner and result. But the subevents must combine to designate a coherent, familiar situation or experience that constitutes a cultural unit. In what follows, we will see that *combinations* of verb and construction are not subject to the Conventional Frame constraint. But before we focus on combining verb with constructional meanings, we need to review the notion of constructional meaning.

3.4 Predications designated by combinations of verb and construction

There is a growing consensus that it is important to distinguish a verb's inherent or 'core' lexical semantics from the semantics associated with the grammatical structures in which the verb can occur (e.g. Jackendoff 1990; Goldberg 1989, 1992, 1995; Rappaport Hovav and Levin 1998, 1999). That is, simple sentence types are directly correlated with semantic structures. For example, in English we find the correspondences shown in Table 3.2.[7]

[7] The form of such constructions abstracts over the linear order of constituents. For example, I assume the same ditransitive construction is involved when it is questioned, e.g. *What did Pat give*

TABLE 3.2 English argument structure constructions

Ditransitive	(Subj) V Obj1 Obj2	X CAUSES Y to RECEIVE Z
Caused-Motion	(Subj) V Obj Oblique	X CAUSES to MOVE Z
Resultative	(Subj) V Obj Pred	X CAUSES Y to BECOME Z
Transitive	(Subj) V Obj	X ACTS ON Y; X EXPERIENCES Y
Way construction	($Subj_i$) V [$poss_i$ *way*] Oblique	X CREATES PATH & MOVES Z_{path}

Linking generalizations on this view are statements about argument structure, constructions; as we've seen, individual verbs typically code much richer, more complex frame semantic meanings.

Each argument structure construction in Table 3.2 itself designates a general, very abstract semantic frame: transfer of something from one person to another, motion of something to a new location, causation of a state change, directed action and motion along a path. In fact, in the cases of argument structure constructions, the frames involved are basic and very commonly experienced; otherwise they would not be frequent enough to be considered argument structure constructions. Argument structure constructions are generalizations over multiple verbs; this insures that they are fairly general. As I put it in earlier work, 'Simple clause constructions are associated directly with semantic structures that reflect scenes that are basic to human experience' (Goldberg 1995:5).

Since the meanings in Table 3.2 are so abstract, it might seem that the semantic frames associated with constructional meanings are all profile and no background frame. In fact, these abstract predicates do contain little in the way of background frame, presumably because, again, constructional meanings arise from generalizing over many different verbs. So in many cases, the semantic frame consists only of the profiled relation. But this is not always the case. The *way* construction is used to convey the creation of a path and movement along that path (Goldberg 1995); in the case of this construction, only the motion is profiled—the creation of the path (implying motion despite difficulties or obstacles) is part of its background frame. This is evidenced by the fact that metalinguistic negation (involving particularly

Chris? or clefted, e.g. *It was a book that Pat gave Chris.* I should also note that the constructional semantics given in Table 3.2 is somewhat oversimplified, since each formal pattern is typically polysemous (see Goldberg 1995, 2006 for discussion).

stressed elements) is required to negate the presupposition that the motion was difficult in some way:[8]

(20) a. #She didn't make her way into the room, there was a clear path ready for her.

b. She didn't MAKE her WAY into the room, there was a clear path ready for her. (ok to negate the backgrounded creation of a path with metalinguistic negation)

Once we acknowledge that verbs and constructions can each convey meaning, a question arises as to whether there are any general semantic constraints on their combination.

3.4.1 *Constraints on combinations of verb and construction*

It is clear that the most common and prototypical case is one in which the verb and the construction do not designate two separate events. Rather the verb designates the same event that the construction designates, or the verb elaborates the constructional meaning. For example, if we assume that the ditransitive construction has roughly the meaning of transfer, 'X CAUSES Y to RECEIVE Z' then it is clear that the verb *give* lexically codes this meaning. The verbs *hand* and *mail* lexically elaborate, or further specify, this meaning. More interestingly for the present purposes are cases wherein the verb does not itself lexically designate the meaning associated with the construction, in which case we have two distinguishable events.[9]

Causally linked events

Events can be causally related by specifying the means, the result or the instrument involved in some act. A common pattern in English, Chinese, and Dutch is that the verb can code the *means* of achieving the act designated by the construction (Talmy 1985; Goldberg 1995). This is the case in each of the following attested examples:

[8] There is a limited alternative sense of this construction in which the verb only designates a co-occurring activity and no (possibly metaphorical) creation of a path is required (see Jackendoff 1990; Goldberg 1995).

[9] I do not rely in this case on the before-mentioned criterion for determining distinct events. In particular, the events may be temporarily coextensive in some cases. It is clear we have distinguishable events once we recognize that one is designated by the verb, and another by the construction. Verb meaning is determined by what is common across uses of the same verb in different argument structure constructions; Argument structure meaning is determined by what is common across uses of the same argument structure construction across different verbs.

(21) a. I literally had to close my eyes every time they *kicked* him the ball. www.extremeskins.com/forums/
b. I actually had a moth go up my nose once. I . . . *coughed* him out of my mouth. bikeforums.net/archive/index.php/t-292132
c. He *wrote* his way to freedom.
books.google.com/books?isbn=1593080417

Kicking is the means of achieving transfer; coughing is the means of achieving caused-motion; and writing is the means of achieving metaphorical motion.

Pinker (1989) discusses the following example from Talmy (1985) (cf. also Croft 1991):

(22) The bottle floated into the cave.

He notes that this sentence is not felicitous in the situation in which the bottle is carried into the cave in a bowl of water. It is only acceptable in the case that the floating is the means of the bottle moving into the cave.

Goldberg (1995:62) observes that verbs of sound emission are more felicitiously used in motion constructions when the sound is construed to be a result of the motion. Consider the contrast between (23a–b) and (24a–b):

(23) a. another train *screeched* into the station.
www.wunderland.com/WTS/Andy/EmptyCity/
b. a tank *rumbled* down the street at a high rate of speed.
books.google.com/books?isbn=0312980442

(24) a. % The bird *screeched* out of its cage. (to mean that the bird happened to make a screeching sound as it flew out of its cage.)
b. % Elena *rumbled* down the street. (to mean that her stomach rumbled as she walked down the street.)

Notice the same verbs, *screech* and *rumble*, are used in both (23 a–b) and (24 a–b), and yet the examples in (23) are fully acceptable to all speakers, while those in (24) are rejected by many (this is indicated by '%'). The difference is that in the examples in (23) the sound is caused by the motion, whereas in the examples in (24) the sound is not caused by the motion, but is simply a co-occurring event.

Verbs may also designate other aspects of causal events such as the instrument (25):

(25) Gilbert *wristed* the ball into the back of the net.
www.cstv.com/sports/
(the wrist is the instrument of the caused motion)

Therefore, as we saw was the case with lexical accomplishment verbs, it is possible to combine two subevents into a single predication if a causal relation holds between the two subevents.

But as in the case of lexically specified subevents, the verbs are not necessarily causally related to constructional meanings. We now consider certain non-causal relations.

Preconditions

If we assume that the ditransitive construction has roughly the meaning of transfer, i.e. 'X (intends to) CAUSE Y to RECEIVE Z' (e.g. Goldberg 1992b), then we find that this construction allows the verb to designate a precondition of transfer, namely, the creation or preparation of the transferred entity, as for example in (26):

(26) Orlando *baked* his sister a cake.
www.englishclub.com/young-learners/

Here the preparation of the cake is a precondition for Orlando's transferring the cake to his sister.

Similarly, for a theme to move in a direction requires a precondition that the theme be free of physical restraints. In the following attested examples involving the caused motion construction, the verb designates the precondition of removing constraints that will enable motion; the construction designates caused motion.

(27) a. He *freed* the prisoner into the crowd, as he had been ordered. www.angelfire.com/mo/savagegardener/
b. The girl . . . *unleashed* the dog into the west slums.
boards.stratics.com/php-bin/arcpub/

These cases are reminiscent of the lexicalized verbs that encode both some sort of precondition and asserted event (e.g. *return*, *appeal*, *double-cross*). Thus just as verbs may encode subevents related by a causal relation or subevents in which one serves as a precondition for another, so too, can combinations of verb and construction (see Goldberg 1998 for further parallels between verbs and more complex predications). In the case of the examples in (26) and (27), both subevents are asserted, as either can be negated without metalinguistic negation, as is shown in (28):

(28) Orlando didn't bake his sister a cake, he microwaved it/he slept all morning.
He didn't free the prisoner into the crowd, the prisoner was still in chains/he kept the prisoner in lock-up.

We now focus on an important difference between lexicalized verbs on the one hand, and verb + construction combinations on the other. We have seen that lexicalized verbs always evoke established semantic frames. In the following section, we observe that combinations of verb and construction can instead evoke novel events.

3.4.2 *Frames, verbs, and constructions*

Does the Conventional Frame constraint hold of combinations of verb and construction? That is, do novel combinations of verb and construction only designate (unlabelled but) pre-existing semantic frames?

We have seen that the ditransitive construction can be combined with verbs of creation that do not themselves designate transfer. We know that what is transferred from one person to another is often created for that purpose; thus the creation of the transferred entity is a salient precondition within our frame semantic knowledge of transferring. At the same time, we need not have established frames that involve the combined semantics of specific verbs with argument structure constructions. For example, while it *is* arguably the case that we do have a frame of experience in which someone bakes something for someone else, it would be a stretch to say that we have an existing semantic frame that involves microwaving something for someone. And yet we can readily say both (29) and (30):

(29) I *baked* her a loaf of homemade apple bread.
community.southernliving.com/showthread.php?t=5054

(30) I *microwaved* her some leftover noodles.
not-quite-sure.blogspot.com/2006/01/pancakes-against-drugs.html

That is, while the combination of an abstract meaning associated with a general verb class, together with an argument structure predication does seem to require an established semantic frame, the more specific meanings that arise from the combination of an argument structure construction and a specific verb need not. To take another example, we can be said to have a general frame of knowledge involving forces that cause motion; and we also can be said to have a specific frame in which strong winds blowing may cause movement; this more specific frame is evoked when *blow* is combined with the caused-motion construction as in (31). At the same time, one would be hard pressed to claim that we have an established semantic frame that involves the idea that sneezing can cause motion and yet the attested example in (32) is also acceptable:

(31) It *blew* the beard right off of the Captain's chin.
www.emule.com/2poetry/phorum/read.php?7,214604,214649

(32) She *sneezed* the tube right out of her nose!
journals.aol.com/gosso23/my-breast-cancer-story/ entries/2007/09/06/moms-in-the-hospital/630

The idea that verbs can combine with constructions in truly novel ways is supported by the fact that one does not find unique simple morphemes that designate the requisite meanings. I'd venture to say that no language has a unique simple morpheme e.g., *snope*, that specifically means 'to move by sneezing' and no language has a unique simple morpheme e.g., *micrim*, to mean to intend to give something prepared by microwaving. It is in this sense that the meanings involved are 'implausible' verb meanings (Goldberg 1995, 2006).

The *way* construction for some speakers allows the verb to designate a co-occurring activity that is not directly related to the action designated by the construction (see Levin and Rapoport 1988; Jackendoff 1990; Goldberg 1995 for discussion of this construction). For example,

(33) He wheezed his way through all 3 grades.
(about a child with asthma, reported by Kay Bock, heard on the WILL radio station, May 7, 2003)

The relationship between verb and construction in this case is that of simple co-occurring activity. Since we don't find underived verbs in any language that convey both metaphorical motion and some unrelated activity such as wheezing, it is safe to say that the meaning of 'metaphorical motion while wheezing' is not an established semantic frame.

3.5 Conclusion

This chapter has explored the question of what constitutes a unitary semantic predication. It was argued that the constraints on what a verb can mean are dependent only on the notion of *semantic frame* (cf. Fillmore 1977). The subevents associated with a verb's meaning need not be causally related as has been proposed (cf. *blanch*, *braise*), and may also encode both manner and result as long as there exists a semantic frame that unites both meaning components (cf. *schuss*, *scale*, *fry*, and *scribble)*.

The events designated by combinations of verb and argument structure construction are in some ways parallel to subevents within a lexical item's semantic frame. When the verb and argument structure construction profile distinct events, the verbal event and the event profiled by the argument

structure relation often stand in a causal relationship. However, other sorts of relationships including precondition and co-occurring activity also sometimes hold.

The present chapter also focuses on an important difference between verbs and combinations of verb + construction. Verbs necessarily evoke established semantic frames. Constructions also evoke established semantic frames. On the other hand, while classes of verbs are related to argument structure constructions by general, abstract frames, particular verbs may be combined with argument structure constructions to designate novel events that do not evoke any pre-existing semantic frame.

4

Contact and Other Results

NOMI ERTESCHIK-SHIR AND TOVA RAPOPORT

This chapter expands the account of two different types of verbs of contact, such as *hit* and *smear*, discussed in Erteschik-Shir and Rapoport 2007, to a third type: verbs such as *splash*, *spray*, and *spatter*.

Contact verbs pose an interesting challenge for any framework in which argument structure properties and aspectual (*aktionsart*) properties are represented structurally, in syntax. We show here that within our framework, and under the classification argued for in, for example, Erteschik-Shir and Rapoport 2004, the various attributes of these verbs are accounted for and even expected. The predicate classification in this framework is not an aspectual classification in the traditional sense of Vendler 1967, but builds on that of Dowty 1979; it is better characterized as an aspectual-argument classification, in which change, not homogeneity or duration, is the relevant criterion. We thus arrive at a classification similar to that of Pustejovsky 1991, for instance, who uses 'transition' as a basic criterion. Our eventive predicates are thus classified as activities (agentive, non-change), accomplishments (cause + change, whether telic or atelic), and change (non-agentive, telic, or atelic). The property of duration is derived from the nature of the verbal atom.

Consider the verbs of forceful contact (*hit*, *slap*, *punch*, *kick*, *smack*) illustrated by the verb *hit* in (1), for example:[1]

(1) *cause + change ('accomplishment')*
  a Jane hit the table.
  b Jane hit the ball to the other side of the field.

Thanks to the audience of the Israel Science Foundation research workshop on Syntax, Lexicon, and Event Structure, honouring Anita Mittwoch on her eightieth birthday, and to Malka Rappaport Hovav for helpful comments.

[1] Our structural category 'cause+ change' is roughly parallel to Dowty's 1979 accomplishment class and our 'change' structure includes inchoatives, unaccusatives, and Vendler's 1967 and Dowty's achievements.

Change ('achievement')
c The car hit the wall.
d Jane hit the wall. (non-agentive)

We see here, from just a few examples, that a single verb can appear in more than one syntactic frame: with one or two complements, as in the examples in (1)a and b; with several different argument realizations: the subject can be agentive, as in (1)a and b; or non-agentive, as (1)c and d, and the object can be an affected theme (as in (1)b) or not; and the same verb can head structures with different aspectual interpretations.

Such varied behaviour has been widely discussed. The alternations above, as just one example, have been analysed by Fillmore 1970, Pinker 1989, Jackendoff 1990, Dowty 1991, among many others. The theory employed here, in which a single lexical entry projects various structures, accounts for the distribution and thematic properties of these and other types of verbs of contact.

Not all verbs of contact have the same alternations as those of forceful contact, as shown by the examples of *smear*-type verbs in (2)–(4) (from Hale and Keyser 1993 and 2005):

(2) *cause + change (matter as theme)*
a We smeared mud on the wall.
b They daubed pipeclay on their bodies.
c He rubbed ochre on his chest.

(3) *cause + change (location as theme)*
a We smeared the wall with mud.
b They daubed their bodies with pipeclay.
c He rubbed his chest with ochre.

(4) *change*
a *Mud smeared on the wall/*The wall smeared with mud
b *Pipeclay daubed on their bodies/*Their bodies daubed with pipeclay
c *Ochre rubbed on his chest/*His chest rubbed with ochre.

Here, two different agentive readings are available, but no change reading is possible. Yet another type of contact verb allows not only the same two agentive alternations as in (2) and (3), but also one of the change structures. The possibilities of this *splash*-verb type are illustrated in (5)–(8).

(5) *cause + change (matter as theme)*
a We splashed mud on the wall.
b They sprayed water on the flowers.
c He splattered paint on the floor.

(6) *cause + change (location as theme)*
  a We splashed the wall with mud.
  b They sprayed the flowers with water.
  c He splattered the floor with paint.

(7) *change (matter as theme)*
  a Mud splashed on the wall.
  b Water sprayed on the flowers.
  c Paint splattered on the floor.

(8) *change (location as theme)*
  a *The wall splashed with mud.
  b *The flowers sprayed with water.
  c *The floor splattered with paint.

As noted, all such alternations—all the possible versions of a verb like *hit*, or *smear*, or *splash*, for instance—derive from one single lexical representation. In other words, we take it as a basic hypothesis that differences in complement frames, in argument structure realizations, and in aspectual characterization are never attributable to differences in lexical representation. Rather, these same properties derive from variations in syntactic structure. Syntactic structure is itself derived directly from lexical representations consisting of meaning components: lexical atoms.

4.1 The theory of atoms

In Erteschik-Shir and Rapoport 1997, 2000, 2004, 2005, 2007, in preparation, we offer a lexical analysis of verbs in terms of meaning components. This is part of a framework we term Atom Theory (AT). According to AT, verbs are decomposed into atomic meaning components whose syntactic projection derives aspectual interpretation and argument selection; this without recourse to linking rules, functional projections, or movement.[2] In the following paragraphs, we make use of the facts of *hit* to briefly outline AT theory.

There is a restricted universal inventory of atoms from which a verb's meaning is chosen: Manner (M), State (S), and Location (L). As argued in Erteschik-Shir and Rapoport 2005, each of these components also has a plural version (a property that allows the projection of scalar and iterative constructions, for instance). We return to this property of atoms in section 4.3 below, in which we demonstrate that the properties of *splash*-type verbs follow from their plural L atom.

[2] In AT, meaning components project syntactic structures that are similar in many ways to those in the work of Hale and Keyser (e.g. Hale and Keyser 1993, 2005).

Each atom ranges over the same set of concepts as an equivalent morpho-syntactic category. M is equivalent to adverbials (manner, means, instrument), S to adjectives, and L to the full range of prepositions.

A verb's meaning is composed entirely of its atoms. A verb may have one or two atoms. This is a universal constraint which follows from the fact that there are only two types of atoms, manner (M) and possible results (S and L).

These meaning atoms themselves are what merge to create syntactic structure, resulting in one of two possible interpretations:

Atom Interpretation

1. 

an atom merged with a verbal host forms a predicate

2. 

an adjoined atom modifies the element it is adjoined to[3]

In AT, these two interpretive options are always available in principle. States (S), for example, can project change-of-state predicates or can modify adjectivally; Locations (L) can project change-of-location predicates or can modify/identify locations; Manners (M) can project activities or can modify adverbially. The projection possibilities are constrained only by a principle of Full Interpretation (FI). The same verbal lexical entry, that is, the same atoms, may project more than one structure type. The burden on the system, then, is not on projection, but on interpretation. What is important here is that a verb's meaning reduces entirely to its atom/s. And since verbal roots never have more than two (potentially projecting) atoms, our system has the significant attribute of imposing an upper limit on structural complexity.

Let us illustrate with the verb *hit*. This verb decomposes into two meaning components, M (forceful means) and L (point of contact), as shown in its lexical entry:

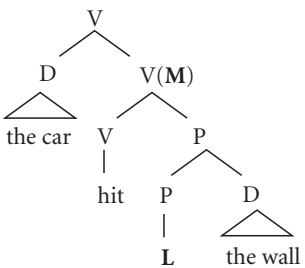
(9) lexical entry of the verb 'hit':[4]
V /hit/
M 'force'
L 'point of contact'

[3] This representation of modifiers is for convenience only. In Erteschik-Shir and Rapoport in preparation, we hold that these and other modifiers are merged in a different plane (adapting ideas in Erteschik-Shir 1987; Rapoport 1999; and Åfarli 1997), how or precisely where is irrelevant here.

[4] We follow Fillmore 1970, who argues that the meaning of *hit* contains a place.

One possible projection of this verb is the change-of-location structure of (1) c, repeated here:

(10) a The car hit the wall.

b 

c The car went (with force) to a point of contact on the wall.

For simplicity's sake, we will assume here that all atoms have categorial realizations in syntax and represent them thus. The L atom projects as a preposition, null for forceful contact verbs in English.[5] In addition, L of 'hit' is lexically unspecified, so a complement is required to provide the location of the point of contact. (This, as opposed to a verb like *shelve,* for example, in which the L atom 'shelf' is lexically specified.) This complement, *the wall*, and the theme, *the car*, constitute the requisite partners in a contact relation, contact defining a relation between two elements; L's interpretation goes through. The M component is interpreted as an adverbial modifier of the change of location structure. The interpretation in (10)c follows.

Since both atoms are interpreted, the projection (10)b is licensed according to FI, which requires the interpretation of each atom within its local V projection. FI thus operates as a restriction on the projection of lexical atoms as it does elsewhere in the grammar.[6]

Each projected V-atom predicate merges with a subject specifier. The interpretation of the specifier follows from the nature of the predicate with which it merges: The subject of a change predicate (e.g. (10)), is interpreted as a theme. This is why even a human subject (as in (1)d) in this structure is interpreted non-agentively. In short, AT does not include any mechanism of theta-role assignment. As in Hale and Keyser's work, the equivalent of

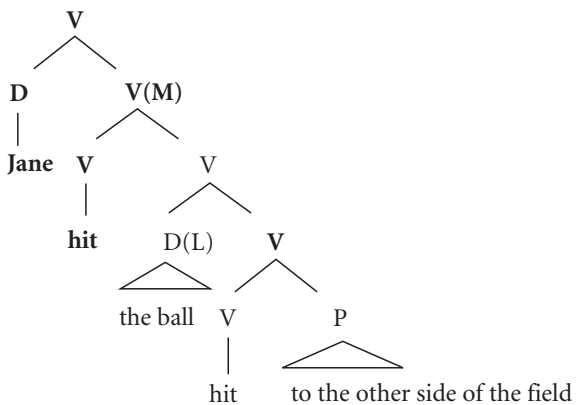
[5] This thematically motivated step receives support from the fact that, as Levin and Rappaport Hovav 2005, 21–2, note, many languages have contact verbs that take a PP or similar complement, such as Tibetan, in which the element with which contact is made obligatorily takes a locative marker. Also in Armenian (Michele Sigler, personal communication) this element is marked with dative case.

[6] The specifics of AT's extended version of FI are discussed in Erteschik-Shir and Rapoport 2007, for example, and Erteschik-Shir and Rapoport in preparation.

theta-role interpretation is derived from the structure with which the specifier merges.

The same atoms of *hit* that project (10) can also project the structures from which examples such as (1)a and b are derived. The structure of (1)b is given in (11).

(11)



In this case, an overt goal predicate is projected and the interpretation is of a change of location of the theme *the ball*. The L atom modifies the D *the ball*, resulting in identification of the two elements. In other words, the theme D provides the location of the point of contact, one of the two contact elements. Interpretation of L goes through since this complex structure provides the second entity for the contact relation: the upper subject *Jane*. The additional merged structure containing this subject (represented in boldface in (11)) is licensed by the availability of the modifying M atom. In AT, projected structure requires the availability of an uninterpreted atom. Note that due to this restriction, any verb composed of M and L or M and S atoms can project a complex structure like that in (11), but single atom verbs (such as *arrive* and *appear*) cannot. (**Jane arrived her guests at the party.*/**The magician appeared a rabbit out of the hat.*)

If the upper V projection were not merged with the lower V projection, the point-of-contact L would remain uninterpretable since one of the two elements of the contact relation would be lacking. This is the explanation for the ungrammaticality of (12):[7]

(12) *The ball hit to the other side of the field.

[7] The preposition *to* blocks its complement from functioning as a second contact element for L.

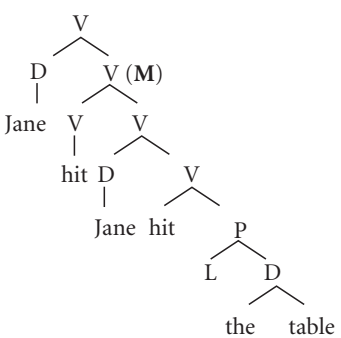
Following Hale and Keyser, we take the V–V structure such as the one projected in (11) to be interpreted as causative and the derived role of the specifier of this structure to be interpreted as a causer.[8] The complete interpretation of the structure is therefore 'Jane caused (with force) the ball (= the location of the point of contact) to go to the other side of the field'.

Note that the same verb is merged twice. (We can consider this the result of the operation of copy and merge.) Following accepted principles, the two verbal copies form a chain, the head of which is pronounced.

The agentive *hit* of (1)a *Jane hit the table* illustrates clearly and in surprising fashion the restrictions of the AT framework. The analysis forced by AT is not that of a typical, simple activity, but of the complex change-of-location structure. This is shown in (13).

(13) a Jane hit the table

b



c 'Jane caused, with force, Jane to come into contact with the table.'

The main difference between the projected structures in (11) and (13) is that here, v's two contact elements are not the agent and the theme, but the theme (*Jane*) and the preposition's complement, the D *the table*.

(13) is derived by copying and merging the specifier *Jane*, operations that are always, in principle, possible. Again, the result is constrained by FI. As with the verb, the two instances of D form a chain, of which the head is pronounced.[9] The same D, with the same referent, thus gets interpreted as both causer and theme, in view of the predicate types with which each specifier copy merges.

[8] As noted above, this complex structure is not necessarily parallel to traditional accomplishments. Like the simple change structure, this cause + change structure represents telicity or atelicity, duration or an instant. These attributes are predictable from the type of atom projecting the structure.

[9] We assume that chains are a phonological entity.

This may seem odd at first, but nothing precludes such a situation, as long as an interpretation for the apparent thematic clash is possible.[10] And in fact, because of the kind of verb involved, a resolution is possible. The relevant characteristic of this verb is that is has an atom meaning 'point of contact' which, when projected, yields a motion-to-goal construction. The only way in which a theme can be forcefully directed to a particular point by an identical agent is when that theme is inalienably possessed by that agent. The fact that the verb is one of point-of-contact means that only a part of the theme *Jane* is in contact with only a part of the table. So the theme copy of *Jane* is interpreted as an inalienably possessed part of Jane, and in this case of forceful contact: her hand. In this way, the same D receives two slightly distinct interpretations.

When Jane hits the table, she not only forcefully causes her hand to come into contact with the table, but directs the motion of her hand on the way there. Only something inalienably possessed, such as a hand, can have its path so directed to a goal, thus ensuring final contact. The option of having two specifier copies which form a chain is thus restricted to cases in which the second copy is interpreted as inalienably possessed.

In fact, our analysis receives support from one of the equivalent constructions in Armenian (Michele Sigler, personal communication).

(14) tserk-əs bad-i-n zargi
hand-1sg.poss wall-DAT-def hit.past.1sg
'I hit the wall with my hand.'
[literally: 'I hit my hand to the wall.']

As we see, the actual Armenian sentence is identical to our analysis of its English equivalent.

Returning to English: if a chain of the two specifiers is not formed, as in (15) b or its equivalent (15)c, the result is impossible.

(15) a Jane hit [Jane] the table.
b *Jane hit Bill/the book the table.
c *Jane hit Jane the table.

[10] As noted in Erteschik-Shir and Rapoport 2007, this situation is parallel to that of the subject's dual thematic role in *John rolled down the hill*, as analysed in Jackendoff 1972: 32. Our analysis of such sentences is near-identical to that in (13): a second copy of *John* is merged as a theme. In this manner-of-motion case, however, this copy is understood as John's path, rather than a body part.

An obvious explanation for this is that the second noun phrase does not get case.[11] We find some evidence for this approach in the fact that when a preposition is added, the result is fine:

(16) Jane hit the book against/on the table.

The unmarked body part in a case of controlled forceful contact is a hand. This is shown in the oddness of (17)a with the additional PP (unless understood as accidental contact) as contrasted with (17)b and c, in which the *with*-phrase adds further specification.

(17) a Jane hit the table with her hand. (non-volitional only)
b Jane hit the table with her fist.
c Jane hit the button with her thumb.
d Jane hit the table with her foot (non-volitional only)

(17)a, with the cause + change structure would, under a volitional reading, have a complete interpretation like the redundant: 'Jane caused her hand to come into contact with the table with her hand.' This is why the change, non-volitional reading is so much preferred for this sentence: 'Jane went to a point of contact with the table (with her hand).' (17)b and c, on the other hand, are fine under a volitional interpretation, in which the understood forceful contact body part is specified as a fist or a thumb, respectively. And the reason (17)d cannot be understood volitionally is that this reading is blocked by the verb *kick* which means 'hit with one's foot'; this leaves us, then, with the change, non-volitional reading like that of (17)a. Note that *I hit the edge of the wall with my head* is fine when understood non-volitionally. A head cannot, obviously, specify the default hand body part of forceful contact that is always present in the complex structure. For a volitional reading, one uses the complex construction: *I hit my head against the wall (to make a point)*.[12]

The English verb *hit* thus demonstrates that it is the nature and number of the atoms and the interpretive constraints of AT that result in complex or simple structures. It is in this way that the atoms of a verb determine the variety of arguments it may take. AT therefore does not require that the argument properties of a verb be stipulated, whether once or several times.

[11] Note that this assumes a different analysis for double-object constructions, that is, possessive constructions without the preposition *with*.

[12] In the non-volitional *She hit her head on the table*, *on* is not the overt realization of the point-of-contact preposition. Here, the *on*-PP modifies the null point-of-contact L of a change. *On* is used, then, to signal non-volitionality as opposed to volitionality, which is why *The car hit on the wall* is unacceptable.

4.2 Alternating contact verbs

Consider the following alternations, repeated from (2) and (3) above:[13]

(18) a We smeared mud on the wall.
b They daubed pipeclay on their bodies.
c He rubbed ochre on his chest.

(19) a We smeared the wall with mud.
b They daubed their bodies with pipeclay.
c He rubbed his chest with ochre.

The verbs in (18) and (19) are composed of M and L atoms, as *hit* is, but the M and L are of a different type and so yield different syntactic properties, as illustrated by the lexical representation of the verb *smear*:

(20) Lexical entry of the verb 'smear':[14]
V /smear/
M smear manner
L surface contact

Here, unlike with *hit*, there is no force manner; the L atom of *smear*-type verbs is a surface location, not a point of contact. As we see in (18), verbs with this L type generally can appear with the overt preposition *on*. In this case, the L atom modifies P (as shown in (21)), restricting *on* to surface contact; the complement, *the wall*, specifies the location of this contact.[15] The interpretation of this type of L atom and the different M atom results in the surface differences between *hit*-type verbs and *smear*-type verbs.

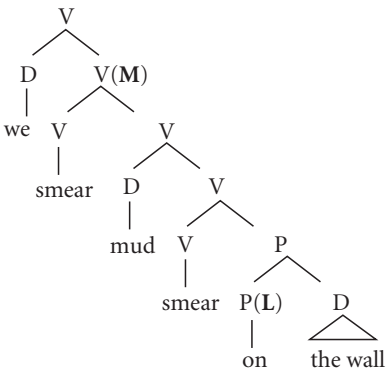
The two atoms of *smear* allow for the projection of the complex cause structure ((18)a) on a par with *hit* (as in (11)), as shown in (21).

[13] These alternations have been discussed extensively by, for example, Fillmore 1968; Rappaport *et al.* 1987; Pinker 1989; Jackendoff 1990; Levin and Rappaport Hovav 1991; and Tenny 1992.

[14] Because the lexical entry consists of concepts, it is rarely a simple matter to represent every entry verbally. Still, every English speaker knows exactly what a 'smear' manner is — the hand motion, for instance, is the same for all speakers.

[15] The constraint of brevity requires that we leave out details of this analysis, particularly in reference to the role and nature of prepositions in AT.

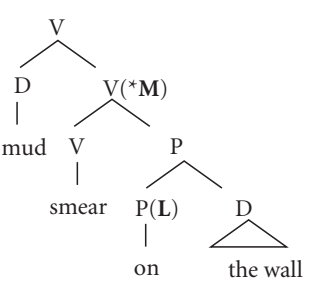
(21) a We smeared mud on the wall

b 

c 'We caused (with smearing) mud to go on the surface of the wall.'

The parallel change structure can also be projected, but the sentence is unacceptable, as shown in (22).

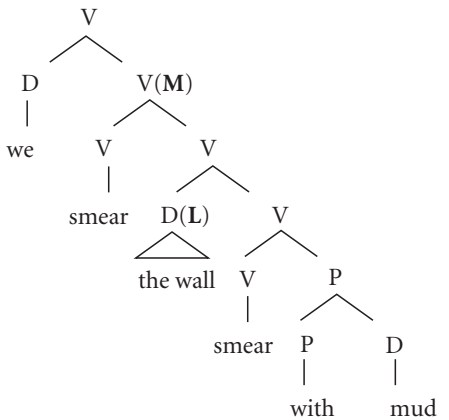
(22) a *Mud smeared on the wall

b 

(22) violates Full Interpretation, since the M atom remains uninterpreted: The manner of smearing is such that it requires an agent, which is lacking in the change structure.

Since all verbs are associated with atoms rather than an argument structure, it is not surprising to find that, in addition to the surface contact structure in (21), we also find an alternate cause structure ((19)a), as shown in (23).

(23) a We smeared the wall with mud.

b 

c 'We caused (with smearing) the wall to have mud on it.'

Like Hale and Keyser 1993, 2002:160, we assume a possessor relation in this type of case, due to the presence of the preposition of 'central coincidence', that is, *with*. But in AT, this possession interpretation is derived by the combination of (a) the projection of *with*'s central coincidence predicate and (b) the modification of its theme subject *the wall* by the L atom. Specifically, we derive the possessor interpretation from the fact that the wall is the locus of the mud, i.e., the wall is (covered) with (smears of) mud.[16] Note that the PP is obligatory, since without it nothing would be predicated of the possessor.

In contrast with verbs like *smear*, a verb like *hit* does not allow this alternation: *hit*'s L atom is 'point of contact', not surface contact, and so we do not get the possession relation. It follows that sentences such as *I hit the fence with a stick*, can only get the interpretation that contact is made on a point on the fence, and no possession interpretation can be derived.

However, we do find the following:

(24) a I hit the ball to you. (as in baseball)
b I hit you with the ball.

[16] See Erteschik-Shir 2007, 202 for a similar analysis of dative verbs.

In (24)b the D *you* does not end up possessing the ball. In this way, despite a seemingly similar alternation, different L atom types result in different interpretations and possibilities.

This cause structure of (23), on a par with (22), does not allow the simple (change) possession structure in (25).

(25) *The wall smeared with mud

The reason is the same as before, namely that the M atom of smearing cannot modify in the absence of an agent.

4.3 'Splash'—similar but different

The classic contrast (noted in, for example, Hale and Keyser 1993) between *smear* verbs and *splash v*erbs, as shown in (26), is also explained within AT in terms of the atoms involved.

(26) a *Mud smeared on the wall.
b Mud splashed on the wall.[17]

According to Hale and Keyser 2005:20–21 and previous work, 'the difference between these two verbs lies in the semantic components of their root elements. Specifically, the difference is to be found in what might be termed the "manner factor" inherent in the semantics of the root. The verb *splash*... involves a manner feature which is in a clear sense "linked" to the internal argument *mud*. It represents the motion and dispersal of particulate matter associated with *mud* not with the external argument. This relation is preserved in both the transitive and intransitive alternants. By contrast, the verb *smear*... is characterized by a "manner feature" linked externally, i.e. embodying a gesture or motion associated with the external argument.'[18]

[17] For some of our informants, the change sentences of (i), without the overt preposition *on*, are as good as or even better than the sentences of (26).

(i) Mud splashed the wall.
Water sprayed the flowers.
Paint spattered the floor.

At this point, we have nothing to add about these cases.

[18] Malka Rappaport Hovav informs us that she has seen examples in Google such as *Blood smeared on the wall*. We do not find such examples at all acceptable, but recognize the possibility that for some speakers, *smear* may be analysed like *splash*.

Our explanation of the ungrammaticality of (26)a above is in essence the same as that of Hale and Keyser.[19] However, we differ with respect to (26)b. The difference lies in our analysis of the meaning of verbs of the *splash* type. We agree with Hale and Keyser that splashing involves 'dispersal of particulate matter', but we view this not as a manner, but rather as a particular configuration, the particular shape of points of contact on a surface, i.e., an L atom, as shown in the lexical representation of (27).

(27) Lexical entry of the verb 'splash':
V /splash/
$\mathbf{L_{pl}}$ splash-shaped surface contact

An important property associated with verbs of this type is that they involve dispersal of a plurality of particles. This is because the configuration type is such that the L atom of these verbs is plural. It is this essential property of the meaning of these verbs which provides the basis for our explanation of the alternation available for these verbs. (And note that this shape/plurality is the property that restricts the type of matter that can end up splashed on a surface: mud or water, for instance, is fine; clumps of dirt are not.)

Before proceeding to a discussion of the plurality of atoms, we would like to point out that verbs like *splash* do not always seem to involve contact; Malka Rappaport Hovav notes sentences like: *Jane splashed water into the air*. This sentence is fine and doesn't seem to have contact with an obvious surface, but we contend that this has to do with the nature of air itself. Consider *Jane splashed water into the bucket*: it is clear that the water is coming into splashed contact with some surface inside the bucket. And note: *Jane splashed/sprayed the bucket with water* is clearly understood as resulting in the outside surface of the bucket having water on it. The fact that air doesn't have a *visible* surface does not change the contact interpretation of the verb. As further, interesting support for this view, consider: *Jane sprayed the air with perfume*. Here there seems to us no question that the air is indeed the surface on which perfume is sprayed; the air is possessed of perfume. (The reason *spray the air* is out is because, as noted above, a PP is required to be predicated of the possessor.)

To return to our analysis of *splash*-type verbs as having a plural L component: In Erteschik-Shir and Rapoport 2005, we argue that all predicates which describe a sequential (incremental or iterated) change have in common that

[19] Although the theoretical nature of 'manner' is distinct. In AT, manner is simply one of the possible atoms, not an additional theoretical construct such as Hale and Keyser's 1993 tag, or Harley's 2005 'thought balloon'.

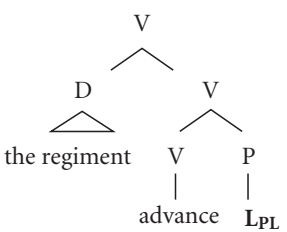
they are plural. Just as a noun can be singular, denoting an individual, or plural, denoting a collection of individuals, so a verb can be singular or plural, describing an individual event, or a collection of individual events, respectively. Examples of verbs with plural atoms are *run* with its plural M, *cool* with its plural S, and *advance* with its plural L. (See also Rothstein 2008 for a similar view.)

One of the consequences of plurality, we argue, is that single-atom plural verbs themselves allow control by a causer. Crucially, this causer controls the increments or iterations and the extent of the change in addition to causing it. Consider the lexical representation in (28) and examine the alternation in (29) and (30), for example.

(28) Lexical entry of the verb 'advance':
V /advance/
$\mathbf{L_{pl}}$ spatial axis, forward

(29) a The regiment advanced

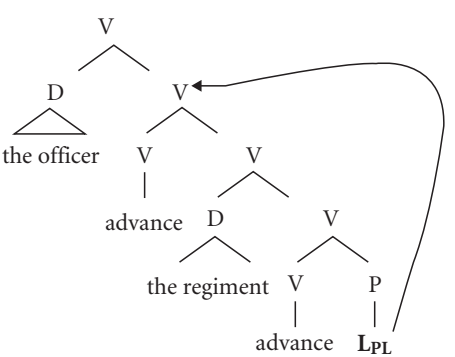
b



c 'The regiment went forward incrementally.'

(30) a The officer advanced the regiment.

b



c 'The officer caused the regiment to go forward and controlled the increments/extent of their advance.'

That a single component verb projects the change structure in (29) is not surprising. However, according to the AT requirement, mentioned at the beginning of this chapter, that projected structure requires the availability of an uninterpreted atom, it is surprising to find an additional projection of a verb with only one component, as in (30). Here the plurality of the component comes into play: the upper projection is licensed because the increments of the change can be controlled by a causing event. The causer thus has the additional interpretation of controlling the sum of the individual events, the increments that make up the plural change. This additional interpretation licenses the additional, upper projection. The licensing by plurality rather than by manner also explains why the causer need not do anything in particular in order to control the event, as would be the case if a manner were involved.

This analysis extends elegantly to verbs of the *splash*-type. These verbs can occur in structures completely parallel to the ones given for *advance* in (29)b and (30)b and the structures need not be repeated here. This analysis not only explains the transitivity alternation but also explains why splashing and spraying need not be done in any particular manner as long as the particular configuration specified by the verb is implemented by the individual particles of the matter involved; that these verbs involve liquids which not only allow for the particular configuration, but also can be viewed as a sum of individual particles.[20]

One more puzzle remains to be solved: Although *splash*-type verbs allow for the same alternation as do *smear*–type verbs, as shown in (29), only (31)a has a change structure parallel, as shown in (32).

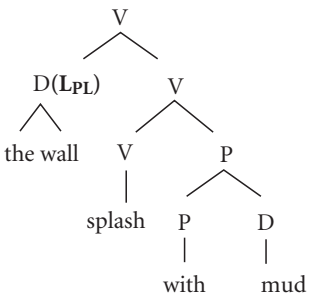
(31) a John splashed mud on the wall.
b John splashed the wall with mud.

(32) a Mud splashed on the wall.
b *The wall splashed with mud.

In order to understand why (32)b is not allowed, let us examine its structure and its properties in more detail:

[20] The plural atom is not to be confused with Jackendoff's 1990 distributive location (roughly equivalent to our possessor location).

(33)



Recall that the interpretation of the L atom as modifying the subject forces an interpretation in which the subject is a possessor. The sentence therefore means 'the wall, whose surface was the location of the splashed-shaped configuration, had mud on it'. This sentence, like all sentences with possessor subjects, is stative. There is no upper cause projection to make it dynamic, nor is the verb itself listed in the lexicon as dynamic– its meaning consists solely of atoms. This stativity is in conflict with the plurality of the L atom. In order for the wall to be splashed with mud, a repetition is involved, be it of the action itself or of the contact of the matter with (different) parts of the wall. Such event repetition is obviously not compatible with stativity. Therefore the plurality of the L atom remains uninterpreted and Full Interpretation is thus violated.

4.4 Conclusion

We have seen that all alternations, whether in argument number, argument type or realization, or aspectual class, ultimately derive from the type of meaning atom involved and the interpretations atoms require of the structures they project. This has been illustrated here with certain classes of contact verbs: forceful contact, such as *hit*, and singular and plural surface contact verbs, such as *smear* and s*plash*, respectively.

We note that meaning components do not necessary translate from language to language. A seemingly similar verb may have different atoms in different languages, even a slight difference allowing the projection of different structures; thus, translations are not identical cross-linguistically. However, the inventory of atoms is universal.

We trust that this brief review of the possibilities of Atom Theory is enough to demonstrate that it is possible to account for the various syntactic frames of a single verb without recourse to multiple lexical representations or linking rules. The burden for AT lies in constraints on interpretation rather than in constraints on projection, which, we feel, is as it should be.

5

The Lexical Encoding of Idioms

MARTIN EVERAERT

Idiomaticity is a pervasive feature of language. Igor Mel'čuk (1995:169) formulates it like this: 'People do not speak in words; they speak in phrasemes.' By that he means that many expressions in language are not free combinations of lexemes (words or other atomic forms) but are fixed, frozen phrases. The opposite position seems to be taken in generative theorizing: 'Repetition of sentences is a rarity; innovation, in accordance with the grammar of the language, is the rule in ordinary day-by-day performance. The idea that a person has a 'verbal repertoire'—a stock of utterances that he produces by 'habit' on an appropriate occasion—is a myth, totally at variance with the observed use of language' (Chomsky 1972:118). In his book *The Language Instinct* Pinker formulates it like this: '. . . virtually every sentence that a person utters or understands is a brand-new combination of words, appearing for the first time in the history of the universe' (1995:22).[1] These statements can be misleading. Chomsky and Pinker do not deny that many utterances in everyday language are, or contain, conventional expressions that must be used in a certain way, but they argue that, in generative grammar, the essence of the study of language lies in the fact that 'language relies in an essential way on this unboundedness, on the fact that language contains devices for generating sentences with arbitrary complexity' (Chomsky, *ibid.*). However, even though focusing on what is not conventional makes linguistics, seen as part of the cognitive sciences, so challenging, it is still

I would like to thank the editors for their patience and encouragement. I am thankful for the comments of Nicole Grégoire, Malka Rappaport Hovav, and two reviewers on an earlier draft. They are not to blame if what I try to convey is still not clear.

[1] Chomsky's and Pinker's statements might be taken as only referring to sentences, while it is generally assumed that idioms are rarely full sentences. However, the creativity argument (Chomsky 1966) does not apply only to full sentences. Moreover, in my view idioms are just as easily full sentences as they are phrases.

important to see how to address the behaviour of idiomatic expressions in generative theorizing.

In this chapter I will address the question of how idioms are lexically represented in a generative theory, and the consequences that this has for a theory about the computational system. Answering such a question inevitably means that we have to reflect on what idioms are in a study of language which understands language to be a system of conditions deriving from the human biological endowment, an innate component of the human mind that yields a particular language through interaction with presented experience. Ultimately this requires one to be explicit about the concept of a lexicon, and its properties, that could figure in such a study of language.

In section 5.1 I will explain in detail that the notion 'idiom' is not straightforward. In section 5.2 I will look into 'non-compositionality' as a defining feature of idioms. Sections 5.1 and 5.2 will make clear that the only possible interpretation of what can be taken as 'idioms' encompasses all formulaic expressions, including sayings, proverbs, collocations, and whatever has been suggested in taxonomic approaches. My interpretation of idiom is close to what is called 'a multiword expression' in computational linguistics, a combination of words that have linguistic properties not predictable from the individual components or the normal way they are combined. For that reason, those properties must be stipulated in the lexicon. In section 5.3 I will discuss some of the possible interpretations of the notion lexicon in generative theorizing, allowing me to specify my ideas about the lexical encoding of idioms in section 5.4.

5.1 Defining properties of idioms

It is not difficult to find numerous definitions of the notion of an idiom taking non-compositionality (in some form) at its core. In (1) I have listed some:

(1) a. 'I shall regard an idiom as a constituent or a series of constituents for which the semantic interpretation is not a compositional function of the formatives of which it is composed.' (Fraser 1970)

b. 'An idiom is a multilexemic expression E whose meaning cannot be deduced by the general rules of the language in question from the meaning of the constituent lexemes of E, their semantically loaded morphological characteristics (if any) and their syntactic configuration.' (Mel'čuk 1995:167)

c. '. . . any expression in which at least one constituent is polysemous, and in which a selection of a subsense is determined by the verbal context, is a phraseological unit.'
'A phraseological unit that involves at least two polysemous constituents, and in which there is a reciprocal contextual selection of subsenses, will be called an idiom.' (Weinreich 1969:42)

Fraser's definition (1a) reflects most straightforwardly what is taken as an idiom in formal theorizing, whether generative or not. It is about idioms of the type in (2):

(2) a. *to fly in the face of* something, *to have other fish to fry*, etc.
b. *All's fair in love and war*, *Beggars can't be choosers*, etc.
c. *a feather in* one*'s cap*, *a family man*, etc.
d. *for the time being*, *in a nutshell*, etc.
e. *to follow* someone*'s lead*, *to feast* one*'s eyes on* something, etc.

The definition I have taken from Mel'čuk (cf. 1b) does not give full justice to what he takes as the central concept in the study of idioms, i.e. phrasemes. Phrasemes are 'set phrases', phrases that are not free. He sees the examples in (2) as a proper subset of the class of phrasemes. Phrasemes would also include examples as in (3):[2]

(3) a. *French window*, *black coffee*
b. *bacon and eggs*, *ebb and flow* / *high tide and low tide*
c. *to do a favour*, *to crack a joke*
d. Dutch: *dag en nacht* / #nacht en dag
English: *day and night* / *night and day*
e. Dutch: *peper en zout* / #zout en peper
English: *salt and pepper* / #pepper and salt

For many scholars examples as in (3) would not normally be taken as idioms, but perhaps as collocations. If we make such a distinction, idiom is the term reserved for semantically opaque phrases while collocation is used for non-free phrases with a transparent semantics.

Weinreich's definition (1c) is twofold. The first part refers to a phraseological unit, a notion that is not fundamentally different from Mel'čuk's phraseme. Subsequently he defines idioms, in the sense of Fraser, as a subset of the phraseological units. Below I will reflect more on Weinreich's definition (1c), which contains important insights, but I will first focus on Hockett's insights on what the defining properties of idioms are.

[2] I am using the #sign to indicate grammatical infelicity.

In Hockett (1956) too, an idiom is a grammatical form, the meaning of which is not deducible from its structure. However, the following quote adds a crucial dimension:

(4) 'In every living language, new idioms are constantly being created, some destined to occur only once or twice and then to be forgotten, others due to survive for a long time. [. . .] the mere occurrence of a nonce-form [= free expression, ME] for the first time does not in itself constitute the creation of a new idiom. An additional requirement is required: something more or less unusual either about the structure of the newly produced nonce-form, or about the attendant circumstances, or both, which renders the form memorable. [. . .] Given any such novelty, either of expression or of circumstances or of both, the event installs meaning into the linguistic form which is used, and the latter becomes idiomatic' (Hockett 1956:222–3).

What Hockett argues for is that idioms can only be realistically defined in relation to a language community, i.e. only exist in a language community.

The same tenet is found in Fillmore, Kay, and O'Connor (1988): 'We think of a locution or manner of speaking as idiomatic if it is assigned an interpretation by the speech community if somebody who merely knew the grammar and the vocabulary of the language could not, by virtue of that knowledge alone, know (i) how to say it, or (ii) what it means, or (iii) whether it is a conventional thing to say.' Likewise in lexicologist tradition this feature is stressed (Burger, Buhofer, and Sialm 1982:1): A combination of two or more words is a phrasal lexical item iff (a) the words behave as a unit, which is not the result of regular syntactic or semantic rules applying to the word combination, and (b) the phrase is used in a language community as if it was a lexical unit.[3] The first part of this definition is the non-compositionality constraint, but the second part adds the dimension of the linguistic community which uses a word combination in a way that deviates from 'normal' use.

These quotes from Hockett and Burger, Buhofer, and Sialm add an interesting perspective, because they focus on an issue that is also raised in Nunberg, Sag, and Wasow (1994). The latter discuss a number of properties that are relevant for an understanding of what idioms are, but pick out one feature that all idioms necessarily have, viz. conventionality: 'Idioms are

[3] 'Phraseologisch ist eine Verbindung von zwei oder mehr Wörtern dann, (a) wenn die Wörter eine durch die syntaktischen und semantischen Regularitäten der Verknüpfung nicht erklärbare Einheit bilden, und (b) wenn die Wortverbindung in der Sprachgemeinschaft, ähnlich wie ein Lexem, gebräuchlich ist.'

conventionalized: their meaning or use can't be predicted, or at least entirely predicted, on the basis of a knowledge of the independent conventions that determine the use of their constituents when they appear in isolation from one another)' (Nunberg, Sag, and Wasow 1994:492). The fact that *kick the bucket* means 'to die' or that we have to say *spill the beans* and not *spill the peas* does not follow from any underlying grammatical principle or from our knowledge of the world, but simply has to be learned. Their use of the notion 'convention' is based on Lewis (1969), who defines it as follows:

(5) A regularity R in the behaviour of members of a population P when they are agents in a recurrent situation S is a *convention* if and only if it is true that, and it is common knowledge in P that, in any instance of S among the members of P,
   (1) everyone conforms to R;
   (2) everyone expects everyone else to conform to R;
   (3) everyone prefers to conform to R on condition that the others do, since S is a coordination equilibrium and uniform conformity to R is a coordination equilibrium in S.
   (4) everyone prefers that everyone conforms to R, on condition that at least all but one conforms to R;
   (5) everyone would prefer that everyone conforms to R', on condition that at least all but one conforms to R', where R' is some possible regularity in the behaviour of members of P in S, such that almost no one in almost any instance of S among members of P could conform both to R' and to R.

In other words, conventionality in language is a relation between a linguistic regularity, a situation of use, and a population that has implicitly agreed to conform to that regularity in that situation out of preference for general uniformity.

If we follow this line of reasoning and take 'conventionality', for instance in the sense of (5), as a defining feature of idioms, it will lead to an interpretation of an idiom as crucially defined with respect to a linguistic community. But this has an important consequence because taking the defining feature of idioms to be conventionality defines idioms in terms of E-language, triggering the question what idioms in a study of I-language would be (Chomsky 1995).

In various publications, Chomsky has distinguished between various meanings of the word 'language': I-language versus E-language. E is to suggest external and extensional; I is to suggest internal, individual, and intensional. E-language defines language as a social construct, a pairing of sentences and meanings as used by a speech community where certain regularities in action

or belief hold among the population (Chomsky 1995:15–16). This could be taken as the language of a community (Basque), country (Swedish), area (Romance languages) or era (eighteenth-century French). In an I-language perspective, language is taken as part of cognitive psychology (ultimately, biology), an investigation of what an individual 'knows' of a language, our innate ability to produce and understand utterances.

Perhaps I can illustrate the point further with a comparison. In morphology it has been argued that one should distinguish between (im)possible words (result of the principles of morphology) and existent, actual words (Halle 1973; Aronoff 1983). In such a morpheme-based lexicon along with its word formation rules, the rules that govern the combination of morphemes, generate more words than what really exists in a particular language. Potential words are words that are well-formed with respect to the word formation rules, whereas actual words are those potential words that are realized in a language. In this sense morphology would be different from syntax because syntax would only be concerned with defining the class of possible sentences in a language. However, one could take idioms, defined in the broad sense of the word, as actual phrases, like actual words part of an 'actual lexicon'.

The conclusion I draw from the discussion above is the following. I propose to take a liberal notion of idiom: the phraseological unit of Weinreich, an actual phrase.

(6) Idioms are conventionalized linguistic expressions which can be decomposed into potentially meaningful components and exhibit co-occurrence restrictions that cannot be explained in terms of rule-governed morphosyntactic or semantic restrictions.

Such a definition would include the examples given in (2) and (3), and many more such as, for example, the discourse or pragmatic idioms in (7), and the constructions in (8) (Fillmore, Kay, and O'Connor 1988):

(7) a. Q: *How are you?* A: *Fine, thanks, and you?*

b. [addressing the customer at the counter in a shop]
English: *Will that be all?* Dutch: *Anders nog iets?*
otherwise again anything

c. [on packaging material of perishable food]

English:	French:		German:		
Best before…	*À consommer avant…*		*mindestens haltbar*		*bis.…*
Use by …	to consume	before	at least	keepable	till

(8) a. . . . *let alone* X
Martin won't drink beer, let alone whiskey

b. *the* X-*er*, *the* Y-*er*
The more the merrier, The bigger they are the harder they fall, etc.

c. *will/shall* + progressive (Mittwoch 1992)
He'll be owning his own house next
#He is owning his own house

d. Dutch:
het X-*ste is niet* X *genoeg*; X = goedkoop, groot, mooi, etc.
the X-est is not X enough cheap big beautiful
'expressing a high degree of X-ness'

Such examples are classified as idioms because the definition in (6) does not take (non-)compositionality as a defining feature. These examples show conventionalized co-occurrence restrictions, whether they are taken as compositional or not. This means that idioms are firstly and foremost defined in terms of E-language.

This leaves open the question whether there is any reason, or any way, to define 'idiom' in the sense of I-language. To put it in other words, one might raise the question whether the notion idiom has any meaning with respect to the study of the computational system. However, if we are to define idioms in the sense of the mentally represented linguistic knowledge that a native speaker of a language has, then it seems that non-compositionality as a defining property might be the only way to proceed. For that reason, I will focus on that issue in section 5.2.

5.2 (Non-)compositionality

Compositionality is generally defined as:

(9) The meaning of a complex expression is a function of the meaning of its parts and the mode of composition.

Compositionality is one of the most central principles of formal semantics, a principle that concerns the relation between syntax and semantics. Idioms are always discussed in this context because they are a clear example of syntactic expressions that do not obey this principle. But it is important to understand that in formal semantics '. . . the principle of compositionality is not an empirical hypothesis. Rather, it must be viewed as a methodological principle, one that represents a choice to do semantics in a particular way'

(Groenendijk and Stokhof 2005, based on Janssen (1983)). And, to add to that 'while it makes good sense to ask if a semantics is compositional or not, it makes no sense to ask the same question about a particular phrase' (Westerståhl 1998).[4] Let me illustrate the point.

Weinreich (1969) contains an important and careful discussion of the semantics of idioms. He illustrates how an idiomatic sense of a complex expression may be the result of a suppression, addition or replacement of some component of meaning. He argues that many morphemes (words) appear in a dictionary with more than one sense. Each sense is contextually specified, and the contextual features may be of several kinds. They may be syntactic; the subsense may vary for transitive (*to walk the dog*) vs. intransitive use (*to walk*) of the verb. The contextual feature may be semantic; *blind* has at least two senses, viz. 'unseeing' and 'without exit at opposite end'. The latter is only available in *blind alley*. Finally, the selection of the subsense might be dependent on the contextual presence of a specific morpheme: *blind date* vs. # *blind appointment* (Weinreich 1969:40–1).[5] Weinreich adds that the contextual specialization may work both ways: subsense X on R requires the presence of S, while subsense Y on S requires the presence of R. This is an important theoretical innovation, which I will illustrate below in (10–13), because it allows non-heads to contain contextual restrictions on heads.

Suppose we apply Weinreich's point to the well-known idiom *kick the bucket*. We might argue that *to kick* has two subsenses, given in (10), and that the same holds for *bucket* (cf. 11), each having two subsenses with different contextual features:

(10) a. $kick_1$ MEANING: 'kick'
SYNTAX: [- (NP)]
b. $kick_2$ MEANING: 'die'
SYNTAX: [- *the* $bucket_2$]

(11) a. $bucket_1$ MEANING: 'bucket'
SYNTAX: -
b. $bucket_2$ MEANING: -
SYNTAX: [$kick_2$ -]

If the lexicon is structured in this way, only two meanings can be computed. If we combine (10a) with (11a) we will derive the literal meaning of *kick the bucket*, and by combining (10b) with (11b) the idiomatic reading is derived. In

[4] This issue is lucidly summarized in Dowty (2007).

[5] This is what Katz (1966) defines as a syncategorematic element, i.e. an element whose meaning makes crucial reference to an element in its immediate context.

other words, the modes of composition in the idiomatic and non-idiomatic reading are distinct, but neither violates compositionality.

What would make this implementation of compositionality unacceptable? Well, not the fact that some context sensitivity is built into the meaning of lexical items (cf. Kamp and Partee 1995). However, one might say that the way in which meanings are defined and combined are not 'natural'. Indeed, there is a familiar way to compose a transitive verb meaning with a NP-meaning to form a VP-meaning (10a + 11a) and one might argue that the combination of subsenses (10b) and (11b) is 'unnatural'. The reason for that would be that the NP-meaning in the idiomatic reading (11b) is empty, and the idiomatic subsense of the verb (10b) is quite unrelated to the other subsense (10a).[6] Essentially, what (10) and (11) illustrate is the point made in Partee (1984) that 'the principle [of compositionality, ME] can be made precise only in conjunction with an explicit theory of meaning and of syntax, together with a fuller specification of what is required by the relation "is a function of". If the syntax is sufficiently unconstrained and meanings are sufficiently rich, there seems no doubt that natural languages can be described compositionally.'

There are more 'natural' examples of the strategy exemplified in (10–11). These are idioms, reminiscent of cases discussed in Weinreich (1969) that are partially or fully semantically transparent:

(12) a. It is *raining cats and dogs*
'raining very heavily'

b. She *disturbed the peace*
'to commit the illegal act of behaving in a noisy way in public' /
'to disregard the state's requirements to behave in a peaceful, orderly way'

c. He *dressed the part*
'to clothe oneself suitably for what one has to do, for the role or function one has to perform'

In (12a) the only 'idiomatic' part seems to be *cats and dogs*, which combined with predicate *rain*—and not, for instance with *pour*, *snow*—means that it rains very hard:[7]

(13) *cats and dogs* MEANING: 'very hard' [adverb of degree]
SYNTAX: [*rain* -]

[6] But cf. Ruhl (1975) for arguments that this analysis is justified.
[7] All semantic specifications are from *Macmillan English Dictionary for Advanced Learners* 2006.

(12b) refers to a legal description of an offence, but is a specific combination of one of the original subsenses of to disturb (*Not even a breath of wind disturbed the beautiful scene*)—let's call it subsense 2—and one of the subsenses of *peace* (*Can't I get a moment's peace around here?*)—let's call it subsense 3—adding a judicial aspect:[8]

(14) *disturb*$_2$ MEANING: 'to do something that stops a place/situation from being pleasant, calm, or peaceful'
SYNTAX: [- *the peace*$_3$]
peace$_3$ MEANING: 'a calm quiet situation in which you are not annoyed by noise or other people'
SYNTAX: [*disturb*$_2$ -]

Likewise, the verb 'dress' in (12c) retains (one of its) subsenses, *to clothe* in the idiom, in which *part*—subsense 5, for argument sake—seems to add the special meaning, deriving approximately the meaning of (12c):

(15) *dress*$_2$ MEANING: clothe oneself
SYNTAX: [- *the part*$_5$]
part$_5$ MEANING: 'clothing that is usual or expected for a particular situation'
. SYNTAX: [*dress*$_2$ -]

Interestingly, Nunberg, Sag, and Wasow (1994) argue precisely for this type of solution to what they call Idiomatically Combining Expressions like *to pull strings* 'to exploit personal connections'. They explain that in this idiom parts of the idiom have identifiable meaning, but crucially 'the availability of these meanings for each constituent can be dependent on the presence of another item . . . it arises through a convention that assigns particular meanings to its parts when they occur together' (Nunberg, Sag, and Wasow 1994:496–7).[9] Building on this compositionality—the degree to which the phrasal meaning, once known, can be analysed in terms of the contribution of the idiom

[8] Malka Rappaport Hovav rightly pointed out to me that what is suggested in (14–15) implies that if the observed subsenses are independently needed outside these specific environments, these subsenses would have to be listed twice.

[9] The use of the term 'semantically decomposable/analysable' in Nunberg, Sag, and Wasow (1994) might suggest that they mean something different from compositionality. The following quote makes clear they do not, and adhere to direct compositionality: 'Notice that this approach predicts a strong correlation between semantic analysability and "transformational productivity". That is, to the extent that compositional semantic analysis of an idiomatic expression is possible, a lexical analysis, i.e. an analysis that posits interpretationally interdependent words combining by general syntactic principles, is to be preferred…' (Nunberg, Sag and Wasow 1994:508).

parts—they explain why one can find manifestations of the idiom *to pull strings* as in (16):[10]

(16) a. We could . . . *pull* . . . yet more *strings*.
b. Those *strings*, he wouldn't *pull* for you.
c. Kim's family *pulled* some *strings* on her behalf, but they weren't enough to get her the job.

Nunberg, Sag, and Wasow argue that idiomaticity is of a fundamentally semantic nature. That is, to account for the morphosyntactic behaviour of idioms 'we have to appeal not just to the semantic properties of idioms, but to the figurational processes that underlie them and the discursive functions that they generally serve' (p. 494). More precisely, the syntactic flexibility of a phrase will 'ultimately be explained in terms of the compatibility of its semantics with the semantics and pragmatics of various constructions' (p. 531).

That might very well be true, but it is impossible to decide because we are unable to (dis)prove the essence of the contention. It is simply not possible to define the subset of phrasal expressions called idioms or idiomatically combining expressions on the basis of semantic considerations. The crucial question is whether there is any fundamental difference between the *kick the bucket* cases of (10–11) and the *pull the strings* cases of (16). From a formal semanticist's point of view there is not, unless we are offered a theory of meaning that specifies what limitations the relation 'is a function of' in the compositionality definition in (9) has. Since Nunberg, Sag, and Wasow (1994) do not give us such a theory, the distinction between 'compositional' idioms, i.e. idiomatically combining expressions, and 'non-compositional' idioms is nothing else than saying that some idioms allow more morphosyntactic flexibility than others. How morphosyntactic flexibility should be accounted for is, despite the suggestion in Nunberg, Sag, and Wasow (1994), not basically different from what Weinreich (1969) concluded: 'the relation between idiomatic and literal meanings is so unsystematic as to deserve no place in the theory. It is an essential arbitrary relation, which looks plausible only in retrospect.' (Weinreich 1969:76).

The conclusion of this section is that there is no straightforward way to use compositionality as a way to make a distinction between idiomatic expressions and idiomatically combining expressions, to use Nunberg, Sag, and Wasow's terminology. Similarly it is impossible to make a principled

[10] Even though the subsenses in these cases are not independently available, contrary to the examples in (14,15), I assume that the mechanism is the same in both cases.

distinction between the syntactic flexibility of types of idioms based on their supposed compositional semantics. The only way to ensure that idioms will be analysed as non-compositional seems to be (i) not to allow semantics to make use of contextual specifications that are defined in terms of phonological strings (cf. 10b, 11b, 13–15), instead of morphosyntactic features (like [– NP], [– <+plural>], etc.) and (ii) to put restrictions on what are acceptable subsenses of a basic expression. Restriction (i) would disallow descriptions such as given in (10, 11, 13–15) and, therefore, a connection between conventionality and semantics. Basically restriction (ii) would require a theory on how to define polysemy and distinguish it from homonymy. It would result in not allowing the verb *to kick* to get a subsense in which it would mean 'to die' because it would be unrelated to the subsense 'to hit something/someone with your foot'.

If we follow Weinreich's assumption about subsenses and contextual features, it will be important to be clear about how the lexicon might look in such an approach. I will address this in the next section.

5.3 Structuring the lexicon

5.3.1 *Idioms as part of the lexicon*

The lexicon could be taken as the list of lexemes, i.e. the linguistic objects that need to be memorized because they do not have the form or interpretation specified by the definitions of the language (cf. Di Sciullo and Williams (1987)):

(17) a. *-ing*
b. *micro-*
c. *book*
d. *cran-berry*
e. *kick the bucket*

This is the conception of the lexicon as the collection of the lawless, a list of lexical items characterized by a set of features specifying all and only the idiosyncratic, unpredictable information with it. Let's call it the narrow lexicon. Together with valency rules, or other 'lexical' rules, the narrow lexicon constitutes 'the lexicon' in the lexicalist sense of the word (Siloni 2002). Distributed morphology (Halle and Marantz 1993, 1994) questions this interpretation of the lexicon. In distributed morphology there are no lexical items in the traditional sense of the word, no lexicon as a list of 'exceptions' (Chomsky 1995:235). The properties of the narrow lexicon are divided over

three independent but interrelated lists. To begin with there is a list of grammatical features which are structured into bundles of features by syntax. Distributed morphology furthermore distinguishes a vocabulary and an encyclopaedia. The vocabulary contains the set of vocabulary items relating a phonological string and information about where that string may be inserted, the terminal elements taken as atomic bundles of grammatical features, providing the set of phonological signals available in a language for the expression of abstract morphemes. The encyclopaedia is the list of units relating meaning to a vocabulary item, or combination of vocabulary items: the list of idioms in a language.

Both in a lexicalist framework as in distributed morphology the strings in (17) have to be listed as units of some form. In distributed morphology idioms are part of the encyclopaedia, in a lexicalist theory they could be part of the narrow lexicon.

Distributed morphology takes idioms as an argument against the 'lexicalist' interpretation of the lexicon: 'there is no sharp divide between word and phrasal special meaning' (Marantz 1997). I believe that, whatever position one takes in the lexicalism debate, idioms like in (17e) will have to be listed, and will never count as atomic for syntactic computation. As far as idiomaticity is concerned, I fully agree with the position of distributed morphology that we need an encyclopaedia as a place where conventions are listed, and issues like frequency, register, collocation, and non-linguistic knowledge play a role. But note that such an encyclopaedia is a lexicon in the E-language sense of the word, the 'actual lexicon', including actual words, and actual phrases, that is, idioms in the broad sense of the word. Taken this way, it will be clear that it has no direct bearing on the study of the rule system allowed by UG. In a lexicalist approach one could very well argue that something like an encyclopaedia is independently needed, separate from the narrow lexicon, taken as the set of atoms encoding the morphosyntactic inventory of a language. A discussion of idioms will, thus, never be able to contribute to the question whether there are lexical rules, taken as I-language concepts, fundamentally different in nature from the rules of syntax, and a lexicon in which 'things can happen' (Siloni 2002; Reinhart and Siloni 2005). The real question is what a lexicon in the I-language sense of the word would look like—simply the list of morphosyntactic features, or more?—and whether idioms could be part of such a lexicon.[11]

[11] This means that in this line of reasoning the distinction between actual words and potential words (or phrases) does not have any effect on I-language. So, to illustrate this, because the notion

5.3.2 *Lexical redundancy*

Before I present an outline of a theory of lexical encoding of idioms in the next section, one preliminary issue with respect to idioms needs to be addressed. Whatever position one takes on the representation of idioms in a lexicon, there is one 'lexical' fact that everyone takes for granted, but has imported consequences for the structure of the lexicon:

(18) In an idiom all lexical items, or the combinations of lexical items, retain their morphosyntactic properties.

Take, for instance, the phrase *to lose one's cool*. Even though this idiom is listed as a word combination, the individual words appearing in the idiom retain their 'original' properties in the idiom. The past tense of the verb *lose* is *lost*, and not *losed*, both in the idiom (19a) and in its 'literal' use in (19b).

(19) a. He *loses/lost/*losed* his *cool*.
b. He loses/lost/*losed his umbrella.

(20) gives a similar example from Dutch. The verb *houden* in *een slag om de arm houden* (refuse to commit oneself) takes *hield* as a past tense and not the regular form *houd-de*, both in idiomatic (20a) and non-idiomatic (20b) use.

(20) a. Hij *houdt/hield/*houdde een slag om de arm.*
He holds/held a turn around the arm
'He refuses/refused to commit himself'
b. Hij houdt/hield/*houdde het boek.
'He keeps/kept the book'

This last example illustrates further that the same principle applies in the nominal domain. Dutch has two productive plurality markers, *-s* and *-en*, the choice of which is phonologically triggered. In the plural the noun *slag* /slax/ takes *-en*, however, with an accompanying vowel change (lengthening: slagən). In this particular idiom the noun can be pluralized, and takes the irregular form, just like in non-idiomatic use

(20) c. Hij *houdt slagen om de arm*
He holds turns around the arm
'He refuses/refused to commit himself in more than one way'

The principle in (18) is also illustrated by the example (21) from Nunberg (1978):

blocking is dependent on listing, blocking cannot be part of I-language. (Thanks to Malka Rappaport Hovav for making this clear.)

(21) a. #He *kicked the bucket* slowly
b. He died slowly
c. #He kicked the ball slowly

How are we to explain the illformedness of (21a) while (21b) is perfectly well-formed? What Nunberg suggests is that lexical aspect of the verb *to kick* (cf. 21c) is retained in the idiom.

Everaert (1995, 1996) discusses a slightly different instantiation of principle (18). It is argued that auxiliary selection in Dutch idioms is not sensitive to the lexical semantic properties of the idiom as a whole but is determined solely by the lexical semantic features of the verb contained in that idiom. So, whatever the meaning of the idiom might be, the verb retains the auxiliary selection features of its non-idiomatic use. Under the assumption that auxiliary selection is sensitive to aspectual features, BE for telic intransitives, unaccusatives, HAVE for all other predicates, Dutch verbs like *vertrekken* (to leave) (cf. 22a) or *sterven* (to die) (cf. 23a) take BE, as expected. However, the idioms *je biezen pakken* (to leave) in (22b) and *de geest geven* (to die) (23b), similar in meaning to, respectively, (22a) and (23a), take HAVE, as these verbs would select in their non-idiomatic use (cf. 22c, 23c):

(22) a. Zij is vertrokken
'She has left'
b. Zij heeft haar *biezen gepakt*
She has her bags packed
'She left'
c. Zij heeft/*is haar boeken gepakt
'She packed her books'

(23) a. Hij is gestorven
'He died'
b. Hij heeft *de geest gegeven*
He has the ghost given up
'He died'
c. Hij heeft/*is het boek gegeven
'He gave the book'

A different type of argument for (18) comes from wordplay. The basic morphosyntactic and lexical semantic properties of the atoms in an idiom are always available, and allow speakers to change the idiom in such a way that the literal and the idiomatic sense are simultaneously available (cf. Kuiper 2007).

Take the Dutch idioms in (24a) and (25a), respectively meaning that a person who is in trouble might act unexpectedly, and that a person in a prominent position is expected to be criticized:[12]

(24) a. *Een kat in het nauw maakt rare sprongen*
A cat in the 'tight spot' makes funny jumps
'A drowning man will clutch at a straw'

b. De Griekse diplomatie *maakt sprongen* als *een kat in het nauw*
The Greek diplomacy makes jumps as a cat in the tight spot
'Greek diplomacy is hard pressed'

(25) a. *Hoge bomen vangen veel wind*
high trees catch much wind
'The bigger they are, the harder they fall'

b. Lage *bomen vangen* minder *wind*
low trees catch less wind
'The bigger they are, the harder they fall, but if they are less big, they will fall less hard'

In (24b) the form of the saying is quite seriously transformed, but we still recognize the saying (all the words but one are retained) and its semantics. The words modifying the nouns *boom* (tree) and *wind* (wind) are changed into their opposites. The result is that (25b) expresses a meaning that modifies the meaning of the saying in the following way 'if you are less important, criticism will be less severe'. Note that in both cases modification of the idiom is only possible if we accept that the original lexical and syntactic properties of the individual words and the way they are combined in the idiom are retained.

Now take the often discussed example *kick the bucket*. It is your typical frozen idiom, and nobody disagrees on that, but it is still possible to find the idiom modified:

(26) a. Say Hallelujah; Throw up your hands; *The bucket is kicked*; The body is gone.
[From the lyrics of the song *Say Hallelujah*, Tracy Chapman]

b. 'When we do talk about death, we are trained to hold euphemisms like shields. Far more people pass on, push up daisies, *kick buckets*, visit Davy Jones locker, or journey to the great beyond, than simply die. In fact, linguistically speaking, we are close to overcoming death.' http://scicom.ucsc.edu/SciNotes/9502/Death.html

[12] The b-examples are from newspapers.

(24–6) clearly illustrate that even idioms that are highly fixed, as sayings are (cf. 24, 25), or idioms that are proverbially non-compositional (cf. 26), are not taken as unanalysable strings of words but built up of phrases with syntactic properties, containing lexical items that have retained their morphosyntactic and lexical semantic properties. Given the right context, syntactic flexibility is not tied to semantic transparency: any element in an idiom can be modified, replaced. That is not to deny that out of context or outside the boundaries of wordplay there is a distinction between semantically transparent and non-transparent idioms that has its consequences for their morphosyntactic flexibility. But it shows that the 'original' properties of words in idioms are never lost, always available, and it is this lexical transparency in idioms that needs to be accounted for in a structuring of the lexicon (cf. Jackendoff 1975).

5.4 The lexical representation of idioms

5.4.1 *Approaches to the lexical encoding of idioms*

In early generative work idioms were represented as a 'string of words' (Fraser 1970; Bobrow and Bell 1973): the idiom *hit the sack* would be represented in the lexicon as:

(27) [+V; hit], [+DET; the], [+N; sack]

However, given that lexical items have selectional properties of various kinds (such as subcategorization) it is an attractive hypothesis to suppose that the syntactic representation of idioms is not fundamentally different from other lexical items, and should be constrained by such properties.

In Chomsky (1965:90–106) two types of lexical contextual features were distinguished: selection restrictions and (strict) subcategorization. A feature of the form [X - Y] is called a subcategorization feature if the symbols X and Y are categorial (also called C-selection in Chomsky (1986)), and is called a selection feature if the symbols X and Y are syntactic features (of the type ±animate, ±count, ±human, etc.).[13] Part of the empirical content of selection restrictions was taken over by theta-grid specifications, or S-selection in the sense of Chomsky (1986). Chomsky (1965:190–2) also discusses the lexical representation of verb-preposition constructions like *decide on*, suggesting that selection in terms of lexical formatives could be regarded as a form of

[13] Note that these feature are called 'syntactic' in Chomsky (1965), reflecting that these features are visible to syntax, and are not purely semantic in nature.

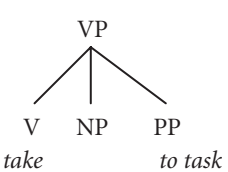
subcategorization. This is what Baltin (1989) in fact proposes, assuming idiomatization to be a special case of subcategorization.

In early Lexical Functional Grammar idiom chunks are lexically encoded by means of constraint equations on grammatical functions (cf. Bresnan 1982; Grimshaw 1982) which can be taken as an equivalent of subcategorization in this respect. A similar conclusion appears to hold for the encoding of idioms in Generalized Phrase Structure Grammar. Although the lexical representation of idioms is not explicitly discussed in Gazdar *et al.* (1985), it seems straightforward to assume that idiom chunks are to be introduced by PFORM/NFORM/ etc. features as part of the phrase structure rules that reflect subcategorizational features in Government-Binding theory (cf. Erbach 1992).

The position that idioms are to be defined as contextual restrictions on heads has been defended by authors such as Jackendoff (1975); Chomsky (1981:37); Bresnan (1982); Coopmans and Everaert (1988); Baltin (1989); Everaert (1991); Pesetsky (1995), among others. They all take it, in one way or another, that (some) idioms are represented in the lexicon just as heads are represented (cf. 28a below). A different view is developed by, for instance, Abeillé and Schabes (1989); Abeillé (1995); Di Sciullo and Williams (1987); van Gestel (1995); Jackendoff (1995), who argue that idioms are represented in the lexicon as phrase markers, for instance as trees or labelled bracketed representations (presumably independent of their heads).[14] Idioms are syntactic objects, a syntactic unit of some kind—an NP, VP, and so on, listed in the lexicon. For example, the VP *take* NP *to task* is formally a VP and functions as one when inserted for the node VP in a sentence (cf. 28b). In the former approach a lexicon only consists of heads, in the latter, the lexicon will contain both heads and phrases:[15]

(28) a. *make*; V, +[_ [$_N$ *headway*]] (Baltin 1989:6)

b. *take* someone to *task* (Di Sciullo and Williams 1987:5)



[14] Emonds (2000:42–3) argues that the lexicon cannot mention phrases, nor distinguish between heads and projections.

[15] It is clear that these approaches give different answers to the question what an idiom may look like. But I will not go into that issue here (cf. Everaert 1993; Kuiper and Everaert 2000).

In the next section I will show that we may need both types of representation. But, more importantly, I will be more specific on how we could envisage idioms defined as contextual restrictions on heads.

5.4.2 *Lexical selection*

As mentioned above, Chomsky (1965) takes selection in terms of lexical formatives as a form of subcategorization. However, I want to argue for a separate form of contextual restriction, lexical selection, separate from categorial selection, allowing us to make reference to item-specific content, to specific morphemes. This feature is strictly lexical, invisible to the computational system (cf. Zwicky 1989).[16] More specifically I will argue that the lexical representation of idioms is defined by lexical selection, L-selection (cf. Everaert 1991, 1993 and Pesetsky 1995). So, I will argue that, apart from being specified for categorial features (C-selection), syntactic features (S-selection), and a phonological matrix, a head also has necessary features that determine its co-occurrence with another lexical head (cf. Vergnaud 1985, Baltin 1989 for related ideas). A head could, thus, L(exically)-select a specific item. L-selection incorporates Weinreich's idea that the meaning/subsense of a lexical element makes crucial reference to an element in its immediate context.

L-selection is defined as in (29), leading to a definition of idiom as in (30)

(29) a. L-selection involves the selection by one terminal element α of another terminal element β where the projection of β is in the syntactic domain of α.
b. The syntactic domain of head α is the set of nodes contained in Max (α) that are distinct from and do not contain α.

(30) An idiom is a syntactic constituent X such that there is a set of terminal elements Q, Q = $(\alpha_1, \ldots, \alpha_i, \ldots, \alpha_n)$ for $n \geq 2$, for which it holds that α_i is the head of X and for all α_j, $j \neq i$, α_j is L-selected by α_i.

This definition states that in an idiom, the heads of (at least) two phrases are always lexicalized and thus represented in the lexical entry for the idiom, i.e. both these heads cannot be substituted for without the idiom ceasing to be recognizable as a

[16] Note that L-selection is not at work when grammar refers to lexical formatives, such as infinitival *to* or the auxiliary *have*, etc. because, crucially, these lexical formatives can be taken as the spell-out of grammatical features such as ±finite, ±auxiliary, etc. (cf. Zwicky 1989).

form of the idiom. Observe that the head of the idiom can L-select more than one head, as is the case, for instance, in *take note of* and *take aim at*.[17]

From the definitions in (29) and (30) it follows naturally that idioms are always headed (Kuiper and Everaert 2000). In this approach it would, for instance, be impossible to encode an idiom consisting of a lexicalized direct object and a locative PP without a lexicalized verb being part of it (31a), or an idiom consisting of only a subject and an object in which the predicate is not part of it (31b) (parts of the potential idioms underlined):

(31) a. $[_{VP}$ V $\underline{NP}_{OBJ}$ $\underline{PP}_{LOC}]$
b. $[_{S}$ $\underline{NP}_{SUBJ}[_{VP}$ V $\underline{NP}_{OBJ}]$

This restriction does not need to be stated by a separate principle, such as in O'Grady (1998) or Koopman and Sportiche (1991). A lexical item could not be L-selected if there was not a lexical item to L-select it in the first place.
In (32) I have spelled out what the (partial) lexical entry of a particle verb like *decide on* would look like if one would employ L-selection:

(32) [*decide*]
V
a. Phonological representation: /disaɪd/
b. C-selection: [___ PP]
c. L-selection: [___ [on]]
d. Semantics:
(1) 'choose someone or something from a number of possible choices'

Let's look again at the idiom *kick the bucket*. As made clear in section 5.3, the lexical encoding should reflect that the verb *kick* in the idiom is not to be distinguished from the 'normal' verb, which means that its idiomatic use is encoded as a polysemous subsense in the lexical semantic specification, be it with a special restriction, an L-selection property:[18]

(33) [*kick*]
V
a. Phonological representation: /kɪk/
b. C-selection: [___ NP] b'. C-selection: [___]

[17] If we follow Vergnaud (1985) that such features are distinct from other selectional restrictions in that they can percolate to the projections of the head marked for this feature, a complement could select its head. This might seem appropriate for idioms like *it is raining cats and dogs* (cf. 12a), and there are many more cases like that. One could argue that in this idiom idiomaticity is limited to *cats and dogs* meaning 'very hard' but only in the context of *rain*.

[18] For expository reasons I have left out other possible lexical restrictions connected to the subsense given.

c. Semantics:
- aspectual marking: + semelfactive
- lexical semantics:
(1) 'hit something/someone with your foot'
(2) 'move your legs as if you were kicking something'
(3) 'stop doing something that is bad for you'
(4) 'hit a horse's sides with your heels to make it move forward'.
(5) 'die', L-selection: [___ [*bucket*, sem:(3), +def]]

We thus assume that the narrow lexicon is structured in such a way that lexical items, through L-selection, can refer to a subsense of another lexical item: in a specific meaning *kick* (33c, 5) points to, is connected to, a specific meaning of *bucket*, in its turn specified as in (34):[19]

(34) [*bucket*]
N
a. phonological representation: bʌkɪt
b. semantics
(1) 'round open container with a handle, used for carrying liquid and substances such as sand or soil'
(2) 'a part of a machine shaped like an open container with a handle, used for moving soil, stones etc.'
(3) 'Ø', L-selection [[kick, sem:(5)] ___]

Given this representation it should come as no surprise that under conditions of wordplay, metalinguistic use, the plural of *bucket* is *buckets* (cf. 26b), that *kick* in its idiomatic use retains some of its aspectual properties (cf. 21a,c), or that passivization is possible (cf. 26a), as the verb *kick* allows passivization in other subsenses.

The definition of idiom in (30) is the definition of idiom in the I-language sense of the word. It is formulated without reference to E-language notions, and is formulated in terms of a special type of contextual restriction, L-selection, which I take to be part of the theoretical inventory of the narrow lexicon.

Idioms listed in the narrow lexicon will also be listed in the encyclopaedia, just like other atoms. Given the fact that we use a liberal notion of what an idiom is, there will also be idioms that will only appear in the encyclopaedia,

[19] This analysis raises the question whether idioms like *kick the bucket* necessarily have a unique meaning, or would allow polysemy/homonymy, like other lexical items. Idioms are rarely polysemous, but it is not excluded. Gehweiler (2006) shows that homonymic idioms exist.

such as the examples in (7).[20] This is to be expected because the encyclopaedia is place to encode pragmatic and sociolinguistic information, such as frequency and register.

The encyclopaedia might also be the place to encode exceptional properties of idioms. For instance, while the verb *zeggen* (to say) in Dutch has an irregular past tense (*zei*), for some speakers the regular form (*zegde*) can also be used (especially in Flanders). In the case of some idiomatic particle verbs, however, the regular form is preferred for all: *toezeggen* (to promise), *opzeggen* (to cancel), while other particle verbs, like *voorzeggen* (to whisper an answer) behave like the simple verb. Another type of exception to be encoded in the encyclopaedia involves idioms with a fixed non-canonical word order, such as the Dutch example in (35):

(35) . . . dat hij [door de bomen]$_{PP}$ [het bos]$_{NP}$ niet meer ziet
. . . that he through the trees the wood not any more sees
'that he cannot see the wood for the trees'

In Dutch prepositional objects canonically follow direct objects, [NP PP V]$_{VP}$, best visible in embedded sentences. But in (35) the PP has to precede the NP if the word combination is to retain its idiomatic sense. This type of information cannot straightforwardly be encoded in the narrow lexicon through L-selection, and we would, thus, have to assume that idiom is listed in the encyclopaedia as a phrase marker.[21]

5.5 Conclusion

The fact that *kick the bucket* means 'die' or that we have to say *spill the beans* and not *spill the peas* does not follow from any underlying grammatical principle or from our knowledge of the world. It simply has to be learned, even if we assume that the latter-mentioned idiom is semantically compositional or analysable. Contrary to what is generally assumed in the literature on idioms, only convention determines which phrases can be called an idiom. I have illustrated that there is no straightforward way to use compositionality

[20] When Hockett says 'one can validly conceive of a whole poem, or novel, or the King James version of the bible, as a long idiom' (p. 223), such idioms could clearly only be part of the encyclopaedia.

[21] These exceptional idioms have ill-understood properties. For instance, in the perfect tense (i), but not in the past tense (ii), the idiomatic reading is lost:

(i) #Hij heeft door de bomen het bos niet meer gezien.
(ii) Hij zag door de bomen het bos niet meer.

as a way to make a distinction between expressions that are idiomatic and expressions that are not idiomatic. The consequences are twofold: idioms are only defined as part of public language (E-language), and consequently idioms are listed in a lexicon encoding non-linguistic knowledge such as conventions. In distributed morphology such a lexicon has been identified as the encyclopaedia, the inventory of actual words, and actual phrases (idioms). If we are to define idioms in the sense of the mentally represented linguistic knowledge that a native speaker of a language has (I-language), we have to make recourse to another lexicon, a narrow lexicon taken as the set of atoms encoding the morphosyntactic inventory of a language, making use of a slightly extended theory of lexical representation. In such a lexicon verbs are not only specified for S-selection (argument structure) and C-selection (sub-categorization, but also L-selection (lexical selection). Linking L-selection to semantic subsenses allows us to view idioms, phrasal lexical items, as a concatenation of lexical formatives. Idioms are, thus, taken as a set of words exhibiting co-occurrence restrictions, defined in terms of lexical contextual specification features (L-selection).

Part II

Argument Structure and the Compositional Construction of Predicates

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6

The Emergence of Argument Structure in Two New Sign Languages

IRIT MEIR

All languages have ways of encoding the particular role that an argument plays in an event, i.e. marking the argument structure of verbs. Three basic mechanisms for encoding argument structure are found in spoken languages: word order, verb agreement, and case markers.[1] Sign languages also have systematic ways of encoding argument structure. Of the three devices, sign languages employ word order and verb agreement.

Though argument structure is fundamental to any human language, grammatical marking of this structure is often redundant, as the relationship between the arguments and the verb may be inferred from the semantics of the verb and the properties of the arguments, together with contextual clues and general knowledge. Yet reliance on semantic and contextual clues may often run into a dead end. While the stretch of words '*boy tree hug*' can have only one plausible interpretation in our world, the stretch '*boy girl hug*' may have two plausible interpretations, which can be systematically distinguished

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[1] These grammatical devices, namely word order, verb agreement, and case markers, are usually regarded as marking syntactic roles, not argument structure per se. However, as will become evident in this chapter, in new languages the distinction between the two linguistic levels—argument structure and syntactic structure—has not emerged yet. The two levels are isomorphic. Since I take argument structure to be more basic diachronically than syntactic roles, I refer to the grammatical mechanisms of word order and verb agreement as markers of argument structure. However, they can equally be referred to as syntactic role markers.

only if a communication system develops formal means for marking the hugger and the huggee. Once such a mechanism is introduced into the system, the system becomes context-independent, and can expand its expressive capabilities to describe events that cannot happen in our world, such as '*The tree hugged/talked to the boy*'.

How does such a mechanism emerge and develop, and how long does it take to develop? Does it show up full-blown right from the beginning, or does it take time to develop? Is there one universal course of development? In order to answer these questions, one needs to be able to observe a new language developing. New languages are hard to come by where spoken languages are concerned. Spoken languages and their argument structures are either some thousands of years old, or have developed from older languages which already had argument structure marking devices. Studies of young spoken languages, pidgins and creoles, indicate that young pidgins rely heavily on word order to express basic syntactic relations (e.g. Hymes 1971) while morphological devices take much longer to develop.

Sign languages as a class are much younger than spoken languages. Most sign languages that have been documented and studied to date are not more than two to three hundred years old. American Sign Language, one of the most widely studied sign languages, is approximately two hundred years old, dating at least from the establishment of the first school for deaf children in 1817, when indigenous sign languages were integrated with a language and pedagogical system brought from France (Lane, Hoffmeister, and Bahan 1996). Some European sign languages are slightly older. However, sign languages can be newer than that. Some sign languages developed recently within the last two or three generations. Such young languages make it possible to observe the oldest as well as the youngest signers of the language. According to Labov's Apparent Time construct (Labov 1994, 2001), the investigation of language use across different aged speakers is a synchronic measure of ongoing language change. Therefore, studying the language of signers of different age groups in these young languages may shed light on the development of linguistic structure almost from the beginning.

My colleagues and I have been fortunate to study two new sign languages that have emerged recently in Israel: Israeli Sign Language (ISL), a sign language that developed as the Deaf community in Israel was formed in the late 1930s, and Al-Sayyid Bedouin Sign Language (ABSL), a sign language that emerged spontaneously in a Bedouin village in the southern region of Israel also some seventy-five years ago. Though the two languages are of similar age, they developed under very different social conditions. ISL developed in a pidgin-like situation: people coming from different countries and bringing

with them different signing systems got together and founded a community. ABSL arose spontaneously in a community where congenital deafness became relatively widespread. There the transmission of the language is within and between families.

By studying sign productions of signers of different age groups in the two languages, we were able to track the development of argument structure marking devices. Our results indicate that the two languages share a basic strategy for encoding argument structure. Both languages show a marked preference towards one-argument clauses, which eliminates the need to mark the different arguments, since only one argument is associated with each verb. However, the two languages chose different paths when developing grammatical marking of argument structure: ABSL moved towards relying on word order, while ISL developed verb agreement. Examining the different stages of development and the different courses taken by the two languages provides us with some insight into how argument structure marking develops in human language.

6.1 History and social settings of two new sign languages

Israeli Sign language (ISL) evolved along with the Israeli Deaf community about seventy-five years ago, in a pidgin-like situation. The members of the first generation came from different backgrounds, both in terms of their country of origin, and in terms of their language. A few were born in Israel, and some of them went to the school for the deaf in Jerusalem that was founded in 1932, but the majority were immigrants who came to Israel from Europe (Germany, Austria, France, Hungary, Poland), and later on from North Africa and the Middle East. Some of these immigrants brought with them the sign language of their respective communities. Others had no signing, or used some kind of home sign.[2] Today, four generations of signers exist simultaneously within the Deaf community, which numbers about 10,000 members: from the very first generation, which contributed to the earliest stages of the formation and development of the language, to the fourth generation, that has acquired and further developed the modern language as a full linguistic system.

Al-Sayyid Bedouin Sign Language (ABSL) arose in a small, relatively insular and endogamous community with a high incidence of non-syndromic recessive deafness (Scott *et al.* 1995). The Al-Sayyid people settled in present-day southern Israel about two hundred years ago, and after five generations

[2] For a description of the history of the Deaf community in Israel and the development of ISL, see Meir and Sandler (2008).

(about seventy-five years ago), four deaf siblings were born into the community. In the next two generations, deafness appeared in a number of other families resulting in what today is estimated at about 150 deaf adults, teenagers, and children. The sign language that arose in the village is different in vocabulary from the sign languages of the region, ISL and Jordanian SL (Al-Fityani 2007), and in word order from ISL and the surrounding spoken languages, the local Arabic dialect and Hebrew (Sandler *et al.* 2005). ABSL is used widely in the community by both deaf and hearing members (Kisch 2000, 2004), and is seen as another language of the village in addition to spoken Arabic. The prevalent use of ABSL in the village has led to widespread exposure to the language by deaf signers and many of their hearing siblings and relatives from birth or a very young age. My colleagues Wendy Sandler, Carol Padden, and Mark Aronoff, and myself, have been privileged to study this language for the past seven years. All the results reported here on ABSL are based on our joint work.[3]

For the purpose of this study, signers were divided into three age groups in each language. In ISL, some of the signers of the first generation are still among us, which makes it possible to observe the oldest signers of the language. In ABSL, the signers of the first generation are all deceased, and the oldest signers we have been able to work with are in their forties. Therefore the division into age groups in the two languages does not match. The oldest ISL group consists of people of the first generation of signers, and the age span of each group is about fifteen to twenty years. The oldest ABSL signers are people in their thirties and forties, and the age span of the signers in each of the younger groups is seven to ten years.

ISL: ***Group 1***: Eleven signers aged 65 years and older.[4] People from this age group were not exposed to a unified linguistic system, but rather they created one through interaction with each other. Members of this group came from a variety of linguistic backgrounds. There are no ISL native signers among them, as the language was too young to acquire native users then, but seven of the eleven signers had deaf siblings or other family members. Therefore, some have used a sign language or some sort of a signing system from an earlier age.

Group 2: Nine signers aged 45–65. Members of this group can be considered second generation signers, since they had linguistic models when they joined the Deaf community. Those who were born in Israel or immigrated to Israel at an early age had at least several years of schooling with other deaf

[3] See, for example, Aronoff *et al.* (2004, 2008); Sandler *et al.* (2005); Padden *et al.* (in press a).
[4] The oldest subject is 91 years old, the first member of the Association of the Deaf in Israel.

children. The daily interaction with other deaf children over a long period gave most members of this age group the opportunity to use signing from childhood. Three of the signers in this group have deaf siblings.

Group 3: Four signers aged 30–44. All members of this age group had formal schooling, and learned Hebrew, and so can be considered bilingual. Three of the four are native ISL signers.

ABSL: ***Group 1*:** Nine second generation signers (eight deaf, one hearing), ages 28–∼45. Six are monolingual ABSL signers, two went to a school for the deaf in Beer Sheva, where they learned some Hebrew and interacted with ISL signers. Four members of this group had a deaf father. They all have deaf siblings, and had adult models of sign language, including deaf relatives such as aunts, uncles, and cousins.

Group 2: Four third generation signers, ages 17–24. All went to a school for the deaf in Beer Sheva, were taught in Hebrew and were exposed to ISL signs. Three have a deaf mother as well as deaf siblings, and the fourth has one deaf sibling. All of the younger adults interact with deaf signers of the second generation.

***Group 3*:** Twelve children (eleven deaf, one hearing), ages 5–15. All deaf signers study in a special class for the deaf in an Arabic speaking school in Tel-Sheva, where they are taught Arabic, and are exposed to some ISL signs used by their hearing teachers. Five children have a deaf parent, and all have deaf siblings.

The next section presents the grammatical structures in sign languages relevant for argument structure marking, namely the referential system and verb agreement. After a short description of the methodology in section 6.3, we turn to examine the development of argument structure marking in the two languages. Both languages seem to develop strategies that enable them to avoid the need for argument structure marking, presented in section 6.4. Yet such strategies are cumbersome, and both languages end up developing grammatical means for encoding argument structure (section 6.5): in ABSL a consistent SOV word order emerges, while ISL develops verb agreement. The implications of the differences between the two languages are explored in section 6.6.

6.2 Relevant aspects of sign language structure: referential system and verb agreement

Sign languages differ from spoken languages in that they are produced by the hands and body in a three-dimensional space. As such, they can employ space to organize their grammar. This grammatical use of space is employed for

marking argument structure in the verbal system of sign languages. Since this mechanism is very different from verb agreement in spoken languages, it is described in some detail in this section.

Like verb agreement in spoken languages, sign language verb agreement is a grammatical system, as it involves systematic encoding of syntactic and thematic roles, as well as the referential features of the arguments on the verb. However, it is different from spoken language verb agreement in that not all the verbs in a language are marked for agreement. Padden (1988) showed that ASL has a three-way classification of verbs, according to their agreement patterns: plain, spatial, and agreement verbs. Subsequent studies found a similar classification in other sign languages as well.

Verb agreement in sign languages takes the following form: the beginning and ending points in the articulation of the agreeing verb are associated with the points in space established for the arguments of the verb. In sign languages, nominals in a clause are associated with discrete locations in space, called 'R(eferential)-loci'. This association is achieved by signing a noun and then pointing to, or directing the gaze towards, a specific point in space.[5] These R-loci are used for anaphoric and pronominal reference for the nominals associated with them, and are therefore regarded as the visual manifestation of the pronominal features of the nominals in question (see e.g. Klima and Bellugi 1979; Lillo-Martin and Klima 1990; Meier 1990; Janis 1992; Neidle *et al.* 2000).

In addition to pronouns, verbs which inflect for agreement (the so-called 'agreement verbs') also make use of the system of R-loci: their beginning and end points, as well as the direction towards which the palm (or fingertips) is facing, are determined by the R-loci of their grammatical arguments. The direction of the movement of the verb is determined by the spatial thematic role of the arguments (movement is from source to goal), and the palm faces the syntactic object (Meir 1998, 2002).[6] The system, then, involves two mechanisms: establishing associations between referents and locations in the signing space, and altering the direction of the movement and palm facing of the verb sign. These mechanisms are independent of each other, but they need to be synchronized in order for the system to operate.

[5] Localization of referents may also be achieved by signing the noun itself in a specific location in space, if the sign is not body-anchored. For example, the sign CHILD is signed by placing a  handshape facing downwards in neutral space. If the signer places his/her hand to the right or to the left of the signing space, this location may serve as an R-locus for the particular child introduced into the discourse.

[6] This description of the mechanism of sign language verb agreement is oversimplified. For a fuller description and analysis, see Meir (2002).

The two other classes of verbs behave differently with respect to the R-loci. Plain verbs have invariant beginning and end points; the direction of the path movement of these verbs is not determined by the R-loci of their arguments. Plain verbs, then, do not make use of the system of R-loci. Spatial verbs are those whose beginning and end points are determined by spatial referents, that is, locations and not subjects or objects. The locations encoded by verbs in this class are interpreted analogically and literally, and not as representing grammatical arguments (Padden 1988).

This tri-partite classification is semantically grounded (Meir 2002). Agreement verbs denote transfer, whether concrete (as in GIVE, SEND) or abstract (as in TEACH, HELP). Spatial verbs denote motion in space, and plain verbs are defined negatively, as not involving transfer or motion. Many plain verbs denote psychological and emotional states.

Many sign languages have the verb agreement system described above, and they exhibit this tripartite division of verbs into the same categories (Meir 2002; Sandler and Lillo-Martin 2006). However, it seems that even in languages where verb agreement is quite robust, it is never completely obligatory. Signers may use non-inflected forms of agreement verbs, that is, sign forms anchored to the signer's body, moving from or towards the signer, and not between R-loci in the signing space. Or signers may use verb forms which are inflected only for one argument, the object argument. In such forms, the end point of the sign is directed towards an R-locus associated with the object argument, but the beginning point is the signer's body, even when the subject is not 1st person.[7] Therefore, while a sign language may have the full-blown system of verb agreement, there is a lot of variation in the language community, and fully agreeing forms co-exist with single-agreement forms as well as with non-inflected forms.

How does the full system develop? The examination of ISL in section 6.5 below indicates that the system does not emerge full-blown overnight (Padden *et al.* in press (b)). Moreover, it is not evident that all sign languages end up having such a system. ABSL provides an example of a sign language that relies on word order for encoding argument structure, and has not developed as yet a verb agreement system.

[7] See Meir *et al.* (2008) for a detailed description and analysis of the single agreement forms of agreement verbs.

6.3 Method: sentence production elicitation task

Since the relationship between the verb and its arguments can often be inferred from the semantics of the verb or from the context, it is important to study argument structure marking in sentences in isolation, where reliance on contextual cues is not available. As part of our study of the argument structure of ABSL and ISL, we designed a set of thirty short video clips (Aronoff *et al.* 2004; Sandler *et al.* 2005). Each clip depicts a single action carried out by either a human or an inanimate entity by itself or involving another entity. The events presented in the clips vary with respect to the number of arguments (intransitive, transitive, and di-transitive) and animacy. For our purposes here, the relevant clips are those denoting transitive and di-transitive events (eighteen clips). The transitive events varied with respect to animacy: six clips have two human arguments (e.g. a girl pulling a man), and six have a human and an inanimate argument (a girl pulling a shopping cart). The six di-transitive events all have two animate arguments and one inanimate argument (e.g. a woman giving a shirt to a man). Signers are asked to view the clips and describe the event in each clip to another signer. To check for comprehension, the addressee is asked to identify one of three pictures best corresponding to the action just described. One of the three pictures correctly depicts the action and entities involved, the second has a different subject but the same action, and the third shows the same subject performing a different action from that shown in the video. If the viewer chooses an incorrect picture, the signer is asked to repeat the description. The responses obtained from the signers in both languages, which constitute the data on which the studies reported here are based, are analysed according to the order of the constituents in the clauses, and various parameters of grammatical use of space described in section 6.5.

6.4 Emergence of argument structure: initial stages

Assuming that synchronic differences between different age groups in a language community reflect diachronic developments in the language (Labov 1994, 2001), a comparison between signers of the three age groups in ISL and in ABSL enables us to trace the development of argument structure devices from very early stages of the two languages. Our findings suggest that initially, languages 'try' to avoid marking argument structure. They develop different strategies that eliminate the need for argument structure marking. One is by showing strong preference for single argument clauses. If a clause has only one

argument, then its relationship to the verb can be inferred from the semantics of the verb. Therefore, if a language is restricted to one-argument clauses, the necessity to develop argument structure marking does not arise in the first place. Second, if the subject is by default 1st person, and the object—non-1st person, then again the assignment of syntactic roles to the arguments follows automatically from their person features. As I show shortly, both languages use the first strategy, while the second appears only in ISL.

6.4.1 *Tendency towards one-argument clauses*

When there is only one argument in a clause, the association of arguments to syntactic roles is trivial. Therefore, one way of avoiding the need to develop a mechanism for marking argument structure is by having only one-argument clauses. And indeed, we find that signers of both languages use this strategy extensively, especially when two animate/human arguments are involved. In such cases, they tend to break the event into two clauses, with two verb signs, each predicating of a different argument. Thus, an event in which a girl feeds a woman may be described as: WOMAN SIT; GIRL FEED. An event in which a man throws a ball to a girl can be rendered as: GIRL STAND; MAN BALL THROW; GIRL CATCH. This tendency is characteristic of signers of both languages. Out of all the responses describing a transitive event, in 22% of the ISL responses, and in 27% of the ABSL responses, the event was 'broken' into two one animate argument clauses. When looking only at those transitive events with two animate arguments, the percentage is higher: 33% in ISL, and 47% in ABSL.

Interestingly, the same tendency towards one-argument clauses has been reported of another new sign language, Nicaraguan Sign Language. This sign language emerged about thirty years ago, when the first school for the deaf was founded in Managua. The first group of deaf children brought to the school came from hearing families, and was not exposed to signing deaf adults. However, as they started to communicate with each other, a signing system started to emerge. The use of this system by subsequent cohorts of children who acquired it from their older peers brought about changes and developments into the language. Ann Senghas and her colleagues, who have been studying the language since its inception, report that the first cohort of children showed a strong tendency towards one-argument clauses if both arguments participating in an event are human. In fact, in their data they did not find *any* response consisting of two human nouns and a verb (Senghas *et al.* 1997:554). Typical responses were: MAN PUSH WOMAN FALL, MAN

PUSH WOMAN GET-PUSHED when describing a clip showing a man pushing a woman, and MAN CUP GIVE WOMAN RECEIVE for an event in which a man is giving a cup to a woman. In the second cohort different word orders appeared, some of which had the two verbs adjacent to each other (e.g. MAN WOMAN PUSH FALL, or MAN PUSH FALL WOMAN). However, even in the second cohort no responses consisted of two human nouns and one verb.

Three young languages, then, show a very strong preference for one-argument clauses in their initial stages.[8] An interesting parallel to this tendency can be found in the study of the history of logic.[9] Aristotelian logic and its subject-predicate schema is exclusively one-place predicate logic. This logic persisted until the nineteenth century, when Frege, coming from mathematics, introduced the notion of function, broadened this concept to include non-mathematical domains, and extended it to many-place functions (Bochenski 1961 [1970]: 323). It seems that the development of formal notation in logic mirrors the natural development of argument structure complexity in new languages.

This strategy, while efficient in terms of associating arguments with syntactic roles and avoiding ambiguities, is cumbersome. First, there is an inflation of verbs in the discourse, since every animate argument is associated with a different verb. Secondly, it is not always clear which verbs can be used to predicate the different arguments of an event. For example, in case of a seeing event, as in 'The child saw the man', what verb can be associated with the object? The only verb that comes to mind is 'be seen', so that the event is rendered as '*The child sees, the man is seen*'. This, again, creates a very 'heavy' and in a way redundant discourse.

6.4.2 *Subject = 1st person*

Another way to avoid the need to mark argument structure is by creating a specific association between syntactic roles and grammatical person. If the subject argument is always associated with particular person features, say 1st person, and the object is associated with another person, e.g. 2nd person, then there is no need for marking the identity of the syntactic arguments; it is derived from their association with person features.

This is clearly a very restrictive device, since it can be applied only in cases where the referential properties of the arguments match the previously

[8] Givón (1979) argues that the tendency towards one-to-one ratio of verbs and arguments is typical of the 'pragmatic mode' of communication, which characterizes pidgins and creoles inter alia.

[9] I thank Edit Doron for this important point, and Louise Röksa-Hardy for helpful discussion on this issue.

established mapping. For example, if the mapping is stated as above, then such verb forms cannot be applied when the subject is non-1st person.

Yet some ISL signers found a way to overcome this restriction. They identify themselves with one participant, the subject, and then present the event as if subject=1st person. The following, for example, was given as a response to a clip showing a woman looking at a man:

(1) WOMAN SIT, MAN SIT; I WOMAN, I LOOK.

The identity of the subject is introduced by forming an association between the signer (1st person) and a particular participant (WOMAN). This participant is then the subject, and the other participant is assigned the object role by implication. In some cases, the signer further identifies the object argument with the addressee, as in the following response to a clip showing a girl spoon-feeding her mother:

(2) YOU MOTHER YOU, FEMALE I CHILD, FEED-OTHER$_{(2)}$
'You are the mother, I am a child, (I) feed (you).'

Notice that when the subject is 1st person, the verb form is always signed with respect to the signer's body. In case of verbs denoting transfer, the verb form either moves from the signer's body towards the addressee (when the signer is the source of transfer, as in GIVE, THROW, FEED, and SHOW), or from the addressee towards the signer (when the signer is the goal of transfer, as in TAKE). In a sense then, the signer's body in such forms is always associated with the subject argument. This association between the signer's body and the subject argument, which we termed 'body is subject' (Meir *et al.* 2007), is very pervasive in the form of verbs in sign languages. Notice that the use of space in such forms is very limited: it is restricted to the signer-addressee axis, the Z axis. R-loci located in other parts of the signing space (e.g. loci associated with 3rd person referents), are not incorporated into these verb forms.

This technique creates an overlap between two grammatical domains: grammatical person and syntactic role. Once the mapping is established, there is no need to further identify the arguments by special markers. Though efficient, the technique is cumbersome since the speaker has to explicitly establish the mapping for each event. While doable for sentences in isolation, it is quite impossible for a stretch of discourse. And even in sentences in isolation it is not that common: only a few of the old ISL signers (four group 1 signers and one group 2 signer) use it. Signers in the younger groups did not use it at all, nor did any of the ABSL signers.

In sum, two strategies are found in the earlier stages of ISL and ABSL: preference for one-argument clauses, and identifying subject with 1st person,

the latter found only in ISL. What characterizes these strategies is that they are not argument structure marking devices, but rather strategies that avoid argument structure marking. Since language users of earlier stages of a language cannot rely on grammatical systems, as these have not developed yet, they ingeniously devise strategies that enable mutual intelligibility in spite of the lack of formal marking devices. These are not grammatical devices per se, but rather communicative strategies. But they contain the kernels of the grammatical structures that the languages eventually develop, to which we turn in the next section.

6.5 Later developments: emergence of grammatical systems

As pointed out above, avoiding the need to mark arguments for their syntactic roles comes with a cost: the discourse created by such means is either heavy with verbs or with explicit associations between syntactic roles and person features. Discourse stretches obtained from signers of the first group in each language are actually ample with verbs, which makes them 'heavy', as often commented by younger ISL signers when looking at the signing of older signers.

But examination of the data reveals that the two languages are not 'stuck' in this initial stage. Quite quickly, though not instantaneously, they develop argument marking devices: word order and verb agreement. Word order (or, more accurately, constituent order) makes use of linear ordering of the nominals in a sentence with respect to one another, but does not involve any morphological marking. Therefore, it is predicted to appear in a language earlier than verb agreement, the latter involving two grammatical categories (syntactic roles and grammatical person) as well as morphological marking. In spoken pidgins and creoles, word order is indeed the first argument marking device to appear. But in our study of the two new sign languages, we find that they developed along different lines: in ABSL a consistent word order appeared within its second generation. In ISL, a tendency towards a consistent word order is found only in the younger group (age 30–44), but the preferred argument marking device that developed in the language is verb agreement.

6.5.1 *Word order*

6.5.1.1 *ABSL* In our study of nine second generation signers of ABSL, we found out that a consistent SOV order emerged (Sandler *et al.* 2005; Padden *et al.* in press (a)). Though one-argument clauses by far outnumber multi-argument clauses, out of those 51 clauses containing two or more

arguments, 31 (61%) were SOV,[10] 8 (16%) were SVO, and 5 (10%) were OSV. Seven of the eight SVO sentences were signed by the younger signer of the group, who has a somewhat different word order, more similar to that of younger adults.

In ABSL young adults (group 2 signers), the word order preference is changed: SVO becomes as widespread as SOV. The younger children, though, show a pattern much more similar to the adults, where SOV is predominant. The difference between the two young groups might be attributed to schooling. In the school systems, the teachers (all of whom are hearing) use a communication system called 'Signed Hebrew' or 'Signed Arabic'. In these systems, manual signs accompany the spoken language (Hebrew or Arabic), but word order is that of the spoken languages. In both Hebrew and the local Arabic dialect the basic word order is SVO. The young adults in our study were exposed to signs in an SVO order for many years, which might very well have influenced their signing. The children, with fewer years of schooling, are less affected by the Signed Arabic word order. The younger signer of group 1 also had twelve years of schooling, which might explain her preference for SVO order.

6.5.1.2 *ISL* In group 1 ISL signers, we find no predominant word order. Both SOV and SVO order each occur in 14% of the responses. OSV occurs in 7%, and SVOV in 4%. As in ABSL, the most prevalent clause form in ISL is SV (29%). That is, there is a strong tendency towards one-argument, verb-final clauses in both languages. At the same time, there is a great deal of word order variation in ISL at that stage; 32% of the responses are orders other than SOV, SVO, or OSV. These results are in line with a study on word order in ISL conducted by Schlesinger and his colleagues in the 1970s (Namir and Schlesinger 1978:107). The signers who participated in the study were adult users of ISL then, who would be in their sixties and seventies today, that is, group 1 signers. The study reported in the present chapter took place thirty years after the study by Schlesinger and colleagues. The parallelism between the results obtained in the two studies provides justification for the Apparent Time method on which the current study is based.

In group 2 (45–65), the percentage of SV sentences decreases to 22%, but there is still no dominant word order in sentences containing two arguments: SOV occurs in 17% of the responses, SVO in 22%. Additionally, the SVOV

[10] This result collapses two word orders reported in Padden *et al.* (in press (a)): SOV, and SCV, where C is a complement which is not a straightforward object, such as WOMAN PAPER WRITE ('The woman wrote on a paper').

order is also becoming more widespread (11% of the responses). This order seems to constitute some kind of a compromise between the two dominant word orders—SOV and SVO. We do find, however, a decrease in the percentages of other word orders (25%), which may be taken as indicating a change towards more uniformity in the language.

In group 3 (age 30–44), SOV becomes the predominant order (32%), and SVOV is a bit more frequent than SVO (14% vs. 10% respectively). Other word orders reduce to 14%. There is still a large percentage of SV clauses (27%), but in this group the verbs in such clauses often inflect for agreement (in 60% of the SV productions), thus encoding the object argument morphologically, though not syntactically.

6.5.1.3 *Discussion* In their initial stages, then, the two languages are similar in showing preference for one-argument clauses, but look very different in terms of word order: one preferred order in ABSL vs. great variation in ISL. In subsequent years, ISL becomes more homogeneous in terms of word order (see Figure 6.1). By its third generation it shows a strong preference for verb-final clauses, where SOV and SVOV are becoming the preferred orders. ABSL, in contrast, developed a strong preference for an SOV order by its second generation. This preference changes in younger signers and shows up again in children.

SOV order, then, appears in both languages. In ABSL it appears quite quickly, in the second generation. In ISL it becomes the predominant order only in the third age group, though other orders are also in use in this age group. A question that arises is—why SOV? Since the surrounding spoken

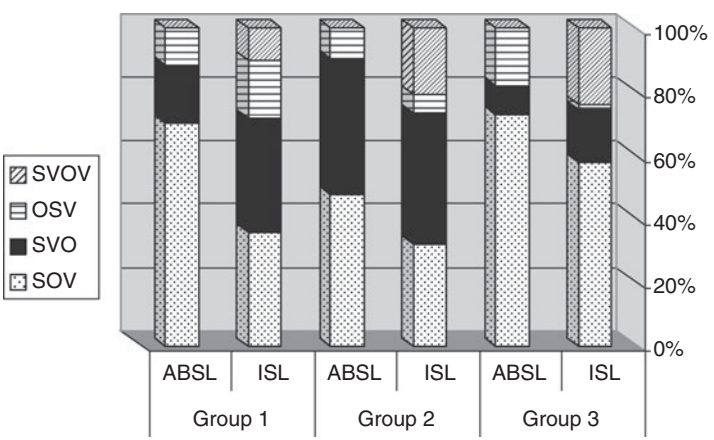


FIGURE 6.1 Proportions of use of four predominant word orders in ISL and ABSL, according to age groups.

languages, Hebrew and spoken Arabic, are SVO, and literary Arabic is VSO, the SOV order that emerged cannot be attributed to influence of the ambient spoken languages. It is also not likely that the two sign languages influenced each other. Since ABSL developed this word order more quickly than ISL, we would have to assume that the former influenced the latter. However, most ISL signers have never been in contact with ABSL signers, and have not even been aware of the existence of the language. Therefore such an influence is rather unlikely.

A different line of explanation is that SOV order is somehow more basic. Indeed, this word order is the most prevalent in the world's languages (Dryer 2005), and is assumed by some researchers to be indeed the basic order (Newmeyer 2000a). More interestingly, it has shown to emerge in cases where people invent a communication system without access to any linguistic model. Susan Goldin-Meadow and colleagues (Goldin-Meadow, So, Özyürek, and Mylander 2008) examined non-linguistic constituent order by using animated clips involving transitive actions. When asked to sort pictures representing parts of the action viewed, speakers of four different languages (English, Spanish, Turkish, and Chinese) consistently gave the order Actor-Patient-Action (that is, SOV order). In a second task, speakers were asked to convey the content of these clips by gesturing without speaking and again, a strong preference for gesture order emerged, the same Actor-Patient-Action order. When the same subjects gave spoken accounts of the animated actions, they reverted to the canonical constituent order of their languages, SVO in the three languages besides Turkish which has SOV order. These findings led Goldin-Meadow and her colleagues to conclude that SOV order reflects a natural cognitive sequencing. They hypothesize that entities are more basic than relations, hence the tendency to introduce arguments before the action. Of the two arguments involved in a transitive action, patients are more closely tied to the action, and therefore the object argument is more likely to appear in a position closer to the verb than the subject, resulting in an SOV order.

An explanation along these lines may explain the SOV order in second generation ABSL signers. Since the language arose spontaneously, with no linguistic system as a model, the word order that emerged is the more basic, default order. It is not clear, however, that it can explain the ISL word order developments, where SOV becomes predominant only in the third age group. If it is a basic cognitive order, why didn't it emerge in the first generation, when people needed a common linguistic system? The answer may be related to the different conditions that led to the development of the two languages. While ABSL arose spontaneously, ISL started off by using many different languages or communication systems. Therefore, grammatical systems did

not develop from scratch, but rather signers had to converge on a mutual system. The forces shaping this kind of a process may be different from those shaping an emerging system. I return to this point in the concluding section.

6.5.2 *Verb agreement*

Verb agreement is a grammatical mechanism which involves two grammatical categories—syntactic roles and grammatical person. In sign languages, grammatical person is built on the association of referents with spatial loci (described in section 6.2), and therefore verb agreement is built on spatial mapping. In order for a full verb agreement system to develop, several subsystems have to be in place. First, the language has to use spatial loci for representing referents, both present and non-present. Second, these loci have to be incorporated into the form of the verbs. This means that developing a full-blown verb agreement system implies dispensing with the anchoring of verb forms to the body, the 'body is subject' strategy. When the verb's path movement is not restricted to the body-inward/outward axis (the Z axis), it can move on the side-to-side axis (the X axis) to mark agreement with two 3rd person referents.

In order to examine whether the two languages developed a verb agreement system, the signers' responses were coded for the following parameters: (i) **Localization:** Responses were coded as to whether the signer established an association between a referent and a specific location in space. (ii) **Axis of the verb's path movement**: For those events that involve a linear motion in space or a transfer event, verbs were coded as to whether their path movement was on the Z axis, the X axis, or a diagonal line. (iii) **Verb agreement**: Five clips showed an event of transfer. The responses for these clips were coded as to whether the verb form shows agreement with one or two arguments. Verbs were coded as agreeing only if arguments were localized first, and the path of the verb moved between these locations.

6.5.2.1 *ABSL* ABSL has not developed a verb agreement mechanism. First, signers rarely localize referents. Signers of the two older groups localize referents only in 12% of their responses, and children even less so (6%). This means that the spatial basis of the system is not established in the language. As for use of axes, ABSL signers strongly prefer to orient the movement relative to their own body. Of 169 verbs coded recorded for groups 1 and 2 (Padden *et al.* in press (b)), 109 or 65% moved along the Z axis. The X axis accounted for 26% and the diagonal line was used in 9% of total forms

produced. Of the verbs denoting transfer, only 8 out of 65 cases (12%) were coded as indicating agreement with 3rd person referents.

6.5.2.2 *ISL* In ISL we find that signers of group 3 have a fully developed verb agreement system; older signers—much less so. A comparison of the three age groups on the different parameters gives us a clue as to how the system developed.

First, groups 1 and 2 differ from group 3 on the localization parameter. Signers of the two older groups localize referents in less than 30% of their responses. In other words, these signers show a strong preference for orienting verb forms with respect to their bodies, rather than moving them in space. Group 3 signers, in contrast, localize referents in almost 50% of their responses.

The two older groups look very much alike in terms of the use of axes (and very similar to ABSL signers): the Z axis is used in almost 60% of the responses, and the X axis in less than 30% of the responses. The two groups differ in the use of the diagonal: group 1 uses it only in 8% of the responses, while it appears in 16% of group 2 responses. The younger signers, 30–44 years old, show a very different pattern of axis use: the Z axis is the least used one (25%), the X axis is used extensively (42%), and the diagonal also becomes quite prevalent (32%). The use of spatial axes in the three groups is illustrated in Figure 6.2.

In group 3, almost half of the responses had double agreement forms. In these sentences, the two 3rd person referents were set in locations in space on both sides of the signer, and the verb forms moved between these two loci. Additionally, 24% of the responses marked agreement with one argument. In other words, almost 75% of the verb forms produced by signers in this group mark agreement. In the two older groups, more than half of the forms do not

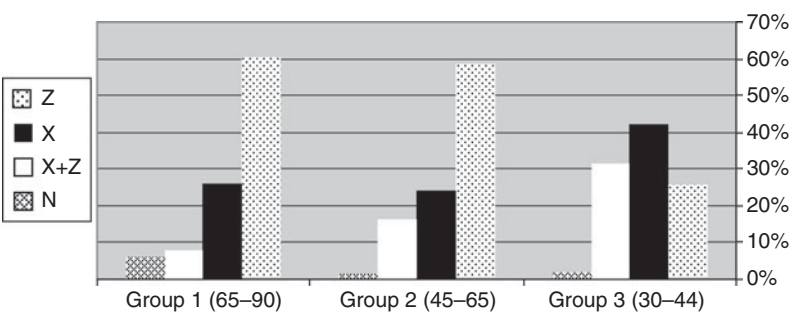


FIGURE 6.2 Per cent use of spatial axes in the three ISL age groups.

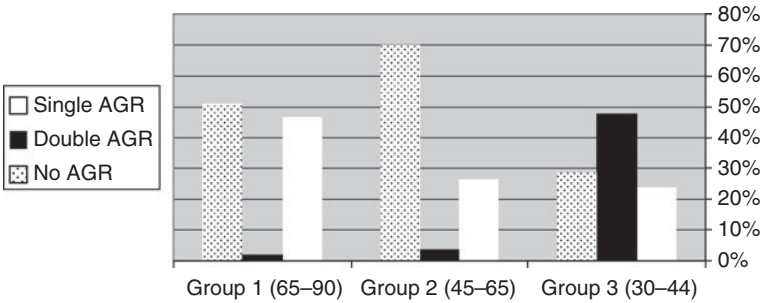


FIGURE 6.3 Per cent use of verb agreement type in three ISL age groups.

inflect at all, and there are very few forms (2 tokens in each group) that mark agreement with both subject and object (Padden *et al.* in press (b)). The percentage of use of the different agreement forms in the three groups is presented in Figure 6.3.

6.5.2.3 *Discussion: the development of verb agreement* How does verb agreement develop? When looking at sheer numbers (percentage of responses marked for agreement), it seems that verb agreement just 'popped out' suddenly in the third ISL group. However, a closer examination of the responses of the older signers reveals forms that can be regarded as precursors of verb agreement, and may give us a clue as to how the system developed.

First, in some responses signers localize referents in the signing space, but do not incorporate these locations in the form of the verb. In such responses, referents are localized to the right and to the left of the signer, but the signer still uses the Z axis in the form of the verb. The verb's path is towards or from the signer's body, not towards the loci established for the referents.[11] Such responses indicate that grammatical use of space may develop at different rates in different grammatical systems. In ISL space is used in the pronominal system before it is being incorporated into the verbal system.

How do spatial loci get incorporated into the verbal system? Two types of what seem to be intermediate steps between non-agreeing and fully agreeing forms are found in the data. First, one signer introduced an 'auxiliary' sign that moves between the R-loci, while the verb does not inflect for agreement. As a response for a clip showing a man throwing a ball to a girl, the signer localized

[11] A similar phenomenon is found also in ABSL (see Aronoff *et al.* 2004).

FIGURE 6.4 (a) Double agreement form (on the X axis) and (b) single agreement form (on the diagonal) of the ISL verb GIVE ('3rd person gives to 3rd person').

the referents by using the sign STAND in two different locations in space. She then signed an uninflected form of verb THROW, using the Z axis, after which she added a sign tracing the path of the ball moving from the R-locus of the subject to that of the recipient object. Such a form can be regarded as a compromise between the two competing strategies: the verb maintains its 'body as subject' form, while the referential system is incorporated into the form of a non-verbal sign indicating the path of transfer. Interestingly, there are sign languages that use similar auxiliary signs to indicate subject and object in non-agreeing verbs.[12] ISL did not end up adopting this grammatical mechanism.

Single agreeing forms constitute a different type of an intermediate step between non-agreeing and fully agreeing verbs. In such forms, the sign's initial location is on the body, and its end point is directed towards a spatial locus associated with the object argument. In other words, one end of the sign is body-anchored, and does not encode grammatical person, while the other moves in space and encodes the referential features of the object argument (see Figure 6.4). A possible scenario for the development of such forms is the following:[13] verbs of transfer usually have a path movement, from the signer's body outside (or inside towards the body when subject is goal, as in TAKE). If the addressee is a participant in the event, then the verb can be interpreted as directed towards the addressee, and consequently, the verb's final location can be re-analysed as

[12] E.g. Sign Language of the Netherlands, Bos (1994); Japanese Sign Language, Fischer (1996); Brazilian Sign Language, Quadros (1999); Taiwan Sign Language, Smith (1990).

[13] This explanation was suggested to me by Ann Senghas (personal communication).

associated with the addressee. Once this reanalysis occurs, it can be generalized to third person referents that are present in the signing situation. The verb's path is directed towards their actual location, resulting in a diagonal path. Then it is only a short step to directing the verb towards loci associated with non-present referents, and analysing the final location of the verb as encoding the referential features of that argument. Such forms, then, actually agree with the (recipient) object argument, and are produced on the diagonal line.

The process described here can be regarded as reanalysis of the verb's final location, from a phonological component of the sign into an agreement morpheme. Of the mechanisms introduced by signers of group 1 for encoding argument structure (e.g. introducing an auxiliary sign, associating subject with 1st person and word order), ISL seems to have adopted the single-agreeing forms as a step towards a full verb agreement system. This is the only parameter over which group 1 and group 2 differ. Group 2 signers use the diagonal line twice as often (16% vs. 8%) as group 1 signers.

Two additional steps have to take place in order for a full verb agreement system to develop: the other end of the sign has to be reanalysed as an agreement morpheme as well, and the body has to be dissociated from representing the subject. These steps did not occur systematically in the two older groups. Apparently, dissociating the verb form from the body takes time. But once such a mechanism finds its way into the language, the change spreads quite quickly, as the prevalent use of verb agreement in group 3 indicates.

6.6 Conclusion

ABSL and ISL start off by sharing a basic strategy—a preference for one-argument clauses. Yet they show different courses of development in terms of the argument structure mechanism they adopt. ABSL came to rely mainly on word order to indicate syntactic roles. This mechanism developed within the span of one generation. ISL, on the other hand, did not develop a preferred word order until its third age group, which is also when a full blown verb agreement system showed up. This difference between the two languages indicates that there is no one universal path for the development of argument structure marking. Languages may differ in that respect from very early stages of their existence.

ISL also shows that word order does not necessarily predate verb agreement in the life of a single language. This contrasts with what has been claimed for new spoken languages. In pidgins and creoles, the main strategy to indicate syntactic roles is by word order (Hymes 1971), while verb agreement takes much longer to develop. This difference between ISL and pidgins and creoles

might be attributed to modality differences, as argued in Aronoff, Meir, and Sandler (2005). Agreement morphemes in spoken languages are often the result of grammaticalization of free personal pronouns (see e.g. Givón 1971, 1976; van Gelderen 2007). Grammaticalization results from various processes of language change, such as reanalysis, extension, phonological erosion, borrowing, and semantic bleaching, which may occur independently or in various combinations (Joseph 2000; Newmeyer 2000b). In order for a lexeme to turn into a grammatical affix, some combination of these processes must occur—typically, over time. Sign language verb agreement, in contrast, is not the result of morphologization of free words, but rather develops when a sign language recruits space in the service of its grammar.[14] The spatial nature of sign languages allows them to represent certain grammatical notions (such as source and goal) in an iconic, transparent way. Since the verb agreement system is motivated and not fully arbitrary, it follows a quicker course of development than the overt inflectional morphology of spoken languages, and may precede the development of a consistent word order in these languages.

Is there any explanation for the differences between ISL and ABSL? The most simplistic answer is that languages may vary as to the grammatical devices they adopt, for no particular reason. Languages vary as to the morphological type they belong to (inflectional vs. agglutinating, for example), the particular word order they adopt, and also the particular argument structure marking strategy they develop.

Another possible line of explanation attributes at least some of these differences to the different socio-linguistic conditions under which each language emerged and developed. ISL developed in a pidgin-like situation, where people with different signing systems came together and formed a community. Not all the basic language ingredients had to be invented from scratch, since at least some of the members of the first generation used other sign languages which they brought with them from their lands of origin. The first generation of ISL was characterized by immense variety in terms of the grammatical devices employed by different people. ABSL developed under very different circumstances. People did not come together to form a community, but rather were born into a community. Yet that community did not have any sign language as a linguistic model. Therefore, any linguistic

[14] Therefore, sign language verb agreement shows that it is not always the case that 'Today's morphology is yesterday's syntax' (Givón 1971). Inflectional morphology may develop by means other than grammaticalization of free morphemes. I thank Edit Doron for this point.

mechanism had to be invented or built on linguistic building blocks that already developed in the emerging linguistic system.

Verb agreement takes time to develop, because it involves encoding two grammatical categories, and freeing verb forms from being body-anchored. ISL started off with more variety, that is, more possibilities to choose from. The kernels of grammatical use of space can be found in the 'subject=1st person' device, and in the spatial mapping that some signers use quite extensively. So it is possible that ISL did not have to come up with a totally new mechanism, but rather to choose from several existing options, and expand on these. ABSL signers, on the other hand, had to develop all the components of the system from scratch, which might slow down considerably the emergence of a verb agreement system. It might also be the case that ABSL will not develop verb agreement at all. If one sub-part of the system does not find its way into the language (e.g. if signers do not systematically establish R-loci for non-present referents), then the verb agreement system found in many sign languages and described in section 6.2 cannot develop.

This line of thought may also explain why ISL took much longer to develop preferred word order. The wide variety of orders found in the first generation made it more difficult to home in on a particular order within a short span of time. The second age group exhibits less variation than the first group, but it is only in the third age group that the language community is homogeneous enough for a specific order to become predominant. Interestingly, this word order is SOV, the same order found in group 2 ABSL signers, and the one argued to be a basic cognitive order (Goldin-Meadow *et al.* 2008). It may be the case that this order did not emerge in the first and second generations, because some signers still relied on the linguistic systems they brought with them. It is only in the third generation, which was much less exposed to other signing systems, and has more native signers, that this order becomes the preferred one, though other orders are still quite frequent as well. It must be concluded, then, that the processes of developing grammatical structures de novo and in a pidgin-like situations are different, and may result in different linguistic structures in the languages.

The approach laid out here assumes that the social conditions under which a language develops interacts with the development of its linguistic structure. Sign languages are crucial for developing and evaluating such approaches. Because of their young age, the social conditions and histories of their communities are relatively known, and their linguistic development is observable from very early stages. Furthermore, new sign languages develop under two distinct settings: within small communities or villages where transmission is within and between families as in ABSL, and in pidgin-like

situations where unrelated signers of different backgrounds are brought together in locations such as cities or schools, exemplified here by ISL. The visual modality, that affords sign languages with the possibility to exploit iconicity in certain aspects of their grammars, allows some grammatical structures to arise more quickly, as discussed above. All of these factors make new sign languages a perfect natural laboratory for studying the development of linguistic structure and its interaction with the nature of the language community.

7

Animacy in Blackfoot: Implications for Event Structure and Clause Structure

ELIZABETH RITTER AND SARA THOMAS ROSEN

Transitivity alternations often involve the addition or suppression of internal arguments with a concomitant shift in aspectual classification. Such alternations include the addition or removal of a direct object, as in antipassive, applicative, instrumental and benefactive alternations. Other transitivity alternations affect the external argument by adding or taking away an agent or causer, as in passive and causative constructions. The current chapter will argue that apparent transitivity alternations in Blackfoot (Algonquian)[1] are fundamentally different in nature. We shall show that alternations between transitive and so-called intransitive verbs in Blackfoot are surprisingly immune to whether or not there is an internal argument. We further show that the relevant morphology is sensitive to the existence of an external argument, the thematic role of the external argument, and the semantic content of the external argument—external arguments must be animate.

Following Bloomfield (1946), it is standardly assumed in the literature on Algonquian languages that verb stems are subcategorized into one of four classes, depending on transitivity and gender.[2] These include two classes of intransitive verb stems, which are distinguished by the grammatical gender (animate or inanimate) of the subject, and two classes of transitive verb stems,

[1] Blackfoot is a Plains Algonquian language of Southern Alberta, Canada, and Northwestern Montana, USA. It is considered an endangered language with approximately 5100 speakers (Ethnologue website). We thank Rachel Ermineskin for teaching us about her language, and Jen Abel, Heather Bliss, and Sara Johansson for their help with the fieldwork. Unless otherwise noted, all data come from our fieldwork.

[2] See, for example, Piggott (1989); Goddard (1990); and Frantz (1991).

which are distinguished by the grammatical gender (animate or inanimate) of the object.[3]

TABLE 7.1 Bloomfield's (1946) Algonquian verb class system

VERB CLASS		INDICATIONS
Intransitive Animate	(IA)	subject is animate
Intransitive Inanimate	(II)	subject is inanimate
Transitive Animate	(TA)	object is animate
Transitive Inanimate	(TI)	object is inanimate

Verb class is indicated by a morpheme that appears at the right edge of the verb stem called a FINAL, whose form is lexically determined. The Blackfoot counterpart of 'eat' is typical of dyadic predicates in that it can be realized by an IA, TA, or TI verb stem, each containing a different final morpheme.

(1)	'eat'	ooy-i	IA	– subject (agent) is animate
		oow-at	TA	– object (patient) is animate
		oow-atoo	TI	– object (patient) is inanimate

A first indication that the standard characterization of the Algonquian final morpheme as a transitivity marker does not accurately characterize the contribution of the final to clause structure is that IA finals appear on verbs with and without thematic objects, as shown in (2) below.[4]

(2) a. naoyiw mamii
na-ooy-**i**-wa mamii
PST-eat-IA-3SG fish
'S/he ate fish.'

b. naoyiw
na-ooy-**i**-wa
PST-eat-IA-3SG
'S/he ate.'

[3] We use the terms subject and object for ease of exposition. There is in fact little evidence that grammatical relations play a role in the grammar of Algonquian languages (cf. Ritter and Rosen 2005; Ritter and Wiltschko 2004 for arguments that these languages lack subjects). Note also that traditional Algonquianists use the term ACTOR for the external argument of transitive verb and GOAL for the internal argument, rather than subject and (in)direct object.

[4] The following abbreviations are used in this chapter: **1/2/3/4** – 1st/2nd/3rd/4th person; AN – animate; BEN – benefactive; CONJ – conjunctive paradigm; CP – complementizer phrase (clause); DIR – direct theme; DEM – demonstrative; DUR – durative; DP - determiner phrase; IA – intransitive animate; II – intransitive inanimate; IMPERF – imperfective; IN – inanimate; INST – instrument; INTRANS – intransitive; INV – inverse theme; NONFACT – non-factive; NON-PRT – non-particular (= general) number; NP – noun phrase; PERF – perfective; PL – plural; PRON – pronominal clitic; PROX – proximate; PST – past; SG – singular; TA – transitive animate; TI – transitive inanimate; TRANS – transitive; TH – theme.

What then is the contribution of the final morpheme? We propose that it determines whether a DP object is licensed in the syntax. If Chomsky (1995) is correct, then the category that formally licenses a DP object is a light verb known as *v*, and *v* also determines whether there is an external argument. We show that Blackfoot finals have both the syntactic and the semantic properties of *v*. It follows that they are not markers of transitivity, and consequently do not signal aspectual or internal argument structure. A survey of different finals in Blackfoot reveals that they have both the formal licensing capacity of a functional category and the open-class content characteristic of a lexical category. Thus, our analysis provides new empirical support for the postulation of *v*, and for the hypothesis that these light verbs constitute a category with mixed lexical and functional properties (cf. Butt 2003).[5]

7.0.1 *Organization*

This chapter is organized as follows: in section 7.1 we demonstrate that finals do not indicate membership in different aspectual classes. In section 7.2 we show that they do not express argument structure alternations, but rather determine whether a DP object is licensed in the syntax. In section 7.3 we argue that finals determine the availability of an external argument. We demonstrate that external arguments must be animate in Blackfoot, and analyse this as a semantic selectional restriction imposed by the final. In section 7.4 we discuss the morphosyntactic category of finals and the syntactic structure of Blackfoot predicates. Section 7.5 contains concluding remarks.

7.1 Blackfoot finals do not express event structure

We begin by demonstrating that Blackfoot finals do not encode aspectual distinctions, and more specifically that the alternation between related TA/TI and IA verb stems does not signal a difference in telicity. The literature has amply demonstrated that telic predicates—i.e., predicates that describe an event with an inherent endpoint—require a direct object (see, for example, van Voorst 1988; Tenny 1994; and van Hout 1998).[6] For verbs of creation and

[5] See Brittain (2003) for a similar proposal based on morphological evidence from a variety of other Algonquian languages.

[6] In fact the requirement is for an *underlying* direct object. This is the case for intransitive telic predicates, which are all unaccusative (e.g. *arrive, die*). We assume that the surface subject of this class of verbs is Merged as a direct object, and subsequently undergoes movement to subject position.

consumption, there is a direct relation between the unfolding of the event and semantic properties of the object noun phrase. This can be illustrated with the pair of examples in (3):

(3) a. She ate fish. Activity
b. She ate the fish. Accomplishment

(3)a describes an ACTIVITY—an atelic event that unfolds over time, but has no inherent endpoint, and there is no specified quantity of fish consumed in the course of the eating event. (3)b, on the other hand, describes an ACCOMPLISHMENT—a telic event that unfolds over time, and whose inherent endpoint is determined by the quantity of fish consumed.

Cross-linguistically, this aspectual distinction is frequently signaled by morpho-syntactic alternations, such as object specificity, object case-marking, object agreement or object shift (cf. Ritter and Rosen 2001, and references cited therein). As noted at the beginning of this chapter, Blackfoot TA and TI finals agree in gender with their objects.[7] Given what we know about the relation between (a)telicity and agreement across languages, the standard view of Blackfoot finals might lead us to expect that these morphemes also serve as morpho-syntactic markers of (a)telicity. For example, we might expect to find evidence that the root 'eat' in combination with an intransitive final constitutes an atelic (activity) predicate, while the same root with a transitive final forms a telic (accomplishment) predicate. On the other hand, our hypothesis that Blackfoot finals are *v* predicts that choice of final should not correlate with aspectual class. In order to test these predictions, we apply standard telicity tests to 'eat' and other verbs of consumption and creation in Blackfoot.

The first test we consider is compatibility with aspectual verbs meaning 'stop' and 'finish', both of which are possible with durative predicates.[8] The difference between them is that 'finish' presupposes that the event denoted by the predicate has some identifiable endpoint, while 'stop' does not. This leads to the prediction that both aspectual classes should be compatible with 'stop', but only accomplishments should be compatible with 'finish'.

(4) a. She stopped eating fish. Activity
b. *She finished eating fish.

[7] In fact finals are also known as stem agreement markers.

[8] The *for an hour/in an hour* test is inapplicable in Blackfoot because this language makes no formal distinction between time frame adverbials and durational ones. Thus, a phrase like *n'ito'takoohsin* 'one hour' is ambiguous between these two interpretations.

(5) a. She stopped eating the fish. Accomplishment
b. She finished eating the fish.

The second test is the potential for ambiguity with 'almost'. For activities, which are described as processes or events with homogeneous subparts, this adverb necessarily modifies only the start of the event. Accomplishments, on the other hand, consist of both a process and a result. Consequently, for this class of predicates the interpretation of 'almost' is ambiguous; it can modify either the process or the result, i.e. the start or the culmination of the event.[9]

(6) a. She almost ate fish. Activity
= almost started; ≠ almost finished
b. She almost ate the fish. Accomplishment
= almost started OR almost finished

The third test is the availability of an entailment from the progressive/imperfective to the simple past. Dowty (1977) first used the term IMPERFECTIVE PARADOX to describe the observation that the entailment from the progressive to the simple past fails with accomplishments. This failure is due to the fact that the progressive form of an accomplishment does not entail completion of the event, whereas the simple past indicates that the event is complete. For example, if Anita was called from the table just as she started to eat her fish course, then she may not have been able to consume the entire portion, and the eating event will not have reached its natural culmination. Thus, (7)a does not entail (7)b.

(7) a. Anita was eating that (piece of) fish. Accomplishment
b. Anita ate that (piece of) fish.

This problem does not arise with progressive/imperfective activities. Since activities are events with homogeneous subparts, the completion of at least one subpart is sufficient for the completion entailment to hold. For example, if Anita was eating fish, rather than meat or pasta, then as long as she consumed at least one bite, she ate fish. Thus, (8)a entails (8)b.

(8) a. Anita was eating fish. Activity
b. Anita ate fish.

[9] See Tenny (2000: 313–15) for an argument that *almost* is vague rather than scopally ambiguous. She correctly observes that while both 'almost start' and 'almost finish' interpretations are salient, what qualifies as *almost* V-ing is 'limited only by the imagination of the speaker'. We have elected to include this test because it is widely used to distinguish between telic and atelic events. What is important for our purposes is the fact that (6)b can be interpreted as almost finished, while (6)a cannot.

TABLE 7.2 Predicted telicity test results if finals are aspectual

telicity test	***ooyi* 'eat-IA'**	***oowat* 'eat-TA'**
stop Ving	✓	✓
finish Ving	*	✓
almost V = almost start Ving	✓	✓
almost V = almost finish Ving	*	✓
imperf V entails simple past V	✓	*

The hypothesis that Blackfoot finals encode aspectual distinctions would predict that the IA verb stem *ooyi* 'eat' was an activity predicate, and that *oowat,* the TA version of this verb stem was an accomplishment predicate. If this were the correct analysis, the application of these telicity tests to the different Blackfoot verbs 'eat' would yield the results shown in Table 7.2.

In the remainder of this section, we show that these predictions are not borne out by the data. Rather, the results of these tests indicate that in fact there is no correlation between choice of final and aspectual class, consistent with the *v* hypothesis.

7.1.1 Stop *vs.* finish *in Blackfoot*

The Blackfoot counterparts of aspectual verbs meaning 'stop' and 'finish' are realized as prefixes on the main verb. As predicted, when the prefix *issik-* 'stop' is added to either transitive or intransitive forms of the verb 'eat', the result is grammatical. Note that the result with intransitive 'eat' is the same regardless of whether there is a bare NP object. In other words, unlike in English, eliding the direct object or manipulating its semantic properties does not seem to change the aspectual classification of a Blackfoot verb.

(9) a. issiksooyiwa (mamii)
issik-ooy-i-wa (mamii)
stop-eat-IA-3SG (fish)
'S/he stopped eating (fish).'

b. issiksowatsiw amo mamii
issik-oow-at-yii-wa amo mamii
stop-eat-TA-TH-3SG DEM fish
'S/he stopped eating this fish.'

The prediction for the prefix *iksist-* 'finish' is that it should be acceptable in combination with the TA verb *oowat*, but not with the related IA verb *ooyi*.

However, as shown in (10), affixation of *iksist-* 'finish' is possible with both versions of the verb 'eat'.

(10) a. akaiksistsooyiwa (mamii)
akaa-iksist-ooy-i-wa (mamii)
PERF-finish-eat-IA-3SG (fish)
'S/he's finished eating (fish).'

b. akaiksistsoowatsiw amo mamii
akaa-iksist-oow-at-yii-wa amo mamii
PERF-finish-eat-TA-TH-3SG DEM fish
'S/he's finished eating this fish.'

Thus, this first diagnostic indicates that there is no aspectual difference between intransitive and transitive versions of the verb 'eat,' and moreover that both belong to the class of accomplishment predicates.

7.1.2 *No ambiguity with* almost *in Blackfoot*

Blackfoot has two verbal prefixes that translate as 'almost': *iimat/omat* and *ai'tamáak*. When the prefix *iimat-* is added to a verb the result is unambiguously interpreted as 'almost start X-ing', suggesting that it modifies event initiation only. Consequently, it should be compatible with both activities and accomplishments. On the hypothesis that *ooyi* is an activity predicate and *oowat* an accomplishment, we predict that both will be acceptable with the prefix *iimat-*. As illustrated in (11), this prediction is borne out by the data:

(11) a. iimatooyiwa (ni'tawaakii)
iimat-ooy-i-wa (ni'tawaakii)
almost-eat-IA-3SG (chicken.AN)
'S/he almost ate (chicken).'
= almost started; ≠ almost finished

b. iimatoowatsiw amo ni'tawaakii
iimat-oow-at-yii-wa amo ni'tawaakii
almost-eat-TA-TH-3SG DEM chicken.AN
'S/he almost ate this chicken.'
= almost started; ≠ almost finished

In order to express the idea that an event is almost finished in Blackfoot, it is necessary to prefix both the adverb *ai'tamáak* 'almost' and the aspectual preverb *iksist-* 'finish'. On the hypothesis that *ooyi* is an activity predicate and *oowat* an accomplishment, we predict that only the latter will be acceptable with this combination of prefixes. However, consistent with our

observations about the prefix *iksist-* 'finish' discussed in section 7.1.1 above, we found that in fact both the intransitive and transitive verbs are compatible with the prefix combination 'almost finished'.

(12) a. ai'tamáakiksistsoyi (owaai)
ai'tamaak-iksist-ooy-i-wa (owaa-i)
almost-finish-eat-IA-3SG (egg.IN-NON-PRT)
'S/he's almost finished eating (eggs).'

b. ai'tamáakiksistsoowatoom amostsi owaistsi
ai'tamaak-iksist-oow-atoo-m amo-istsi owai-istsi
almost-finish-eat-TI-TH DEM-IN.PL egg-IN.PL
'S/he almost finished eating these eggs.'

Thus, this second diagnostic also suggests that both transitive and intransitive verbs 'eat' belong to the class of accomplishment predicates.

7.1.3 *The imperfective paradox in Blackfoot*

Dunham (2007) analyses the Blackfoot prefix *a-* as a marker of imperfective aspect for a number of reasons, including the fact that it cannot occur on verbs that express perfective or completed accomplishments. The evidence that he adduces to support this claim consists of an IA verb with a bare noun complement:

(13) a. anna Joel á'pistotáki pisátsásski
ann-a Joel apistotaki pisatsaisski
DEM-AN.SG Joel around-make.IA flower.IN
'Joel made a flower.'
Good after completion of flower
Bad during construction of flower

b. anna Joel á'paistotáki pisátsásski
ann-a Joel ap-a-istotaki pisatsaisski
DEM-AN.SG Joel around-IMPERF-make.IA flower.IN
'Joel is (in the process of) making a flower.'
Bad after completion of flower
Good during construction of flower

(Dunham 2007)

Our own fieldwork data confirms this finding. More specifically, we found that when we added the imperfective prefix *a-* to both transitive and

intransitive versions of 'eat' the event could not be interpreted as completed.[10] In other words, none of the imperfective versions of 'eat' in Blackfoot has a completion entailment.

(14) a. ooyiwa mamii
ooy-i-wa mamii
eat-IA-3SG fish
'S/he ate a fish.'
Good after entire fish has been consumed
Bad during consumption of fish

b. aooyiwa mamii
a-ooy-i-wa mamii
IMPERF-eat-IA-3SG fish
'S/he was eating a fish.'
Bad after entire fish has been consumed
Good during consumption of fish

(15) a. oowatsiw amo mamii
oow-at-yii-wa amo mamii
eat-TA-TH-3SG DEM fish.AN
'S/he ate that fish.'
Good after entire fish has been consumed
Bad during consumption of fish

b. aoowatsiw amo mamii
a-oow-at-yii-wa amo mamii
IMPERF-eat-TA-TH-3SG DEM fish.AN
'S/he was eating that fish.'
Bad after entire fish has been consumed
Good during consumption of fish

Thus, this final diagnostic confirms that there is no aspectual difference between intransitive and transitive versions of the verb phrase 'eat a/that

[10] In order to elicit these data, the consultant was presented with two pictures: one showing a person with a half-eaten fish on his plate, and the other showing a person with nothing but fish bones on his plate. For each picture, the speaker was asked to judge whether the sentences in (14) and (15) could be used to describe the picture. Like Dunham, we found that when the imperfective prefix *a-* was present, the sentence could be used to describe accomplishments in progress, but not completed accomplishments, and that when *a-* was not present, the sentence could be used for completed accomplishments only. These results were replicated with other accomplishments, including 'fix a/that wagon' and 'sew a/that shirt'. For activities ('sleep', 'dance', and 'run'), the same picture could be described using verbs both with and without the imperfective prefix.

TABLE 7.3 Actual telicity test results

telicity test	***ooyi* 'eat-IA'**	***oowat* 'eat-TA'**
stop Ving	✓	✓
finish Ving	✓	✓
almost V = almost start Ving	✓	✓
almost finish Ving	✓	✓
imperf V entails simple past V	*	*

fish', and moreover that both belong to the class of accomplishment predicates.

7.1.4 *Summary*

The results of the three telicity tests available in Blackfoot indicate there is no difference between the transitive and intransitive finals. These results are summarized in Table 7.3.

As expected, the transitive verb stem *oowat* patterns like an accomplishment, but so does the intransitive verb stem *ooyi*. This suggests that the alternations between transitive and so-called intransitive verb stems do not reflect differences between atelic/activity predicates and telic/accomplishment predicates in Blackfoot. Thus, the evidence does not support the hypothesis that Blackfoot finals are morpho-syntactic markers of (a)telicity.

7.2 Blackfoot finals do not express argument structure

A reasonable interpretation of the standard characterization of Blackfoot finals as markers of (in)transitivity is that they encode information about the verb's internal argument structure. Assuming that such information is listed in the lexicon, this view leads to the following expectations: First, an intransitive final will indicate that the verb has only one lexically listed argument, and a transitive final will indicate that the verb has (at least) two. Second, transitivity alternations will not apply across clause boundaries. In contrast, the hypothesis that Blackfoot finals are *v* predicts that the choice of intransitive versus transitive final will depend on whether an object is licensed in the syntax, and that a transitive final may syntactically license an object which is not a lexically listed argument of the verb. We shall demonstrate that the predictions of the *v* hypothesis are borne out by the facts, and that the predictions of the (in)transitivity alternative are not. We have already seen that the verb stem *ooyi* 'eat' may take two arguments, even though it contains

an IA final. Below we discuss the syntactic constraints on the object of such verb stems. Then we show that morphologically transitive verb stems may borrow their 'object' from an embedded clause, and that morphologically transitive verbs may license a non-thematic object (i.e. an object which is not part of the verb's lexically listed argument structure).

7.2.1 *Different verb classes, same argument structure*

At the beginning of the chapter, we noted that the Blackfoot counterpart of 'eat' is typical of dyadic verbs in that the choice between TA/TI and IA final is not determined by the verb's argument structure. This is evidenced by the fact that the TA verb stem *oowat*, the TI verb stem *oowatoom* and the IA verb stem *ooyi* are all compatible with both an external and an internal argument, as illustrated in (16).

(16) a. naowatsiw amo mamii
na-oow-at-yii-wa amo mamii
PST-eat-TA-TH-3SG DEM fish.AN
'S/he ate this fish.'

b. naowatoom ani akoopis
na-oow-atoo-m-wa ani akoopis
PST-eat-TI-TH-3SG DEM soup.IN
'S/he ate that soup.'

c. naoyiw (mamii/akoopis)
na-ooy-i-wa (mamii/akoopis)
PST-eat-IA-3SG (fish/soup)
'S/he ate (fish/soup).'

The choice among these verb stems is not determined by the presence or absence of an internal argument, but rather by its morpho-syntactic properties, namely by its syntactic category (DP or NP) and its gender (animate or inanimate).

Glougie (2000) argues that there is a categorical distinction between indefinite and definite nominals in Blackfoot: Indefinite nominals, which are often realized as bare nouns, are NPs; definite nominals are DPs. She observes that only definite DP objects occur in the context of verbs with transitive finals; elsewhere an intransitive final is required. This analysis elegantly captures the fact that both intransitive verbs and verbs with bare NP objects require an intransitive final.[11]

[11] There is no parallel alternation between II and IA verbs based on the DP or NP status of the single argument.

(17) a. naowatsiw [$_{DP}$ amo mamii]
na-oow-at-yii-wa amo mamii
PST-eat-TA-TH-3SG DEM fish.AN
'S/he ate this fish.'

b. * naowatsiw [$_{NP}$ mamii]
na-oow-at-yii-wa mamii
PST-eat-TA-TH-3SG fish.AN
'S/he ate fish.'

(18) a. naoyiwa [$_{NP}$..mamii]
na-ooy-i-wa mamii
PST-eat-IA-3SG fish.AN
'S/he ate fish.'

b. * naoyiwa [$_{DP}$..amo mamii]
na-ooy-i-wa amo mamii
PST-eat-IA-3SG DEM fish.AN
'S/he ate that fish.'

The choice between the two transitive finals depends on the grammatical gender of the DP object. As illustrated in (19), a verb that selects a DP object of animate gender requires a TA final, and a verb that selects a DP object of inanimate gender requires a TI final.

(19) a. naowatsiw amo mamii/*akoopis
na-oow-at-yii-wa amo mamii/*akoopis
PST-eat-TA-TH-3SG DEM fish.AN/*soup.IN
'S/he ate this fish/*soup.'

b. naowatoom ani akoopis/*mamii
na-oow-atoo-m-wa ani akoopis/*mamii
PST-eat-TI-TH-3SG DEM soup.IN/*fish.AN
'S/he ate that soup/*fish.'

As noted above, a verb that selects an NP object requires an intransitive final. As shown in (20), the verb imposes no gender restriction on its object; in this case, the final agrees with the gender of the subject.

(20) naoyiwa mamii/akoopis
na-ooy-i-wa mamii/akoopis
PST-eat-IA-3SG fish.AN/soup.IN
'S/he ate fish/soup.'

TABLE 7.4 Verb class finals and object properties

	category of object	
gender of object	**DP**	**NP**
animate	TA	IA
inanimate	TI	IA

The fact that IA finals are compatible with objects of either gender, but TA and TI finals require animate and inanimate objects, respectively, suggests that only TA/TI finals check the gender of their objects. Moreover, both TA and TI verb stems require a theme suffix (TH), which expresses the relative animacy of the subject and object, but IA verb stems do not. This further indicates that only the DP objects of TA/TI verbs function as syntactically active direct objects. Thus, transitivity alternations reflect differences in formal properties of the object nominal and not the verb's argument structure, as summarized in Table 7.4.

7.2.2 *Cross-clausal transitivity alternations*

Evidence that transitivity alternations apply across clause boundaries in Blackfoot constitutes a second argument that finals are not markers of argument structure. This argument assumes that such non-local valence-changing operations are syntactic, rather than lexical in nature (Reinhart and Siloni 2005).

In Blackfoot, transitivity alternations apply across clause boundaries in the context of CROSS-CLAUSAL AGREEMENT (CCA).[12] Normally verbs that select a CP complement bear an IA final, as illustrated in (21). When CCA occurs, the matrix verb agrees with a DP in the embedded clause. In this context, the matrix verb bears a TA or TI final, depending on the gender of the DP it agrees with. In (22), for example, the matrix verb *íksst* 'want' bears the TA final *-at* because it agrees with *noxkówa* 'my son', the animate DP subject of the embedded clause.

(21) nitsíksstaa [$_{CP}$ noxkówa máxka'potakssi] no CCA
nit-iksst-aa [$_{CP}$ n-oxko-wa m-axk-a'potak-ssi]
1-want-IA my-son-3SG 3-might-work-CONJ
'I want my son to work.'

(Frantz 1978: 89)

[12] This term is due to Branigan and McKenzie (2000, 2002), who discuss this phenomenon in Innu-aimûn, another Algonquian language. It has also been called copying from complement (Frantz 1978) and copy-to-object (Dahlstrom 1991).

(22) nitsíksstatawa [$_{CP}$ noxkówa máxka'potakssi] CCA
nit-iksst-at-a-wa [$_{CP}$ n-oxko-wa m-axk-a'potak-ssi]
1-want-TA-TH-3SG my-son-3SG 3-might-work-CONJ
'I want my son to work.'

(Frantz 1978: 89)

Above we noted that TA/TI finals require a DP (rather than an NP) object. CCA is subject to the same restriction: this construction is impossible if the target in the embedded clause is an NP, rather than a DP, as illustrated by the following examples from Bliss (2007).

(23) *Nitáísstaata omááhkitstssi mátapi áíhpiyi
nit-a-i-sstaat-a om-aahk-itstsi-hsi matapi a-ihpiyi
1-DUR-I-want.TA-DIR 3-NONFACT-exist-CONJ person DUR-dance
'I want someone to dance.'
Lit: 'I want there to be a person who dances.'

(24) *Nitáísstaata mátapi ninnááhksspomoyissi
nit-a-i-sstaat-a matapi nin-aahk-sspomo-yissi
1-DUR-I-want.TA-DIR person 1-NONFACT-help.TA-INV.CONJ
'I want someone to help me.'
Lit: 'I want a person to help me.'

(Bliss 2007)

This shift from IA to TA/TI final in CCA provides compelling evidence that the relationship between finals and direct objects is syntactic, rather than lexical.

7.2.3 *Transitivity alternations due to non-thematic benefactive objects*

Assuming that benefactive objects are the result of a syntactic operation of incorporation, as argued by proponents of Principles and Parameters theory (e.g. Baker 1988; Marantz 1984; Pylkkänen 2008), Blackfoot benefactives provide a third argument that transitivity alternations do not indicate argument structure alternations.[13] Although benefactive DPs are not inherently part of a

[13] As a reviewer points out, the addition of the benefactive final might alternatively be viewed as indicative of a *lexical* valence increasing operation, as argued by proponents of LFG Lexical Mapping Theory (Bresnan and Moshi 1990) or Lexical Decomposition Grammar (Wunderlich 2000). If this were indeed the case, then the existence of a benefactive final would indicate that at least some finals signal changes in argument structure. In fact, Frantz (1991) distinguishes between abstract finals, which only indicate verb class, and concrete finals, which are valence-changing morphemes that derive new verbs of a particular class (TA or IA). The concrete finals include causative, benefactive, accompaniment, reflexive, and reciprocal morphemes. In most cases the concrete finals are added to

verb's argument structure, they can be added to any Blackfoot clause. Further, when they appear, they function as direct objects, and are licensed by a benefactive marker (Frantz 1991).

(25) a. Iihpómmaawa ónnikii.
iihpomm-**aa**-wa onnikisi
buy-IA-3SG milk
'He bought milk.'

b. Iihpómmoyiiwayi ónnikii.
iihpomm-**o**-yii-wa-ayi onnikisi
buy-BEN(TA)-TH-3SG-4PRON milk
'He bought milk for her.'

(Frantz 1991: 104 (k))

Frantz analyses the benefactive marker as a TA final because it always licenses an animate DP object, appears in complementary distribution with the IA final and with other transitive finals, and because it is followed by the THEME suffix, which is an obligatory inflectional suffix added to all and only transitive stems.[14] If finals can license non-thematic objects, then clearly they are not markers of argument structure.

7.2.4 *Summary*

In short, we have seen that a transitive final is required if the verb has a DP internal argument, if it agrees with a DP argument of another predicate, or if it agrees with a non-thematic DP such as a benefactive. Otherwise, the verb will take an intransitive final. Thus, there is no evidence that related transitive and intransitive verb stems are associated with different argument structures, or that apparent transitivity alternations are due to lexical operations on argument structure. Rather, the difference between related IA, TA, and TI verb stems in Blackfoot is syntactic in nature: Transitive finals (TA and TI) license a DP object, intransitive (IA) finals do not. This is precisely what we expect given the hypothesis that Blackfoot finals are *v*. These facts show that

stems consisting of the verb root and an abstract final. The benefactive final *-o*, which is added to the verb root as shown in (25), is an exception, but there is another benefactive final, *-(o)mo*, which is added to TA verb stems (cf. Frantz 1991: 104–5). The evidence from CCA discussed in the last subsection strongly argues that abstract finals are syntactically determined. Since concrete finals are added after abstract finals, we suggest that they, too, are syntactically determined.

[14] Theme suffixes express relative animacy of the subject and object. DIRECT theme suffixes indicate that the subject outranks the object and INVERSE theme suffixes indicate that the object outranks the subject. The suffix *-yii* in (25)b is a direct theme suffix, indicating here that a 3rd person subject acts on a 4th person object.

finals have the syntactic property of *v*. In the next section, we argue that Blackfoot finals also have the semantic property that characterizes *v*, i.e. that they determine whether there is an external argument.

7.3 Animacy, agency, and verb classification

Standard descriptions of the verb class system of Blackfoot all specify that verb stems with TA or TI finals agree in grammatical gender with their objects. Frantz (1991: 45) observes that these verb stems also impose a semantic selectional restriction on their subjects, i.e., they 'must reference an entity which is capable of exercising will'. Since all nouns that denote entities capable of exercising will (i.e., people and animals) are grammatically animate in this language, the result is that verb stems with TA or TI finals require an animate external argument, capable of functioning as an agent. Frantz's evidence for this comes from the fact that there exists a small class of non-sentient animate nouns, such as *isttoan* 'knife', *pokón* 'ball', and *po'táá'tsis* 'stove'. Even though they are grammatically animate, these nouns cannot function as subjects of transitive verbs, as illustrated in (26). In contexts where English would allow such instrumental subjects, Blackfoot requires an instrumental prefix on the verb licensing an instrumental adjunct, and a phonetically null, unspecified, animate subject, which is interpreted as an agent, as shown in (27).

(26) *oma isttoána ikahksínima annistsi ikkstsíksiistsi
om-wa isttoán-wa ikahksini-m-wa ann-istsi ikkstsiksi-istsi
DEM-3PROX.AN knife-3PROX.AN cut.TI-TH.3SG DEM-IN.PL branch-IN.PL
'That knife cut those branches.'
(Frantz 1991: 45 (k))

(27) oma isttoána iihtsikahksínii'pi
om-wa isttoan-wa iiht-ikahksini-'p-yi
DEM-3PROX.AN knife-3PROX.AN INST-cut.TI-TH-IN.PL
annistsi ikkstsíksiistsi
ann-istsi ikkstsiksiistsi
DEM-IN.PL branch-IN.PL
'By means of the knife the branches were cut off.'
(Frantz 1991: 45 (l)[15])

[15] As part of the example reproduced in the text as (32), Frantz lists the same translation as (26), but in the accompanying discussion he suggests that translation given here is in fact a more literal rendering of his Blackfoot example. The selectional restriction on subjects of transitive verbs still applies in examples like (27), with the result that the unspecified subject is also restricted to animate beings capable of will. Both (26) and (27) were further modified by the addition of a morphemic analysis and glosses.

We attribute this animacy restriction on the external argument to the final morpheme. In section 7.2 we demonstrated that finals play no role in the selection of *internal* arguments. We now propose that they determine whether the verb takes an *external* argument. In particular, we propose that all TA and TI finals select an external argument, and that they impose a semantic animacy restriction on this argument. IA finals that derive related PSEUDOTRANSITIVE verbs (i.e., verbs with both an external argument and NP object) impose the same semantic animacy restriction on their external argument.[16] The standard Algonquian verb class system obscures this fact because it treats the animacy restriction on IA verb stems as a type of syntactic agreement, rather than semantic selection.

In the remainder of this section, we further explore the relation between the verb final and the selection of an external argument. In section 7.3.1 we argue that verb stems with II finals typically fail to select an external argument, and thus II finals derive unaccusative verb stems. In section 7.3.2 we show that some IA finals select an external argument; others do not. The result is that IA finals constitute a heterogeneous set deriving unergative, pseudotransitive and unaccusative verb stems.

7.3.1 *Intransitive inanimate (II) verbs lack an external argument*

We begin by reviewing Johansson's (2007) evidence that there are no II verbs with agentive or experiencer subjects. For verbs that denote emotional states, such as 'be happy' or 'be sad', Frantz and Russell's (1995) Blackfoot dictionary lists only IA stems. Similarly, for verbs that require an agent, the dictionary lists IA, TA, and/or TI stems, but strikingly no II ones. Johansson was interested in the question of how a Blackfoot speaker describes a fictional world in which inanimate objects feel, think, and act. She found that in this context, a strategy of gender mismatch is employed: For verbs that denote emotional states, existing IA verbs are predicated of an inanimate DP, as illustrated in (28)a. Johansson tested other strategies for dealing with this situation, namely coining a new II verb and switching the gender of the DP subject, but both were categorically rejected, as shown in (28)b,c.[17]

[16] The term PSEUDOTRANSITIVE is due to Taylor (1969: 165). More recently, Frantz (1990: 41) coined the term PARATRANSITIVE for this type of IA verb. We adopt Taylor's original terminology, as we assume that such objects are syntactically inactive. See section 7.4 for discussion.

[17] The gender of a Blackfoot DP can be deduced from the form of the plural suffix attached to the noun and demonstrative determiner: In an inanimate DP the plural suffix that appears on both categories is *-istsi*, whereas in an animate DP, the plural suffix is *-iksi*. In order to determine whether a gender switching strategy is possible, Johansson replaced the inanimate plural suffix with the animate one, as shown in (28)c.

(28) a. ámostsi pisátssaisskiistsi iikí'taamssiiyaawa
amo-istsi pisatssaisski-istsi iik-i'taam-ssi-yi-aawa
DEM-IN.PL FLOWER(IN)-IN.PL very-happy-be.IA-PL-PRON
'These flowers (inanimate) are happy (animate).'

b. *ámostsi pisátssaisskiistsi iikí'taamiiyaawa
amo-istsi pisatssiasski-istsi iik-i'taam-ii-yi-aawa
DEM-IN.PL FLOWER(IN)-IN.PL very-happy-be.II-PL-PRON
'These flowers (inanimate) are happy (*inanimate).'

c. *ámoksi pisátssaisskiiksi iikí'taamssiiyaawa
amo-iksi pisatssaisski-iksi iik-i'taam-ssi-yi-aawa
DEM-AN.PL FLOWER(IN)-AN.PL very-happy-be.IA-PL-PRON
'These (*animate) flowers are happy (animate).'

The fact that II finals cannot be used to fill the gaps in the verb inventory indicates that related verbs do not constitute an inflectional paradigm, and consequently that finals are not simply inflectional agreement morphemes.

Johansson also gathered data on transitive verbs, and determined that DPs that denote willful or sentient inanimate entities can function as agentive subjects of transitive verbs, regardless of their grammatical gender. Thus, (26) is considered grammatical in a world where knives are capable of volitional action. Similarly, the examples in (29), with IA, TI, and TA verbs 'eat', are all fine in a world inhabited by wilful, hungry flowers.

(29) a. ámostsi pisátssaisskiistsi naooyiiaawa mamii
amo-istsi pisatssaisski-istsi na-ooy-i-yi-aawa mamii
DEM-IN.PL flower-IN.PL PST-eat-IA-PL-PRON fish
'These flowers ate fish.'

b. ámostsi pisátssaisskiistsi náówatoomiyaawa
amo-istsi pisatssaisski-istsi na-owatoo-m-yi-aawa
DEM-IN.PL flower-IN.PL PST-eat.TI-TH-PL-PRON
ámostsi míínistsi
amo-istsi miin-istsi
DEM-IN.PL berry-IN.PL
'These flowers ate these berries.'

c. amostsi pisatssaisskiistsi naowatsiyi amo mamii
amo-istsi pisatssaisski-istsi na-owat-yi-yi amo mamii
DEM-IN.PL flower-IN.PL PST-eat.TA-TH-PL DEM fish
'These flowers ate this fish.'

The conclusion to be drawn is that Blackfoot imposes a semantic animacy constraint on agents and experiencers of IA and TA/TI verbs. Given the

possibility of sentient inanimates, i.e. inanimate gender nouns that denote entities capable of thought, feeling, or action (in a fictional world), the question arises as to why there are no agentive or experiencer II verbs. According to Folli and Harley (2008), such animacy effects arise from the interaction of grammar and conceptual structure. They argue that conceptually, agents must have the teleological capacity, i.e., inherent qualities and abilities, to generate the event on their own, and that animacy constitutes the grammatical realization of this teleological capacity. We propose that the animacy constraint on experiencers has a similar explanation, i.e., experiencers must have the teleological capacity to respond to the event, and as sentient beings, animate entities have the necessary inherent ability. We attribute the impossibility of II verbs with agentive or experiencer subjects in Blackfoot to the fact that II finals are unable to semantically select arguments with the required teleological capacity.

It follows that (most) Blackfoot II verbs will be unaccusative.[18] An examination of the II verb stems listed in Frantz and Russell's Blackfoot dictionary suggests that this prediction is borne out. II verbs primarily belong to three semantic classes: (a) stative verbs, (b) eventive change of state verbs and (c) eventive change of location verbs. For both types of eventive II verb, the single argument undergoes the change denoted by the verb. Though we have not yet developed language-specific syntactic evidence in support of this classification, we note that these Blackfoot verbs correspond to unaccusative verbs in other languages. Some representative examples are listed in Table 7.5.

In short, we have seen that Blackfoot has no II verbs with agentive or experiencer subjects, and that in fact verbs of this class are primarily stative or require a patient or theme subject. We have also seen that Blackfoot IA verbs may be predicated of a grammatically inanimate subject just in case that

[18] Folli and Harley (2008) point out that other semantic classes of unergative verbs require other kinds of teleological capacity. They observe, for example, that English verbs of sound emission such as *whistle, ring*, and *squeak* are unergative verbs. They all require an argument that denotes an entity with the necessary constitution to make the named sound, accounting for the contrasts below:

(i) John/the train/the kettle/*the bullet whistled.
(ii) The phone/the bell/*John rang.

The prediction for Blackfoot is that there may be unergative II verbs if they require an external argument with a teleological capacity other than animacy, such as the ability to emit a sound. The Blackfoot dictionary lists the following II verbs of sound emission (all of which are related to IA verbs with the same meaning):

(iii) *isatsiksi* 'jingle'; *ohtako* 'make a sound'; *isitsipohtako* 'be [sic] a sound that breaks the silence'.

In order to test the prediction, we need to determine whether these verbs are unergative or unaccusative. We leave this question for future research, pending the development of language internal tests for unaccusativity.

TABLE 7.5 Blackfoot II verbs

stative verbs	**II**
'be small'	*ohpokii*
'be deep snow'	*immiko*
'be slow'	*iitsiksist.a´pii*
'be a risky situation'	*i'sa'pii*
change of state verbs	**II**
'spoil, rot'	*oka'pihtsii*
'burst'	*ipákksii*
'curdle, congeal'	*ipahsii*
'break (said of a rope or string-like object)'	*ikahkapi'kaa*
'blow down, collapse (said of a structure)'	*ikóóhpapokaa*
change of location verbs	**II**
'fall'	*ohpi'yi*
'disappear'	*sayínakoyi*
'lodge, land on end'	*sstaaka'si*

Frantz and Russell (1995)

subject is an agent or experiencer. This indicates that the language specific animacy constraint on external arguments is uniformly a type of semantic selection, and that it is imposed by TA, TI, and IA, but not II finals. Consequently, we speculate that verbs with II finals are (almost) all unaccusative, and attribute this to the fact that II finals cannot impose the semantic animacy restriction required for an agentive or experiencer external argument.

7.3.2 *Some intransitive animate (IA) verbs have an external argument*

The Blackfoot animacy constraint on external arguments leads us to expect two subclasses of IA verbs: (i) unergative and pseudotransitive verbs, which have an external argument; and (ii) unaccusative verbs, which do not. Our hypothesis that the final morpheme determines whether an external argument is selected leads to the expectation that these two subclasses of IA verbs will have different finals. In this section, we show that this prediction is indeed borne out.

Some preliminary evidence for these two types of IA verbs comes from an analysis of Frantz and Russell's (1995) Blackfoot dictionary, which lists verb stems subcategorized by class (IA, II, TA, or TI). At the end of the main entry

for a given verb stem are listed related stems of other classes.[19] Ritter and Wiltschko (2006) conducted a study of this dictionary and found that the majority of verb stems mentioned belong to the IA class (1247 – 54%). This is in stark contrast to the number of II verb stems (292 – 13%). They attribute this quantitative difference to differences in the argument structure possibilities of the two verb classes: IA verbs may be pseudotransitive, unergative or unaccusative, while II verbs may only be unaccusative. They observe that entries in the Blackfoot dictionary for verb stems with external arguments only list related stems with the same root that share this property. Strikingly, pseudotransitive and unergative IA verb stems are often listed in the dictionary as related to TA and/or TI stems, but II verb stems are not.[20] Moreover, these IA-TI/TA pairs and IA-TI-TA triples almost always have agentive or experiencer arguments. Some illustrative examples are given in Tables 7.6 and 7.7. Similarly, when the dictionary entry for verb stems without an external argument mentions a related stem, the related stem also shares this property. Consequently, unaccusative II verb stems are often listed in the dictionary as related to unaccusative IA stems. Table 7.6 contains the II verb stems in Table 7.5, along with the IA stems listed in the dictionary as related. In most cases it is clear from the examples given that these related IA and II verb stems have the same argument structure, i.e., both take a theme argument.

As mentioned above, our hypothesis that the final determines whether there is an external argument leads to the prediction that unergative/pseudotransitive IA verb stems should have different finals from unaccusative IA verb stems. This is obviously the case for Blackfoot verb stems meaning 'dry' reproduced in (30). The dictionary lists two IA verb stems that appear to have the same root but different finals; it is clear from the examples given that *ihkssaki* is an unergative/pseudotransitive verb stem with an agentive subject while *ihkssoyi* is an unaccusative verb stem with a theme subject. Note also that the entry for the unergative/pseudotransitive verb stem *ihkssaki* lists a

[19] The decision as to which verb stems to provide main entries for is not entirely systematic, and the list of related stems is not exhaustive (Donald Frantz p.c.). Nevertheless, it is clear from the presentation of verb stems in the dictionary that Frantz and Russell adopt the standard Algonquianist view, i.e., they treat stems consisting of the same root but different finals as derivationally related, but distinct lexical items.

[20] The dictionary includes six examples of II verbs related to transitive verbs, but in each case the II verb is clearly unaccusative. For example, the main entry for *istsitsii* 'melt' indicates that this is an II verb whose single argument undergoes the change of state named by the verb. The entry for this verb lists IA, TI, and TA related stems, all meaning 'melt' or 'thaw', suggesting that these related stems are all causative counterparts. Frantz (p.c.) confirms that the decision to list related verbs that share the property of (not) having an external argument is based on their intuitions about which verbs are related, rather than formal criteria, and that these six entries, which list causative-inchoative pairs, are inconsistent with their own criteria.

TABLE 7.6 Blackfoot IA-TI-TA verbs

agentive subject	**IA**	**TI**	**TA**
'whet, sharpen'	*iksisiststaki*	*iksisiststoo*	*iksisistsim*
'saw (e.g. wood)'	*ikahksiststaki*	*ikahksiststoo*	*ikahksistsim*
'save (food)'	*imsskaa*	*imsskatoo*	—
'save food for'			*imsskat*
'roll (s.o./s.t.)'	*inakataki*	*inakatoo*	*inakat*
'challenge (someone)'	*ikahtomaa*	—	*ikohtom.a't*
'play a non-athletic game, gamble;'	*ikahtsi*	—	
'play against'			*ikahtsiim*
'stir a liquid into a powdery substance to create sthg'	*iitssksiiststaa*	*iitssksiiststoo*	—
'use a feather as head ornament'	*ikkimaani*		—
'use as a head ornament'		*ikkimaanatoo*	
experiencer subject	**IA**	**TI**	**TA**
'regret the loss of/miss (s.t. or s.o.)'	*ikooki'taki*	*ikooki'tsii*	*ikookimm*
'feel grateful/be appreciative/ thankful'	*iniiyi'taki*		
'appreciate'		*iniiyi'tsi*	
'respect'			*iniiyimm*
'think/desire (s.t.) secretly'	*iksimsstaa*		
'think about/covet'		*iksimsstatoo*	*iksimsstat*
'be fascinated, amazed'	*ipisatsi'taki*		
'be amazed at'		*ipisatsi'tsi*	*ipisatsimm*

Frantz and Russell (1995)

related TI stem, which also has an external argument, but the unaccusative verb *ihkssoyi* does not. On the other hand, the main entry for the unaccusative II verb stem, *ihkitsi* 'dry', lists *ihkssoyi* (but not *ihkssaki*) as a related stem.

(30) a. *ihkssaki* [IA] dry (something); ihkssakít! dry (s.t.)!; áakihkssakiwa î'ksisakoi she will dry meat; also ihkihsaki; Rel. stem : [TI] ihkssi dry.

b. *ihkssoyi* [IA] become dry; áakihkssoyiwa it will dry; iihkssóyiwa it dried; annííksi katsííksi máátomaihkssoyíwaiksaawa your pants, they are not dry yet.[21]

[21] The Blackfoot noun *atsís* 'pants' is grammatically animate, and thus requires an IA verb form rather than an II one.

c. *ihkitsi* [II] dry; áakihkitsiwa it will dry; iihkítsiwa it dried; ákaihkitsiwa kaapoksíínimaani the floor is dry; Rel. stem: [IA] ihkssoyi dry.

Frantz and Russell 1995: 17

TABLE 7.7 Blackfoot II-IA verbs

stative verbs	**II**	**IA**
'be small'	*ohpokii*	*ohpokssi*
'be slow'	*iitsiksista'pii*	*iitsíksista'pssi*
'be deep snow'	*immiko*	—
'be a risky situation'	*i'sa'pii*	—
change of state verbs	**II**	**IA**
'spoil, rot'	*oka'pihtsii*	*oka'phitsimi*
'burst'	*ipákksii*	*ipákksskaa*
'curdle, congeal'	*ipahsii*	—
'blow down, collapse (said of a structure)'	*ikóóhpapokaa*	—
change of location verbs	**II**	**IA**
'fall'	*ohpi'yi*	*ohpi'yi*
'disappear'	*sayínakoyi*	*sayinako*
'lodge, land on end'	*sstaaka'si*	—

Frantz and Russell (1995)

Though it is not always easy to isolate the final morpheme in the verb stem, we have identified some finals that are exclusively associated with one type of IA or the other. In particular, unergative/pseudotransitive IA verbs, such as those in Table 7.6 often have the finals *-aki* or *-i'taki*, and unaccusative IA verbs, such as those in Table 7.7, often have the finals *-ssi* and *-a'pssi*. Other IA finals are possible (e.g. *-imi* on *oka'phitsimi* 'spoil, rot'), but importantly *-aki* or *-i'taki* never appear on unaccusative IA verbs, and similarly *-ssi* and *-a'pssi* do not appear on unergative/pseudotransitive IA verbs.

7.3.3 *Summary*

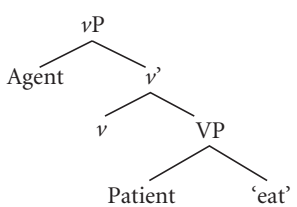
Johansson's research provides compelling evidence that II verbs cannot have experiencer or agentive subjects under any circumstances, and that TA, TI, and unergative or pseudotransitive IA verbs may all be predicated of experiencer or agentive subjects regardless of grammatical gender; the subject need only denote an entity capable of will. This indicates that Blackfoot TA, TI, and IA finals impose a semantic animacy requirement on external arguments. As a

consequence of this language-specific constraint, II verbs are almost always unaccusative. IA verbs, in contrast, are a heterogeneous class which includes both pseudotransitive/unergative and unaccusative verbs, and these two subclasses are identified by different finals. Based on this semantic animacy requirement, and the observation that the form of IA finals attached to verbs that select agentive or experiencer subjects differs from that of IA finals attached to verbs that select patients or themes, we argued that the semantic contribution of the final is to determine whether an external argument is selected.

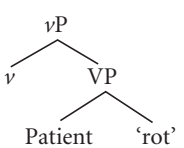
7.4 Finals are light verbs (*v*)

We have now established the following properties of Blackfoot finals: First, transitive finals are distinguished from their intransitive counterparts by their syntactic properties, and not by their event or (internal) argument structure. More specifically, transitive finals license DP objects, but intransitive finals do not. Second, finals determine whether the predicate has an agent or experiencer as its external argument. Taken together, these properties suggest that finals are *v*, a light verb that theta-marks the external argument DP, and enters into a Case-checking relation with an internal DP argument (cf. Chomsky 1995).[22] The hypothesis that finals are *v* gives rise to the structure in (31)a for verbs with an external argument, such as 'eat': the Patient Merges with V forming a VP, *v* Merges with VP, and the agent Merges in Spec, *v*P. Verbs without an external argument, such as 'rot', have the syntactic structure in (31) b. The only difference between this structure and (31)a is that there is no external argument in Spec, *v*P.

(31) a.



b.



[22] More recent work has proposed that extended projections essentially define the lexical categories. In other words, *v*, *n*, and *a* are functional heads that combine with category-neutral roots to derive verbs, nouns, and adjectives (Embeck and Marantz 2006; Landau this volume). Our treatment of Blackfoot verbs is compatible with this more radical approach.

The assumption that theta-role assignment is a property that is otherwise associated with lexical categories and that structural Case checking is a property of functional categories leads to the characterization of *v* as a quasi-lexical category.[23] While some authors (e.g., Horvath and Siloni 2002, this volume) consider this mixed status problematic, Butt (2003) takes a different approach, proposing that light verbs (including *v*) constitute a third type of syntactic category, whose mixed status is their defining property. In this section we demonstrate that Blackfoot finals have both the functional and lexical properties that characterize *v*.

In the Minimalist framework, it is assumed that only functional categories syntactically license arguments that they do not theta-mark by entering into formal feature checking relations with them (Chomsky 1995, 2000). In particular, it is assumed that transitive *v* licenses a direct object by entering into a checking relation with it. As discussed in 7.3.1, there is clear evidence that Blackfoot transitive finals (TA and TI) license a DP object in the syntax by means of formal feature-checking, and that IA finals fail to enter into such a checking relation.

While views differ as to the details and mechanisms involved, the consensus is that lexical verbs determine the theta role of their internal arguments (Grimshaw 1990; Jackendoff 1972, 1990; Rappaport Hovav and Levin 1998; and many others). For example, whether the internal argument is a patient, which undergoes a change of state, or a theme, which undergoes change of location, depends on the semantic content of the verb that theta-marks it. Similarly, the hypothesis that *v* theta-marks the external argument entails that the semantic content of *v* will determine whether this argument is an agent or an experiencer. The prediction for Blackfoot is that different theta roles are assigned by different finals. It appears that this prediction is borne out, at least for the verbs in Table 7.6. If we compare the agentive and experiencer verbs listed there, we find that all of the experiencer verbs have the finals *-i'taki* (IA), *-i'tsi* (TI) and *-imm* (TA), and that none of the agentive verbs have these finals. Our Blackfoot consultant also commented that '*i'taki* means you feel

[23] The assumption that only lexical and quasi-lexical categories assign theta-roles is not uncontroversial. For example, Doron (2003), Folli and Harley (2005), and Alexiadou (this volume) all assume that *v* is responsible for assigning a theta-role to the external argument, and that different members of this category (or a second functional category Voice) assign different theta-roles (agent vs. causer), but they do not assume that *v* is a lexical category. Regardless of whether the ability to assign a theta role is a diagnostic of (quasi-)lexical status, in the remainder of this section we discuss other properties of Blackfoot finals that argue against treating them as either purely functional or purely lexical morphemes.

something', providing additional evidence that these finals theta-mark their external arguments as an experiencer.

Functional categories consist of a fixed inventory of grammatical items whose semantic content is frequently characterized in terms of formal features and whose contribution to interpretation is systematic and predictable. Lexical categories, in contrast, are open classes, and elements in these classes have wide-ranging semantic content that does not lend itself to representation in terms of formal features. Their contribution to interpretation is often idiosyncratic and unsystematic. With these criteria in mind, we briefly consider the question of whether the semantic content of Blackfoot finals is like that of a functional or lexical category.

We observed above that experiencer finals have a specific interpretation related to the theta-role of the external argument they select. Other finals contain specific semantic content that is independent of their grammatical function. For example, Frantz (1991: 101) notes that there are specific finals that 'indicate the instrument (usually a body part) involved'. Some of the verbs that contain a final meaning 'with teeth' are listed in Table 7.8; verbs that contain a final meaning 'with hand' are given in Table 7.9. Comparing the two lists, we note the existence of at least one minimal pair: *iipakkio'tsi* 'burst by hand (TI)' and *iipakksstsi* 'burst with teeth (TI)'.

Moreover, when different finals are added to the same root the resulting verbs may have distinct meanings. The stative II and IA verbs in Table 7.10 are representative. Each row of the table contains a pair of related verbs that have the same root but different finals, and different meanings. Although these shifts in meaning are related to the choice of animate or inanimate arguments, the specific semantic content of the various IA and II verbs cannot be compositionally determined from the meaning of the root and the final.

We have seen that Blackfoot finals signalling membership in a given verb class have a variety of morphological shapes. The semantic evidence indicates

TABLE 7.8 Verbs with final meaning 'with teeth'

verb meaning	**IA**	**TA**	**TI**
'bite off of'		*ika'k-**sipi***	*ika'k-**stsi***
'bite off (something)'	*ika'k-**staki***		
'burst (with teeth)'	*ipakks-**staki***	*ipakk-**sip***	*ipakks-**stsi***
'pop/burst/crack/nip with the teeth'		*ipikk-**sip***	
'bite'	*sik-**staki***	*sik-**sip***	*sik-**stsi***

Frantz and Russell (1995)

TABLE 7.9 Verbs with final meaning 'with hand'

verb meaning	**IA**	**TA**	**TI**
'catch with hands'	*íkan-**o'taki***	*ikan-**o'to***	*ikan-**o'tsi***
'uproot, pull out (a small natural embedded 'growth') by hand'	*ipohk-**o'taki***	*ipohk-**o'to***	*ipohk-**o'tsi***
'burst by hand'			*iipákki-**o'tsi***
'break off with one's hands'			*omin-**o'tsi***
'break (s.t.)'	*omin-**o'taki***	*omin-**o'to***	
'break apart (a wooden object) by hand'			*opaks-**o'tsi***
'dig out, hollow out by use of hand or finger'			*waatan-**o'tsi***
'mould, shape using the hand'			*yaakaahki-**o'tsi***

Frantz and Russell 1995

TABLE 7.10 II–IA stative verbs

verb meaning	**II**	**IA**
'be without design, pointless'	*íksísst-a'pii*	
'be aimless'		*iksisst-a'pssi*
'be of fine quality'	*itsów-a'pii*	
'be handsome'		*itsów-a'pssi*
'be bad'	*ok-a'pii*	
'be bad, mean'		*ok-a'pssi*
'be delicate/fragile'	*ika'k-ii*	
'be sensitive'		*ika'k-ssi*

Frantz and Russell 1995

that these represent different morphemes and not simply allomorphs of the same abstract functional morpheme. This suggests that finals belong to a lexical category.

In short, we have argued that Blackfoot finals have both the functional and lexical properties that characterize the category *v*: they theta-mark the external argument and syntactically license the direct object. In addition, we have shown that finals have open class semantic content and unpredictable effects on the meaning of the derived verb stem. These are semantic properties that characterize lexical categories, and distinguish Blackfoot finals from the abstract functional category postulated by Chomsky (1995) and Kratzer

TABLE 7.11 Mixed properties of *v*

properties	functional category	Blackfoot finals	lexical category
syntactic licensor of direct object	yes	yes	no
theta-marker	no	yes	yes
independent semantic content	no	yes	yes

(1996): the latter has been characterized as a quasi-lexical functor, whereas Blackfoot finals appear to be quasi-functional lexical morphemes. The hypothesis that both are light verbs, a category with mixed properties as proposed by Butt (2003), would allow for a unified treatment of this cross-linguistic variation.

7.5 Conclusion

In conclusion, we have argued that, contrary to the standard characterization (Bloomfield 1946), Blackfoot stem final morphemes do not encode transitivity. Consequently, the alternation between transitive and so-called intransitive verbs signals neither an aspectual shift nor a modification of the verb's (internal) argument structure. Rather, the difference is purely syntactic: verbs with a transitive final formally license a DP object in the syntax; verbs with an intransitive final do not, though they may have an NP or CP complement.

In addition to their syntactic function, the stem-final morphemes discussed in this chapter determine whether the verb has an external argument, and in cases where it does, the theta-role assigned to that argument. Blackfoot has a strict animacy requirement on external arguments which we analysed as a type of semantic selection imposed by the final. We concluded that finals must be *v*, a light verb that selects the external argument and formally licenses the direct object, as proposed by Chomsky (1995) and Kratzer (1996). Chomsky and Kratzer conceptualized *v* as an abstract element lacking phonetic content, but there is no principled reason why it should not be overt. Given the option to realize *v* overtly, our analysis of Blackfoot finals provides additional empirical support for this category.[24]

[24] See Doron (2003) for persuasive arguments that Semitic template morphology also realizes *v* overtly.

Chomsky characterizes *v* as a quasi-lexical functional category, based on its properties in languages like English. We found that Blackfoot *v* elements have the open class semantic content characteristic of a lexical category. A second difference between Blackfoot *v* and its English counterpart is that only the former imposes an animacy restriction on the external argument. We speculate that it is the lexical semantic content of Blackfoot *v* that imposes a semantic selectional restriction on the external argument (i.e., s-selects in the sense of Grimshaw 1979, 1990). In a language like English, *v* lacks this lexical semantic content and imposes no s-selectional restrictions on the external argument. Thus, the characterization of *v* as a functional or lexical category may be subject to cross-linguistic variation.

As it turns out, an animacy restriction on external arguments is not uncommon. For example, de Swart, Lamers and Lestrade (2008) point out that similar restrictions have been found in a wide range of languages, including Japanese (Kuno 1973); Jacaltec (Craig 1977); Dutch (van Voorst 1988); Lakhota (Van Valin and LaPolla 1997); and Irish (Guilfoyle 1997). Our analysis predicts that in these languages *v* also has the semantic content of a lexical category. If *v* is lexical we further predict that there may be significant variability in the specific selectional restrictions on the external argument in the different languages. It is a question for future research to determine whether these predictions are borne out.

8

Lexicon versus Syntax: Evidence from Morphological Causatives

JULIA HORVATH AND TAL SILONI

Causativization has been the topic of much linguistic research. Across languages causatives appear either in a periphrastic construction composed of two verbs or as one morphological verbal form, henceforth, morphological causatives. The two options are illustrated below in French and Hungarian (1a–b respectively).

(1) a. Jean fera marcher Pierre.
Jean will+make walk Pierre
'Jean will make Pierre walk.'

b. Az edző ugrál-tat-ja Marit.
the coach-NOM jump-CAUS-PRES.DEF.DO Mari-ACC
'The coach makes Mari jump.'

This chapter concentrates on morphological causatives. The fact that they constitute a word does not implicate that they are formed in the lexicon. On the contrary, recently it has become rather popular to advocate a uniformly syntactic treatment of all verbal alternations that seem to involve causativization (Harley 2006; Pylkkänen 2002). The chapter carefully sets apart the distinct morphological alternations often grouped together under the label causativization. It then reveals new evidence unequivocally showing that while certain

We would like to dedicate this chapter to the memory of Tanya Reinhart, whose approach to linguistics has been a source of inspiration for us. For helpful comments and discussion we are grateful to Roey Gafter and György Rákosi. We would like to thank Chris Piñón for his useful comments on the manuscript of this chapter. We are also grateful for helpful feedback to the participants of the Syntax, Lexicon, and Event Structure Workshop held in Jerusalem (July 2006) and the audience at the colloquium of the Research Institute for Linguistics of the Hungarian Academy of Sciences in Budapest (October 2007), where parts of this research have been presented. Finally, many thanks to Roey Gafter and Kyoji Tsujita for their help with the Japanese data, and Lior Laks for his technical assistance. This work was supported by grant 44/05 of the Israel Science Foundation.

morphological causatives are indeed formed in the syntax, others ought to be derived before any syntactic structure is available. This leads us to conclude that these causatives must be formed in the lexicon. We then discuss the formation of morphological causatives in the syntax and in the lexicon.

As is well known, the last decade has seen recurring attempts to eliminate the active (operative) role of the lexicon altogether, replacing it by non-computational lists of items. The chapter provides strong evidence that this could not be the right architecture of grammar. Rather, the grammar ought to include an active lexicon where generative mechanisms can apply.

The debate as to the role of the lexicon has often centred on (i) whether or not the theory is in need of a storehouse for words;(ii) where items get associated with the phonological matrix: in the lexicon, along the whole derivation (that is also in the syntax), or only upon spell-out ('late insertion' of the phonological 'clothing' (Halle and Marantz 1993 and subsequent work))? But these issues are irrelevant to the question at hand. Plausibly, words can be formed along the whole derivation (see Borer 1989), thus applying to outputs of the lexicon as well as of the syntax (by Baker's (1988) incorporation). Possibly, words are formed as abstract feature bundles that get their phonological 'clothing' only upon spell-out. These issues are orthogonal to the decision as to whether or not the lexicon is computational. The sole criterion for deciding that is whether or not we have compelling evidence that certain generative mechanisms must apply before any syntactic merging does. We believe the investigation of morphological causatives offers such evidence (see Landau (this volume) for independent evidence that operations can apply before any syntactic merger).

The study of reflexive verbs has led Reinhart and Siloni (2005) to put forward the so-called Lex(icon)-Syn(tax) Parameter, which states that arity (valence changing) operations can apply in the lexicon and in the syntax. As morphological causatives can be formed in the lexicon and in the syntax, the question arises whether their formation is yet another operation subject to the lex-syn parameter. As will become clear in the course of the chapter, there is no basis to assume that causatives formed in the syntax are subject to an arity operation. Only their lexical counterparts undergo modification of meaning and argument structure. We will show that under the division of labour between the lexicon and the syntax advanced in this chapter, this is precisely the expected state of affairs.

The chapter is structured as follows. Section 8.1 defines the empirical array. Section 8.2 investigates the properties of two types of morphological causatives involving monoclausal versus biclausal structure. Section 8.3 offers novel evidence that the former type must be derived before syntactic merging. In

section 8.4 the formation of morphological causatives in the syntax and in the lexicon is discussed and the relevance of the lex-syn parameter is examined.

8.1 Setting the stage

Examining verbal pairs whose two members differ basically in that one of them has one more θ-role than the other, Reinhart (1991, 2002) and Levin and Rappaport (1995) argue that the pairs split into two distinct alternations: (i) the transitive–unaccusative alternation and (ii) the causative–anticausative alternation. The former alternation is also labelled the causative–inchoative alternation; we use the term transitive–unaccusative (or simply unaccusative) alternation to avoid ambiguity in the course of the discussion. Literature on Japanese causatives provides robust support for this split.

Japanese has a productive operation of causativization. The operation systematically marks the causative alternate with the causative morpheme -(*s*)*ase*.[1]

(2) a. Yoshi-wa it-ta.
Yoshi-TOP go-PAST
'Yoshi went.'

b. Hanako-wa Yoshi-o ik-ase-ta.
Hanako-TOP Yoshi-ACC go-*sase*-PAST
'Hanako made Yoshi go.'

The outputs of the operation show a number of biclausal properties to be discussed in more detail in section 8.2 (Dubinsky 1994; Hara 1999; Kitagawa 1986; Kuroda 2003; Shibatani 1990; Terada 1991). For example, in (3) an adjoined -*te*-verbal form (a non-tensed verbal form), which requires subject control, can be controlled either by Hanako (i) or by Taro (ii). This optionality shows that the sentence involves two subjects, and hence, two clauses (Dubinsky 1994; Harley 2006; Terada 1991).

(3) Taroo-wa arui-te Hanako-o ik-ase-ta.
Taro-TOP walk-*te* Hanako-ACC go-*sase*-PAST
i 'Taro made Hanako go, walking.'
ii 'Taro, walking, made Hanako go.'

[1] -(*S*)ase has an allomorph -(*s*)*as*. Hara (1999) claims that the difference between -(*s*)*ase* and -(*s*)*as* is sociolinguistic, -(*s*)*ase* is considered more formal. Miyagawa (1998) points out that the difference is regional. The initial [s] in both is deleted if the last segment of the base is a consonant.

Alongside this operation, Japanese also has a transitive–unaccusative alternation, which is marked with an unpredictable morphology on the transitive and/or unaccusative alternate.

(4) a. Hanako-wa hi-e-ta.
Hanako-TOP cool-UNACC-PAST
'Hanako(s body) cooled.'

b. Taroo-wa Hanako-o hi-(y)as-ita.
Taro-TOP Hanako-ACC cool-TRANS-PAST
'Taro cooled Hanako.'

Control of a *-te*-phrase diagnoses only one subject for the transitive alternate, Taro in (5a). Note that the notion of someone becoming cool by getting wet is semantically sensible, as shown by the acceptability of (5b), where the subject of the unaccusative controls the adjunct (Harley 2006). This strongly suggests that the transitive alternate involves a monoclausal structure.

(5) a. Taroo-wa nure-te Hanako-o hi-(y)as-ita.
Taro-TOP wet-te Hanako-ACC cool-TRANS-PAST
'Taro getting wet cooled Hanako.'
Impossible reading: 'Taro cooled Hanako getting wet.'

b. Hanako-wa nure-te hi-e-ta.
Hanako-TOP wet-te cool-UNACC-PAST
'Hanako, getting wet, cooled.'

In the same vein, while negation detects two predicates in the causative examples, only one predicate is available for negation when the transitive alternate of the unaccusative alternation is used. Thus, negation can either follow the causative morpheme *-(s)ase* and thus negate the causative predicate (6a) or intervene between the base verb and the causative morpheme, thereby negating the base verb (6b) (Hara 1999). In contrast, when the transitive member of the unaccusative alternation is negated, the position of negation is invariable—it cannot precede the morpheme marking transitivity if there is one—and accordingly it must negate the whole transitive predicate (7).

(6) a. Toru-wa Yoko-o ik-ase-nakat-ta.
Toru-TOP Yoko-ACC go-CAUS-NEG-PAST
'Toru did not make Yoko go.'

b. Toru-wa Yoko-o ik-anaku-sase-ta.
Toru-TOP Yoko-ACC go-NEG-CAUS-PAST
'Toru made Yoko not go.'

(7) Taroo-wa niku-o kog-as-anakat-ta
Taro-TOP meat-ACC burn-TRANS-NEG-PAST
'Taro did not burn the meat.'

In sum, the transitive–unaccusative alternation exhibits idiosyncratic morphology, unlike the causative alternation that systematically marks the causative by *–(s)ase* (see Alexiadou (this volume), who also notes the variation in morphological marking of transitive–unaccusative pairs). Further, while the causative projects a biclausal structure, the transitive alternate is monoclausal.

Moreover, the transitive–unaccusative alternation is found across languages. In this regard, too, the two alternations differ. French, for instance, does not form morphological causatives. The French causative construction is a periphrastic structure composed of two distinct verbs: the causative verb *faire* ('make') and the causativized, embedded predicate, *marcher* ('walk') in (1), repeated in (8). Nonetheless, French does exhibit the universal unaccusative alternation, which is morphologically encoded on the unaccusative alternate by means of the clitic *se* (9) (with the exception of a dozen or more unaccusatives which bear no morphological encoding).

(8) Jean fera marcher Pierre.
Jean will+make walk Pierre.
'Jean will make Pierre walk.'

(9) a. Jean a cassé la branche.
Jean has broken the branch
'Jean broke the branch.'

b. La branche s'est cassée.
the branch SE is broken
'The branch broke.'

So languages differ as to whether they have morphological causatives or not. Reasonably, this is contingent upon the morphological inventory of the language: does it have a causative morpheme allowing the formation of morphological causatives or not? The unaccusative alternation, in contrast, is universal.

The question, then, arises whether the causative construction (when available) is uniformly biclausal in contrast with the transitive alternate of unaccusative, which involves a monoclausal structure. Assuming that this is so, Harley (2006) derives both alternations syntactically. The biclausal causatives, according to her, are formed by a V_{CAUS} head that takes a phase, a *v*P, which is equipped with an external argument, as its complement. The biclausal properties follow from the presence of two phases. The transitive alternate of

unaccusatives involves a V_{CAUS} that takes a bare root, a $\sqrt{P}$, which lacks an external argument, as its complement. Hence, it does not show any biclausal properties.

The next section shows that the split between the two alternations does not correspond to the biclausal-monoclausal split, and therefore cannot be captured by means of a distinct complement, *v*P or $\sqrt{P}$ respectively.

8.2 Two types of causatives

In the previous section we demonstrated that what is commonly referred to as causative constructions involve (at least) two distinct alternations. Furthermore, it was noted that one of these, the transitive–unaccusative alternation, is available universally, while the other, the causative alternation, is not. But in languages that do instantiate it, is morphological causativization a uniform operation? In other words, do causatives cross-linguistically behave on a par with the Japanese biclausal *-sase* construction?

Similarly to Japanese, Hungarian is a language known to have a productive morphological causative construction. It instantiates the causative alternation in a way that at first glance may appear to be parallel to Japanese *-(s)ase*. It is formed productively by a uniform affix, namely the suffix *-(t)at/-(t)et*. As in Japanese, this alternation is clearly distinguishable from the unaccusative-transitive alternation. First, similarly to Japanese, the morphological encoding of the transitive–unaccusative alternation is not uniform; morphological markings occur in an unpredictable fashion on the transitive and/or on the unaccusative member of the alternation, as illustrated in (10), in contrast to the uniform morphological realization of causatives (for more on the morphology of the unaccusative alternation, see Komlósy 1994).

(10)

	Transitive	Unaccusative
a.	*old*	*old-**ód(-ik)***
	'dissolve'	'dissolve'
b.	*olv-**aszt***	*olv-**ad***
	'melt'	'melt'
c.	*fejl-**eszt***	*fejl-**őd(-ik)***
	'develop'	'develop'
d.	*szár-**ít***	*szár-**ad***
	'dry'	'dry'
e.	*nyi-**t***	*nyí- **l(-ik)***
	'open'	'open'

f. *fagy-**aszt*** *fagy*
'freeze' 'freeze'

g. *zsugor-**ít*** *zsugor-**od(-ik)***
'shrink' 'shrink'

h. *tör* *tör(**-ik**)*
'break' 'break'

Corresponding to the dichotomy of morphological realization, the two alternations display a systematic distinction in interpretation as well. While transitive members of the unaccusative alternation exemplified in (10) roughly mean 'α executes the action on β', the causatives mean 'α causes β to do the action'. Note that β here, informally speaking, is a Causee; the transitive alternate of unaccusatives involves no such argument. An additional striking difference attested between the two alternations involves the external role: causative verbs (Verb+*-(t)at/-(t)et*) assign uniformly an Agent role (11a,b), while the external role of the transitive member of the unaccusative alternation is a Cause (12). A Cause role, in contrast to the Agent, is unspecified with regard to the mental state of the argument realizing it. Thus, in (12), not only animates like 'Mari', but also inanimates, such as 'the warm air', can materialize the external argument.

(11) a. Az edző/*az öröm ugrál-tat-ja Marit.
the coach-NOM/the joy-NOM jump-CAUS-PRES.DEF.DO Mari-ACC
'The coach/joy makes Mary jump.'

b. Az edző/*a száraz meleg it-at-ott Marival
the coach-NOM/the dry heat-NOM drink-CAUS-PAST Mari-INSTR
két üveg vizet.
two bottle water-ACC
'The coach/the dry heat made Mary drink two bottles of water.'

(12) Mari/a meleg levegő meg-olv-aszt-ott-a a jeget.
Mari-NOM/the warm air-NOM PERF-melt-TRANS-PAST-DEF.DO the ice-ACC
'Mari/the warm air melted the ice.'

It is important to note here that the transitive members of the unaccusative alternation are systematically equipped with a Cause role not only in Hungarian but across languages. Observing that, Reinhart (2002) argues that this is what defines the set manifesting the alternation. The present chapter is devoted to a comparative study of the causative alternation. We have discussed the unaccusative alternation and its systematically distinct

characteristics only in order to determine the empirical array under investigation. We will not investigate the nature of the alternation here. For discussion, see Horvath and Siloni (2008).

In spite of the superficial parallelism between the Hungarian *-(t)at/-(t)et* causatives and their Japanese counterpart in terms of productivity and morphological uniformity, a systematic comparison of their syntactic and semantic behaviour reveals that the Hungarian causative alternation is significantly different from the Japanese biclausal *-(s)ase* alternation in its structure and derivation.

Below we present a variety of phenomena serving to diagnose the biclausal nature of the productive *-(s)ase* causative, and apply the same tests to the corresponding productive *-(t)at/-(t)et* causative of Hungarian. Our immediate goal is to determine whether the latter also involves a biclausal structure.

8.2.1 *Diagnostics: biclausal versus monoclausal structure*

8.2.1.1 *Binding* Following Miyagawa's (1984) original observation, Hara (1999) shows that the application of Condition B of the binding theory provides evidence for a biclausal structure for Japanese *-(s)ase* causatives. Hara assumes Reflexivity (Reinhart and Reuland 1993) but a parallel argument can be made under the traditional binding theory. Consider the contrast between (13a) and the causative (13b).

(13) a. Toru$_i$ wa Kitahara$_j$ ni kare$_{*i/*j}$ o syookai si-ta.
Toru TOP Kitahara DAT he ACC introduction do-PAST
'Toru introduced him to Kitahara.'

b. Toru$_i$ wa [Kitahara$_j$ ni kare$_{i/*j}$ o syookai s]-*ase*-ta.
Toru TOP Kitahara DAT he ACC introduction do-PAST
'Toru made Kitahara introduce him.'

Condition B of Reflexivity states that a pronominal object of a semantic predicate cannot be co-indexed with the subject or any other co-argument if the predicate is not reflexive-marked (i.e. has a SELF-anaphor as an argument).

In (13a) co-indexation of the pronoun with either of the two other arguments of the ditransitive verb *syookai su* 'introduce' results in a Condition B violation, as none of these arguments is a SELF-anaphor. But crucially, the causativized verb *syookais-ase* in (13b) allows co-indexation of the Causer subject *Toru* and the base object *kare* 'he' without any reflexive-marking. Thus the Causer subject NP is not a co-argument of the base object: the former is an argument of a causative predicate *-(s)ase* and the other of the base verb, as

expected if the construction has a biclausal structure (co-indexation between *Kitahara* and *kare* in (13b) is disallowed, as expected, since they are co-arguments of the base verb and neither is a SELF-anaphor).

Compare now the corresponding Hungarian causative (14b) with the Japanese (13b).[2] The Hungarian construction turns out to manifest a Condition B violation parallel to the clearly monoclausal (14a).

(14) a. A diákok$_i$ ír-tak néhány sort
the students-NOM write-PAST-3PL a-few lines-ACC
*ról-uk$_i$/maguk-ról$_i$
about-them/themselves-about
'The students$_i$ wrote a few lines about them$_i$/themselves$_i$.'

b. A tanár$_j$ ír-at-ott a diákokkal
the teacher-NOM write-CAUS-PAST the students-INST
néhány sort *ról-a$_j$/magá-ról$_j$.
a-few lines-ACC about-him/himself-about
'The teacher$_j$ had the students write a few lines about him$_j$/himself$_j$.'

Compare (14b) also with the Hungarian periphrastic (permissive) causative (15), involving two distinct verbs, which, as expected, manifests no Condition B violation:

(15) A tanár$_j$ engedett a diákoknak írni róla$_j$
the teacher$_j$ let- PAST the students-DAT write-INF about-him$_j$
néhány sort.
a-few lines-ACC
'The teacher let the students write a few lines about him'

In (14b), co-indexation of the Causer with a pronominal argument of the base verb *ír* 'write' results in a Condition B violation; only a SELF-anaphor is possible. This indicates that in Hungarian *-(t)at/-(t)et* causatives, the Causer and the arguments of the base verb are co-arguments, i.e. arguments of a single predicate. It follows that the causative morpheme *-(t)at/-(t)et* cannot involve a biclausal structure.

8.2.1.2 *Negation* As we saw in section 8.1 (examples (6a,b)), negation provides evidence for the biclausal nature of the Japanese *-(s)ase* causative construction. In contrast to Japanese, negation in Hungarian unambiguously

[2] The subject of a transitive base verb bears Instrumental case in Hungarian causatives. The subject of an intransitive base verb normally is marked Accusative (for more on case marking in Hungarian causatives, see Komlósy (2000)).

scopes over the causative. The place of the negative morpheme with respect to the verb and the causative morpheme is invariant; negation cannot intervene between the base verb and the causative morpheme (16).

(16) Nem énekel-tet-tem a gyerekeket.
not sing-CAUS-PAST.1SG the kids-ACC
'I didn't make the kids sing.'
(Narrow scope impossible: 'I made the kids not sing')

Again as expected, the Hungarian periphrastic causatives, in contrast, pattern with Japanese *-(s)ase* (see (6) in section 8.1) in allowing both scopes.

(17) Nem engedtem a gyerekeket énekelni
not let-PAST-1SG the kids-ACC sing-INF
'I didn't let the kids sing.'
Engedtem a gyerekeket nem énekelni
let-PAST-1SG the kids-ACC not sing-INF
'I let the kids not sing.'

8.2.1.3 *VP-ellipsis* Japanese examples involving VP-ellipsis as in (18) are ambiguous between the interpretations given in (i) and (ii). As noted originally by Shibatani (1972), this ambiguity provides further evidence for the biclausal nature of *-(s)ase* causatives. If the sentence contains two VPs, then either the lower VP (consisting of a base verb and its complement) or the higher VP (headed by *-(s)ase*)) is elided (i.e., is copied onto the second conjunct or fails to get pronounced, under the PF-deletion view of ellipsis).

(18) Yoko-wa [musuko-ni [huku-o ki]-*sase*]-ru
Yoko-TOP son-DAT clothes- ACC wear-CAUS-NON-PAST
to Junko mo soo si-ta.
and Junko also so do do-PAST
(i) 'Yoko made her son wear clothes, and Junko made her son wear clothes, too.'
(ii) 'Yoko made her son wear clothes, and Junko wore clothes, too.'

In contrast, VP ellipsis in the Hungarian causative construction is unambiguous, as shown by the interpretation of (19). It can effect only the causative verb. This is consistent with the claim that Hungarian causatives, unlike their Japanese counterparts (18), consist of a single VP, and that VP necessarily includes the causative element.

(19) A tanár fel-olvas-tat-ott Marival egy verset
the teacher-NOM up-read-CAUS-PAST Mari-INSTR a poem-ACC

és János szintén (úgy tett).
and János-NOM also (so did)
'The teacher made Mari read out a poem, and János made Mari read out a poem, too.'
(Impossible reading: 'The teacher made Mari read out a poem and János read out a poem, too.')

8.2.1.4 *Agent-oriented adverbials* A biclausal analysis of Japanese *-sase* causatives predicts that adverbs will be able to modify either an embedded base verb or a causative head *-(s)ase*. Indeed, as shown by Shibatani (1972), Japanese causatives turn out to permit a variety of adverbial modification both for the causing event and the caused event (base predicate). Significantly, consider the availability of Agent-oriented adverbial modification either for the subject of the causative head or for the subject of the base verb, as shown for 'happily' in (20) (Matsumoto 1998 (15b)):

(20) Jon wa muriyari sono ko ni sono kutsushita
John TOP forcibly the child DAT the socks
o **ooyorokobi de** hak-ase-ta.
ACC happily put+on-CAUS-PAST
'John forcibly made the child put on his socks(,) happily.'

Given the positions of the two adverbials, it is necessarily John who is forceful, but either John or the child may be happy.

Unlike Japanese, Hungarian causatives fail to display such ambiguity of Agent-oriented adverbials (21)–(22). It is unambiguously the Causer that is modified, and not the Causee.

(21) A házigazda kelletlenül/szívesen mos-at-ta ki
the landlord-NOM reluctantly/willingly wash-CAUS-PAST out
a feleségével a függönyöket.
the wife-his-INSTR the curtains-ACC
'The landlord reluctantly/happily made his wife wash the curtains.'
(Only 'the landlord' can be reluctant/willing, not 'his wife'.)

Varying the position of the adverb in (21) so that it follows the Causee renders the sentence degraded, and to the extent that it can be judged, the adverb is still construed as modifying the Causer:

(22) ??A házigazda ki-mos-at-ta a feleségével
the landlord-NOM out-wash-CAUS-PAST the wife-his-INSTR
kelletlenül/szívesen a függönyöket.
reluctantly/willingly the curtains-ACC

The impossibility of Agent-oriented modification of the Causee will follow as a direct consequence of our account in section 8.4.

8.2.2 *Interim evaluation*

The above comparison of the productive *-(s)ase* causative of Japanese with the productive *-(t)at/(t)et* causative of Hungarian has yielded unequivocal results: while the Japanese construction is biclausal, the Hungarian causative behaved systematically as monoclausal with respect to all the diagnostic tests.

Consider now the question we raised at the end of section 8.1 as to the nature of the split between the unaccusative and the causative alternation: does this partition correspond to the distinction between monoclausal versus biclausal structure across languages, as is assumed by uniformly syntactic accounts such as Harley's (2006)? Recall that the Harley-type proposal derives the distinction by postulating two instances of a syntactic V_{CAUS} head, one selecting as complement a bare root ($\sqrt{P}$), which contains no external argument, and the other a *v*P phase, including an external argument. The former yields the monoclausal structure, and the latter the biclausal one.

But in view of the monoclausal causative of Hungarian contrasting with the Japanese biclausal one, this account is clearly inadequate. Harley's proposed structural dichotomy fails to capture the fact that monoclausal causatives such as in Hungarian are freely formed from base verbs taking an external argument, namely, from transitive and unergative base verbs, as demonstrated by examples such as (11a–b), (14b), (16), (19). Obviously, these monoclausal structures cannot be treated as a V_{CAUS} head taking a bare root complement lacking an external argument.

Another purely syntactic treatment of morphological causatives, by Pylkkänen (2002), does take note of the existence of monoclausal causatives that embed transitive and unergative base verbs. Discussing Finnish causatives, Pylkkänen observes that this subtype of causatives can contain an argument interpreted as the Agent-participant of the caused event. Noting that 'these embedded Agents are not "agentive enough" to license Agent-oriented adverbial modifiers' (Pylkkänen 2002: 97), she stipulates that they get introduced in the causative construction in a different, ad hoc way by an extra head, unlike in non-causative structures. But such an account completely misses the obvious generalization as to when the verb forming a causative has this additional argument and when it does not: namely, whenever the base predicate has an external role its causative counterpart has a corresponding role. Any analysis adding the role independently of the base verb's external role completely misses this correlation, which cannot be accidental.

The following section presents novel empirical evidence indicating that irrespective of the specifics of individual proposals, any uniformly syntactic (i.e. post-lexical) treatment of morphological causatives is inadequate. Specifically, in section 8.3 we present evidence showing that in fact no syntactic structure is present when the Hungarian-type causative is formed.

Subsequently, we will advance a proposal for the derivation of morphological causatives, according to which the cross-linguistic variation between causatives such as the Japanese and the Hungarian type is due to the distinct locus of their derivation: Japanese-type causatives are derived in the syntax, whereas the Hungarian-type is derived in the lexicon.[3] Their systematic biclausal versus monoclausal behaviour observed above will then follow automatically from the nature of these respective components.

8.3 No access to syntactic structure

8.3.1 *Causativization of coordinations*

Striking evidence in favour of the above hypothesis regarding the locus of derivation of causatives comes from a distinction between Japanese and Hungarian with respect to the causativization of coordinated base verbs.

The rationale of the argument is as follows. If a causative is formed in the lexicon, it cannot exhibit coordination (conjunction or disjunction) of the base verb, since no syntactic structure is available in the lexicon; coordinate structures are built only in the syntax. If on the other hand the base verb and the causative morpheme are distinct syntactic heads, coordination of the complements of the causative head should in principle be possible; that is, the causative affix should be able to attach to coordinated base verbs, unless some independent factor excludes it (such as some morphological or phonological violation).

As observed by Kuroda (2003), Japanese causatives are permitted with coordination, in particular disjunction, of two (or more) base verbs, as shown in (23). This is expected, since they involve two verbal projections, as

[3] Note that the conclusion that the Hungarian-type causative ought to be formed in the lexicon provides evidence that the external argument of transitive and unergative entries cannot be inserted in the syntax via a little *v* type head (Chomsky 1995; Kratzer 1996; Ritter and Rosen this volume, among others). This is so because it must be present in the grid of the predicate in the lexicon (as argued on independent grounds by Horvath and Siloni 2002, among others) for lexical causativization to be able to target transitive entries.

extensively discussed above; this would not be possible if these causatives were formed in the lexicon.[4]

(23) Hanako-ga [[Masao-ni uti-o soozisuru]-ka
Hanako-NOM Masao-DAT house-ACC clean-OR
[heya-dai-o haraw]]-aseru koto ni sita
room-rent-ACC pay-*sase* that to do
'Hanako decided to make Masao clean the house or pay room rent.'
(Reading: -(*s*)*ase* scopes over 'or'; Masao has a choice)
(adapted from Harley 2006, citing Kuroda 2003: 455)

Crucially, Hungarian turns out to disallow causativization of coordinated base verbs (24a), both for conjunction and disjunction cases; it requires two occurrences of the causative morpheme (24b).

(24) a. *Mari olvas- és/vagy énekel-tet-te az osztályt.
Mari-NOM read and /or sing-CAUS-PAST.DEF.DO the class-ACC
'Mari made the class read and/or sing.'

b. Mari olvas-tat-ta és /vagy énekel-tet-te
Mari-NOM read-CAUS-PAST.DEF.DO and /or sing-CAUS-PAST.DEF.DO
az osztályt.
the class-ACC

Uniformly syntactic accounts of causativization, that is, those with V_{CAUS} heads selecting different projections as complements (e.g. Harley 2006, Pylkkänen 2002) predict the possibility of causativizing coordinated base verbs in Hungarian just as well as in Japanese. The impossibility of cases like (24a) seems to pose a serious problem for such accounts, and to provide strong evidence in favour of a lexical derivation for Hungarian causatives.

At this point though there still could in principle be some independent, purely morphological or phonological factors in Hungarian that would exclude realization of the causative *-(t)at/-(t)et* affix on a coordinated verbal constituent. But upon further exploration, this in fact turns out not to be the case.

So let us consider whether it may be a general morphological property of Hungarian that prevents the causative affix from attaching to coordinated verbs. Could the reason for the impossibility of (24a) be that bound

[4] For independent reasons, Japanese seems to prohibit conjunctions in this context. This is not directly relevant for our purposes.

morphemes (affixes) in Hungarian must adjoin to lexical heads, i.e. cannot adjoin to coordinate structures?

It turns out that no such prohibition holds in Hungarian. This is demonstrated by the existence of other cases of bound morphemes that clearly are able to occur attached to coordinate structures, such as the suffix *-ként* 'as', or the suffix *-szerű* '-like':

(25) a. tanár- és barát-ként
teacher and friend-as
'as teacher and friend'

b. telefon- és autó-szerű (dolgok) (Kenesei 2007, (30a))
phone and car-like things
'phone and car-like (things)'

Neither can the impossibility of the causative affix on coordinated base verbs be attributed to some phonological/prosodic factor. At first it might seem plausible to assume that the prohibition may be due to phonological size, namely that the *-(t)at/-(t)et* suffix is too 'small' or phonologically dependent for attaching to coordinations, rather than to a single phonological word (PW). This assumption may arise given that (a) the causative suffix is subject to vowel harmony, hence the alternation *-(t)at* vs. *-(t)et* and (b) the domain of vowel harmony is the PW (see Kenesei 2007 citing Vogel 1989). Consequently, the causative affix must form a PW with the form it attaches to. Could then this PF requirement be what prevents it from attaching to coordinated verbs? Evidence that this cannot be the case is provided by the existence of other suffixes in the language that exhibit vowel harmony similarly to *-(t)at/-(t)et*, and thus must also form a PW at PF with what they attach to, but nonetheless do occur on coordinate structures. A case in point is for instance the suffix *-szor/-szer/-ször* 'times', as in *nyolc-szor* 'eight times', t*íz-szer* 'ten times':

(26) a. kilenc- vagy tíz-**szer**
nine or ten-times

b. hat- vagy nyolc-**szor**
six or eight-times

So the inability of the suffix *-(t)at/-(t)et* to occur with coordinated base forms is neither a consequence of a PF property, nor the result of being a bound morpheme. Thus under a syntactic derivation, this property of the Hungarian causative would have to be stipulated somehow as an ad hoc prohibition of the syntax on the causative head. In contrast, the attested non-occurrence of

the causative affix on coordinated base verbs follows as a straightforward consequence of the lexical derivation we propose for the Hungarian-type causative.

8.3.2 *Causativization of raising predicates*

Evidence from a different empirical domain that directly supports a lexical derivation for Hungarian morphological causatives and a syntactic one for their Japanese counterparts is provided by raising predicates.

Raising predicates take no thematic subject, and select a clausal internal argument. Despite their 'meager' argument structure, raising verbs can be causativized in Japanese, as shown by *owar* 'finish' (27), which is unambiguously a raising verb (see Fukuda 2006). If *-(s)ase* causatives are formed in the syntax, this is not surprising, as will be explained below.

(27) a. Watashi wa hon o kaki-owat-ta
I TOP book ACC write-finish-PAST
'I finished writing the book.'

b. anata wa watashi ni hon o kaki-owar-ase-ta
you TOP I DAT book ACC write-finish-CAUS-PAST
'You made me finish writing the book.'

Note first that the subject of the raising verb ('I' in (27a)) does not receive its θ-role from the raising verb but from the embedded verb 'write'; that is, it is not part of the θ-grid of the raising verb. It can nonetheless participate in the causative construction as illustrated in (27b), because it occurs in a local configuration with the causativizing head. In the syntax both the raising verb and its derived subject are accessible: they are in the search domain of the causativizing head.

If in Hungarian, in contrast, morphological causatives are formed in the lexicon, as we argue, parallel causativization of raising verbs should be impossible in spite of the productivity of the phenomenon. This is so, because in the lexicon there is no relation whatsoever between distinct predicates; they are distinct entries on a list. Thus, a lexical operation applying to a raising verb cannot involve the role of another predicate.

Let us then try to causativize the raising verb *(el)kezd* 'start', illustrated in (28). (29b–c) and (30b) are the causative versions of (29a) and (30a), respectively.

(28) El-kezd-ett havaz-ni.
PERF-start-PAST.3SG snow-INF
'It started to snow.'

(29) a. Mari (el)kezd-ett énekel-ni (valami népdalt).
Mari-NOM PERF-start-PAST.3SG sing-INF some folksong-ACC
'Mari started to sing (some folksong).'

b. *Kati (el)kezd-et-ett énekel-ni Marival
Kati-NOM PERF-start-CAUS-PAST.3SG sing-INF Mari-INSTR
valami népdalt.
some folksong-ACC
Kati made Mari start to sing some folksong.'

c. *Kati (el)kezd-et-te Marit énekel-ni.
Kati-NOM PERF-start-CAUS-PAST.DEF.DO Mari-ACC sing-INF
'Kati made Mari start to sing.'

(30) a. A szobalány el-kezd-te porszívóz-ni a
the maid-NOM PERF-start-PAST.DEF.DO vacuum-INF the
szőnyegeket
carpets-ACC
'The maid started to vacuum the carpets.'

b. *El-kezd-et-t-ük porszívóz-ni a
PERF-start-CAUS-PAST-1PL.DEF.DO vacuum-INF the
szőnyegeket a szobalánnyal.
carpets-ACC the maid-INSTR
'We made the maid start to vacuum the carpets.'

Note that there is no problem with the causative form of the particular verb *(el)kezd* itself; it does causativize when occurring as a two-place verb, with a DP as internal argument (31)[5]

(31) El-kezd-et-t-ük Marival az órát.
PERF-start-CAUS-PAST-1PL.DEF.DO Mari-INSTR the class-ACC
'We made Mari start the class.'

Under a lexical analysis of Hungarian causatives, the reason for the failure of raising verbs to causativize is straightforward. The subject of the raising verb *(el)kezd* 'start' (e.g. 'Mari' in (29a), and 'the maid' in (30a)) does not receive

[5] The raising verb *(el)kezd* 'start' taking an infinitival complement also has a control verb version, similar to its English counterparts *start* or *begin*. This homophonous subject control version cannot causativize either (as shown by the unacceptability of (29b–c) and (30b)). For our purposes it suffices that causativization of the raising verb is impossible. It is worth noting that the failure of the control verb version to causativize provides further support for the lexical derivation of Hungarian causatives, as discussed in Horvath and Siloni (2008).

its θ-role from the raising verb but from the verbs 'sing' and 'vacuum' respectively; that is, it is not part of the θ-grid of 'start'. In the lexicon, there is no relation between *(el)kezd* 'start' and the verb which will end up embedded under it in the syntax. Hence, a lexical operation applying to 'start' can absolutely not involve roles of this predicate.

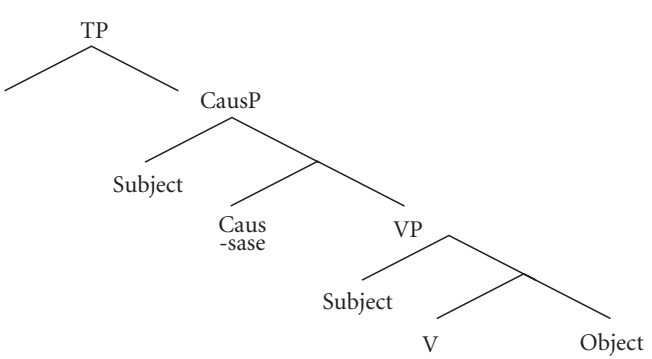
In sum, under uniformly syntactic treatments of causatives across languages, the impossibility of causativizing raising verbs in Hungarian (as seen in (29)–(30))-but not in Japanese (27)-remains a mystery. Under the lexicon-syntax theory we are proposing, it falls out naturally.

8.4 The formation of morphological causatives

8.4.1 *Causatives formed in the syntax*

Biclausal morphological causatives are formed in the syntax. There is no reason to think that they undergo an operation affecting their base verb or its θ-grid. On the contrary, various tests show that the embedded verb denotes its own event and keeps its original θ-grid. Thus, their syntactic structure can involve two Agents, each of a distinct event/head.[6] Structurally, these are periphrastic causatives, but their causative morphology does not constitute a separate verb, but a bound morpheme labeled here Caus. We assume here that the embedded clause is a VP phase that does not project the higher functional categories (TP, CP) (32) but nothing crucial hinges on that (see Harley (2006) for some justification).

(32)



[6] The External argument added by the Caus head is not limited to Agents. Non-animate arguments, [+c], also qualify although they are much less frequent and probably less natural.

8.4.2 *Lexical causatives*

Morphological causatives formed by lexical causativization do not involve two predicates, and therefore do not involve two events in the syntax. Causativization in the lexicon, then, must causativize the event (verb) it applies to, and add an Agent to the original θ-grid. If so, then causativization forms a new, complex concept, which we can label CAUS-V, with a new θ-grid. The new grid is composed of the new Agent and the roles of the input grid, which now become roles of CAUS-V, as schematized in (33); < α > represents the input grid.

(33) Causativization in the lexicon (to be revised in (35))
V< α > → CAUS-V <[Agent], α >

In case the input's θ-grid includes an Agent role, the addition of another Agent raises the obvious query: Is CAUS-V associated with two identical roles, the original Agent and the Agent added by causativization? Semantically, the Agent of the input verb is clearly not interpreted as the Agent of CAUS-V; it is not the argument that causes the event, the added Agent does it. In fact, if the Agent of the input remained an Agent, the new grid would be associated with two Agent roles. But it is well known that thematic relations cannot be instantiated more than once per θ-grid (see Parsons 1990: 73–4, Pesetsky 1995: 62, Williams 1981: 100, and others). Natural languages impose a uniqueness condition on θ-roles.

(34) Uniqueness condition
A θ-grid cannot contain two instances of the same role.

If the Agent of the input verb is not an Agent in the newly formed θ-grid, then the operation of lexical causativization must involve an additional ingredient that adjusts the input's Agent into the newly formed θ-grid.

If θ-roles are grammatical primitives, it is not clear how an operation can adjust a role; what could it mean to adjust an Agent: it is either an Agent or it is not. However, if θ-roles have an internal structure, adjustment becomes possible. We believe that the Agent role, Theme role etc. are conventionalized labels for feature clusters. Following Reinhart (2002), we assume that the atomic features underlying the set of θ-roles are: *c*, which determines whether or not the argument in question is necessarily responsible for causing the denoted event, and *m* which determines whether or not the mental state of the argument in question is relevant to the denoted event. The features specify the relationship between the argument and the event. Each of these features can be valued for [+] or [–], or left unvalued. Thus, the Agent role

bears a [+c +m] relationship to the event, as it brings about the relevant event or change and must be animate (its mental state is relevant). The Cause, in contrast is in a [+c] relationship to the event, as it is unspecified with regard to mental state, and can either be realized by an animate argument or not. The Theme role is [−c −m], as it does not trigger the change in question nor is its mental state relevant to the event.[7] The Experiencer role is [−c +m] as it does not cause the change, but its mental state is relevant to the event. The feature clusters are not just translations of the traditional labels. They capture the nature of the roles in a more precise fashion. Thus, the cluster [−c +m], for instance, is not just another label for the Experiencer, but ranges over all arguments that do not trigger the event in question but whose mental state is relevant to it. For our purposes this short description is sufficient; for more discussion, see Reinhart (2002). The operation of lexical causativization (33) is then defined as follows:

(35) Causativization in the lexicon (to be revised in (37))
V< α > → CAUS-V <[+c +m], α >

If the input's grid includes an Agent, the new grid would violate the uniqueness condition, and therefore some adjustment must take place, as mentioned above. Indeed, in section 8.2.1.4 we have discussed evidence suggesting that the original Agent, [+c +m], becoming a role of the newly formed predicate, loses its Agentive nature. In Hungarian, Agent oriented adverbs identify the added Agent but not the Agent of the input grid as the Agent of CAUS-V ((21)–(22) repeated as (36a–b) below). (Recall that Agent oriented adverbs detect two Agents in the biclausal Japanese causative, as shown in (20) above).

(36) a. A házigazda kelletlenül/szívesen mos-at-ta
the landlord-NOM reluctantly/willingly wash-CAUS-PAST
ki a feleségével a függönyöket.
out the wife-his-INSTR the curtains-ACC
'The landlord reluctantly/happily made his wife wash the curtains.'
(Only 'the landlord' can be reluctant/willing, not 'his wife'.)

[7] At the semantics, an argument bearing a [+c] cluster, which is unspecified with regard to *m*, is interpreted either as an Agent (*Dan* in (i)) or as a non-Agent (say, an Instrument, *this key* in (i)). The mental state of an argument specified -*m*, say [−c−m], *the door* in (i), remains irrelevant at all stages of the derivation, including the semantics.

(i) Dan/This key opened the door.

b. ??A házigazda ki-mos-at-ta a feleségével
the landlord-NOM out-wash-CAUS-PAST the wife-his-INSTR
kelletlenül/szívesen a függönyöket.
reluctantly/willingly the curtains-ACC

To make things more palpable, consider the verb *olvastat* 'CAUS-read', for instance. Its input's Agent, namely the Causee, performs the reading event and therefore its mental state is relevant, but it is not the one that triggers or brings about the event of reading. In feature terms, this means that the valuation of its *c* feature becomes negative, as suggested by Reinhart (2002). If so, then lexical causativization causativizes the event, adding an Agent and applies adjustment, if needed. α' stands for the output grid, which is slightly different from α in case adjustment applies, and identical to α otherwise.[8]

(37) Causativization in the lexicon (final version)
V $<\alpha>$ $\rightarrow$ CAUS-V $<[+c+m], \alpha' >$; if α includes a cluster β with a feature composition $[+c+m]$, $+c$ in β is revaluated to $-c$.

Applying the operation to the verb entry sétál 'walk' in (38), we obtain a verb entry which has two roles: a $[+c+m]$ cluster, the added role, which corresponds to the animate argument that triggers the walking event, and a $[-c+m]$ cluster, the adjusted Agent, which does not bring about the event but executes the actual walking and therefore its mental state is relevant.

(38) walk $< [+c+m] > \rightarrow$ CAUS-walk $< [+c+m],[-c+m] >$

Application of causativization to the transitive entry olvas 'read' yields the same result, modulo the inclusion of the [-c −m] cluster (Theme) in the grid of both input and output.

(39) read $<[+c+m],[-c-m]>$ $\rightarrow$ CAUS-read $<[+c+m],[-c+m],$ $[-c-m]>$

The next question concerns the interpretation of sentences involving CAUS-V. We adopt the common 'neo-Davidsonian' system of the type proposed by Parsons (1990), which relies on θ-roles and an event variable. The event semantic representation of (40a) is shown in (40b).

[8] Formulation (37) (like its predecessors) allows any input verb. In Horvath and Siloni (2008) we show that the input must obey a constraint definable only in lexical terms (namely, only if the operation takes place in the lexicon).

(40) a. János meget-et-te Marival az almát.
János-NOM PERF-eat-CAUS-PAST.DEF.DO Mari-INSTR the apple-ACC
'János made Mari eat the apple.'

b. ∃e [CAUS-eat(e) & [+c+m](e, János) & [−c+m](e, Mari) & [−c−m] (e, apple)]

Trivially, the Agent [+c+m] of CAUS-V has the entailments of an Agent. But what are the entailments of being [−c+m] or [−c−m] of CAUS-V? As the addition of (41a) makes (40a) a contradiction, it follows that being [−c+m] of CAUS-eat entails eating (the apple), that is, being [+c+m] of 'eat'. Similarly, extending (40a) with (41b) forms a contradictory sentence, which means that [−c−m] of CAUS-eat has the same entailment as being [−c−m] of the input 'eat'.

(41) a. #de nem Mari ette meg az almát
but not Mari-NOM eat-PAST.DEF.DO PERF the apple-ACC
'but it wasn't Mari who ate the apple'

b. #de Mari nem az almát ette meg
but Mari-NOM not the apple-ACC eat-PAST.DEF.DO PERF
'but it wasn't the apple that Mari ate'

The above entailment relationship between the roles of CAUS-V and those of its input are summarized in (42).

(42) a. [−c −m] of CAUS-V has the entailments of [−c −m] of the input V.

b. [−c+m] of CAUS-V has the entailments of [+c+m] of the input V.

Other possible θ-roles of CAUS-V (not specified in (42)) also exhibit the same entailments as the corresponding roles of the input V. For reason of space, we do not provide the exhaustive list of examples. Note that CAUS-V and V are two different concepts (lexical entries). Hence, (42a) is not superfluous. It defines the relationship between two lexical items (CAUS-V and V) with regard to the interpretation of their θ-roles. Further, it is important to stress that (42b) does not mean that [−c] is sometimes interpreted as [+c]. (42b) defines the relationship between the interpretation of [−c+m] of CAUS-V and [+c+m] of the corresponding V: [−c+m] of CAUS-V is interpreted as [+c+m] of V (not as [+c+m] of CAUS-V). We can formulate that via a meaning postulate governing the entailment relationship between the two lexical entries CAUS-V and its corresponding V.

(43) The Causativization Meaning Postulate
The θ-roles of the input preserve their entailments under causativization.

Causativization, then, does not affect the entailments of the θ-roles of the input; most significantly, even the adjusted role preserves its entailments.

Finally it is important to mention that in some languages, e.g. English and Hebrew, we find only a small set of lexical causatives, and not the full range attested in Hungarian. In Hebrew, for example, the set is limited to verbs such as *hilbiš* ('dress'), *hin'il* ('put on shoes to someone'), *he'exil* ('feed'), *hextim* ('make sign') and some others. We tend to think that in such languages, the operation of lexical causativization is not operative (anymore), and the causative instances are underived entries (or relics). We currently investigate this linguistic variation, and therefore postpone a more detailed discussion of the issue. We note nonetheless that lexical causatives in these languages tend to undergo semantic drift from CAUS-V to actually 'exercise-V on somebody'. Thus, for instance, in Hebrew *he'exil* has drifted from 'CAUS-eat' to 'feed'. The same is true for *hilbiš* ('dress') and *hin'il* ('put on shoes to someone'). The semantically drifted nature of these lexical causatives provides preliminary support for our claim that at present the languages in question do no employ the operation of lexical causativization. If they did, why would the automatic interpretation obtained by causativization not be available (CAUS-V), in addition to the drifted meaning? Hungarian in fact exhibits precisely this state of affairs: pairs of drifted meaning and undrifted causatives coexist in the lexicon for a variety of items, such as *felöltöztet* (i) 'make X get dressed' (ii) 'dress X', *etet* (i) 'make X eat Y' (ii) 'feed'. Finally, note that a small set of semantically shifted lexical causatives with unpredictable morphology is also found in Japanese, alongside the productive, biclausal -(*s*)*ase* causatives.

8.4.3 *A note on the lex-syn parameter*

It has been argued recently that certain arity (valence changing) operations are subject to the lex(icon)-syn(tax) parameter, which forces their application in certain languages in the lexicon and in others in the syntax (Reinhart and Siloni 2005). Is causativization an operation subject to the lex-syn parameter?

Morphological causatives formed in the syntax do not undergo an arity operation. As we saw earlier, they involve a biclausal structure, namely, two predicates. The embedded predicate's θ-grid is intact just like its counterpart in periphrastic causatives. The only distinction is that in the former the causative predicate is a bound morpheme while in the latter it is a free standing verb. Thus, only lexical causatives are subject to the arity operation of causativization; causatives derived in syntax involve no arity operation.

We conceive of the lexicon as an inventory of coded concepts, a subset of which denotes an event, selects participants in the event (bears θ-roles), and

can undergo arity operations as specified by universal grammar. There is no syntactic structure in the lexicon; this would be a superfluous reduplication of the syntactic component. The syntax, in contrast, is the engine that builds structure from elements selected from the lexicon. We assume the syntactic component must preserve lexical information, in the spirit of the requirement put forth by the projection principle (Chomsky 1981). More precisely, we believe that the syntax cannot manipulate the thematic information predicates are equipped with upon syntactic merging. The syntax cannot alter θ-grids, as stated by the Lexicon Interface Guideline (Siloni 2002).

(44) The Lexicon Interface Guideline: The syntactic component cannot manipulate θ-grids: Elimination, modification and addition of a θ-role are illicit in the syntax.

Under this rough division of labour between the lexicon and the syntax, we expect morphological causatives not to fall in the scope of the parameter as defined by Reinhart and Siloni (2005). Causativization of a predicate in the syntax is only possible through the addition of a distinct predicate, a causativizing head, which adds the causation meaning ingredient and the Causer. Addition of those to the base verb (without a causativizing head) is not licit in the syntactic component.[9]

Nonetheless, languages do differ as to whether or not they allow (i) the operation of lexical causativization, (ii) the syntactic formation of biclausal morphological causatives. This may follow directly from the morphological inventory of the language: whether or not it has the morpheme appropriate for the specific construction. We leave further questions on the topic for future research.

[9] Reflexivization, for instance, as argued by Reinhart and Siloni (2005), is an operation associating two roles with a single argument. Such an operation does not alter the θ-grid, and hence is applicable in both the lexicon and the syntax.

Further, as mentioned in note 3, the external role of monoclausal entries, unlike the Causer of biclausal causatives, must be part of the verbal θ-grid in the lexicon, and cannot be introduced in the syntax via a separate head.

9

On the Morphosyntax of (Anti)Causative Verbs

ARTEMIS ALEXIADOU

9.1 Setting the stage

As is well known, in many languages change of state verbs participate in the so-called (anti)causative alternation; this is illustrated in (1) with an English example. Such verbs permit both transitive/causative and intransitive/anticausative construals:

(1) a. John broke the window *Causative*
b. The window broke *Anticausative*[1]

The paradigm in (1) has been the subject of much discussion in linguistic theory, as its existence raises a number of intriguing questions. In this chapter, I address three of them.

The first question is whether we are actually dealing with a causative formation or a detransitivization process. Both views have been proposed in the literature: proponents of the causative formation approach claim that the intransitive form is basic (e.g. Dowty 1979; Pesetsky 1995, and others), while proponents of the detransitivization process claim that it is the transitive that is basic, and intransitive one is derived (e.g. Levin and Rappaport Hovav 1995; Chierchia 1989; Reinhart 2000, and others). Recently, a third proposal has been advanced, namely that the two alternates do not stand in a derivational relationship (Alexiadou, Anagnostopoulou, and Schäfer (AAS) 2006; Doron 2003).

I would like to thank an anonymous reviewer and the editors of this volume for their comments and suggestions, which greatly improved this chapter. Special thanks to Elena Anagnostopoulou, Florian Schäfer, and the audience at the Workshop on syntax, lexical semantics, and event structure in Jerusalem in July 2006 for their questions and input.

[1] Here the term 'anticausative' is not used as in Haspelmath (1993), where it refers to an intransitive form derived from a transitive one; it is rather meant in a broader sense as 'change of state without an external argument'.

The second question concerns the morphological form of the alternation, namely whether morphological marking plays a role in determining the directionality of the derivation. Derivational approaches typically assume an iconic reasoning; the derived form is expected to be morphologically marked. This means that if the intransitive form is the basic form, as the causativization approach claims, then the transitive form is expected to be morphologically marked (2a). On the other hand, if the transitive form is the basic form, as is claimed by the detransitivization approach, the intransitive form is expected to be marked, bearing morphology related to valency reduction (2b):

(2) a. Intransitive Form: V *basic*
Transitive Form: V-X

b. Intransitive Form: V-X
Transitive Form: V *basic*

As Haspelmath (1993) and much subsequent work discusses in detail, cross-linguistically both patterns are found. This is illustrated in (3) and (4):

(3) Marking on the transitive:

a. Georgian:	*duγ-s*	'cook (intr)	(Haspelmath, op. cit.)
	a-duγ-ebs	'cook (tr)'	
b. Khalka Mongolian:	*ongoj-x*	'open (intr)'	(Piñón 2001)
	ongoj-lg-ox	'open (tr)'	

(4) Marking on the intransitive:

a. Russian:	*katat'-sja*	'roll (intr)'	(Haspelmath 1993:91)
	katat'	'roll (tr)'	
b. Polish:	*złamać-się*	'break (intr)'	(Piñón 2001)
	złamać	'break (tr)'	

The fact that both patterns exist raises questions as to the necessity of establishing a directionality relationship between the two variants (see Doron 2003; AAS, for discussion).

The third question concerns cross-linguistic variation in terms of the verbs that can undergo the alternation. Note here that the variation goes in two directions. On the one hand, we find verbs that lack causative counterparts in English but do have such counterparts in a number of

other languages (5a); on the other hand, we find verbs that lack anticausative counterparts in English (although their 'lexical semantics' would predict the existence of an anticausative variant) but do alternate in other languages (5b). The chart in (5) illustrates this for a couple of verbs:

(5)

	Causative	**Anticausative**
a. *arrive/appear*	+ Japanese, + Salish, −English	+ in all languages
b. *kill/cut*	+ in all languages	+Greek, + Hindi, −English

In the literature, we find two possible answers to this question. On some views, there is always a transitive alternate; it is possible that a verb got frozen in one form in the lexicon of a given language (this is claimed by Reinhart 2002, building on Chierchia 1989, to be the behaviour of *arrive*). On other views, however, variation relates to the classification of verb meanings (Haspelmath 1993; Levin and Rappaport Hovav 1995; Schäfer 2007, and others).[2] Productive patterns might be related to the availability of more than one classification cross-linguistically, i.e. seemingly corresponding verbs do not mean the same thing in all languages.

AAS (2006) propose that verbal meanings represented by a root/core component can be classified as follows:

(6) a. $\sqrt{}$agentive (murder, assassinate)
b. $\sqrt{}$internally caused (blossom, wilt)
c. $\sqrt{}$externally caused (destroy, kill)
d. $\sqrt{}$cause unspecified (break, open)

These classes differ in terms of the way in which the events they describe are conceptualized. With *agentive roots* the bringing about of the event requires the presence of an agent; with *internally caused* roots the cause of the change of state event is linked to properties inherent to the argument undergoing change; with *externally caused* roots the change of state is brought about by an

[2] Note that the classification in AAS departs from Levin and Rappaport Hovav's (1995) and also Reinhart's (2002) classification of alternating verbs as verbs containing [+c] in their lexical entry. *Break* and *open* are classified as externally caused by Levin and Rappaport Hovav. As Smith (1970) points out, verbs like *break* and *open* describe eventualities that are under the control of some external cause that brings such an eventuality about. The contrast between *kill* and *break* is that with the latter group the change could also come about independently, without the volitional intervention of an agent. This is one of the reasons why AAS (2006) suggested that one could posit a third category, namely cause unspecified roots, for all these alternating verbs. See also Harley and Noyer (2000) for a similar classification.

external cause; finally, with *cause unspecified* roots there is no specification of internal vs. external cause.

According to this classification, agentive roots are the ones that are not expected to alternate, as they demand the presence of an agent. For all other roots, in principle an alternation is possible. We need to explain why, however, we find the picture in (5).

In this chapter, I address all the questions enumerated above. Crucially, I will account for the variation at the level of morphology and at the level of productivity on the basis of a non-derivational approach to the anticausative alternation, and I will correlate differences in productivity with differences in the way languages morphologically mark the alternation. Two main groups of languages will be identified:[3]

- Group A: languages like English, where it seems that the type of root involved determines its behaviour in alternations. Crucially, only cause unspecified roots alternate. It will be shown that English is classified this way, on the basis of lack of morphological marking linked with processes of de-transitivization.
- Group B: languages like Hindi and Greek, where this does not seem to be the case. There, all (but agentive) roots can participate in alternations, but the root classification correlates in part with morphological behaviour (see also Volpe 2005, 2007). Crucially, externally caused roots alternate but surface with non-active morphology in the intransitive variant.

The behaviour of both groups will be shown to be related to properties of their (in)transitive syntax. The main claim of the chapter is that the morphology we see in the alternation should be taken seriously and is the device that helps us explain why anticausative and causative formation is freer in some languages than others. First, it will be shown that a correlation exists between the lack of morphological marking and the behaviour in terms of the range of roots which participate in the alternation. The correlation can be described as follows: if a language lacks special morphological marking for de-transitivization processes, this language will allow fewer roots to enter the anticausative alternation. Second, it will be shown that certain languages are more productive than others in forming causatives, as they have a smaller root inventory, but

[3] We will see that a third group also exists: languages like the ones belonging to the Salish family, which differ from both English and Hindi/Greek. This language family makes also use of root modification, which is not related to the derivations under discussion.

have a number of functional morphemes to express causation/becoming. For instance, while English uses two different words for the meanings *arrive* and *bring*, Japanese uses one root having the meaning of *arrive*, which can combine with a different head to generate the meaning of *bring*.

With respect to the morphological variation, following recent literature, I assume that anticausatives do not have a unified structure; two structures are available, one with VoiceP and one without (see e.g. Doron 2003; AAS 2006, and others). In the next section I briefly summarize these approaches. Languages vary with respect to whether or not they can use both structures for the formation of anticausatives. The idea is that if a language can use the structure with VoiceP for anticausative formation, in this language more roots are expected to participate in the anticausative alternation.

With respect to the issue of productivity I propose that (7) holds (see Demirdache 2005):

(7) There is no difference in the way languages classify verbal meaning. The problem is partially one of distribution between functional and lexical vocabulary; i.e. how distinct pieces in particular structures are morphologically realized.

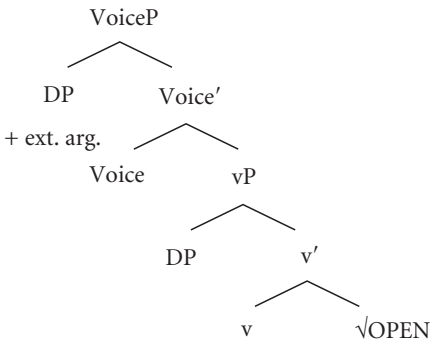
The chapter is structured as follows: section 9.2 discusses the two structures that are available for anticausatives across languages, and presents in detail the morphological evidence for this distinction. It also pays attention to the regularities we can identify in this distribution. Section 9.3 is concerned with English de-transitivization processes, while section 9.4 deals with the issue of productivity. Section 9.5 concludes the discussion.

9.2 Structures and morphological patterns of (anti)causatives

9.2.1 *The structures*

AAS (2006) argued in detail that the structure of all change of state verbs should be as in (8). In (8), Voice introduces the external argument (Kratzer 1996) and bears features relating to agentivity, cf. Ritter and Rosen (this volume) and Landau (this volume).

(8)



Note that the semantics of CAUS are not encoded in v. v is an eventive head; it introduces an event and takes a stative root as its complement; the meaning of causative *open* is built up on the basis of the pieces in (8): a cause brings about a change of state (AAS 2006; see also Marantz 2005; Ramchand 2006a).[4]

As Alexiadou and Schäfer (2006) discuss in detail, Voice simply denotes a relation (R) between a DP and event as expressed in (8′a). There are two thematic notions, agent and causer, that are introduced in Voice. Two different Voice relations exist, R(Caus) and R(Agent) with the semantics depicted in (8′b) and (8′c); while in (8′b) the DP simply names the causing event that brings about the change of state, in (8′c) it is the case that certain properties of the DP are crucial for the coming about of the event:

(8′) a. Voice: $\lambda P.\lambda x.\lambda e.\ (R(x,e)\ \&\ P(e))$

b. R (Caus): the DP names the causing event (following Pylkkänen 2002)

c. R (Agent): (a property of) the DP grounds the coming about of the event

A language might select only one of the two possible relations in the active or passive, hence the two relations can in principle be independent from one another.[5]

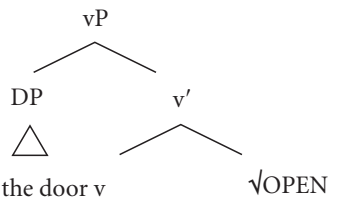
[4] Evidence for the decomposition comes from the licensing of PPs (*from/by)*. Agent by-PPs target VoiceP (Agent); causer from-PPs modify vP (event; Pustejovksy 1995); AAS (2006) for extensive discussion. The structure slightly departs from the one proposed in AAS which contains Caus instead of v.

(i) a. The window was broken by John b. The window broke from the wind

[5] Evidence comes from the morpho-syntactic independence of agent and causers; we will see instances of this below; see Doron (2003) and Ritter and Rosen (this volume).

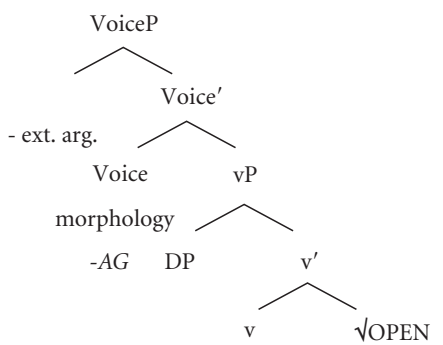
As far as anticausative/intransitive structures are concerned, in principle two structures are available. The first is the anticausative structure in (9) which differs from (8) in that it lacks Voice.

(9)



The second is the anticausative structure in (10). This is a structure related to the absence of an external argument, where the external thematic role is not that of agent, but rather that of a causer.

(10)



The claim is that to the extent that we find morphologically marked anticausatives these appear in the structure in (10), see Schäfer (2007). (10) could be seen as being close but not identical to a passive structure. As known, in many languages passive morphology is used for anticausative formation.

The main intuition concerning the syntax–morphology connection is as follows: marked morphology related to anticausativization is the morphological instantiation of the lack of external argument; see Embick (1998). So marked morphology will not be present in (9), as no projection related to external arguments is present, but it will be present in a version of (8), namely (10), where such projection is present. English has been argued to only have (9), while other languages can have both (9) and (10).

While this is straightforward that (9) is an anticausative structure, (10) at first sight seems similar to a passive construction. In fact in almost all languages under discussion, the morphology we see associated with (10) is the same as passive. Thus in order for both (9) and (10) to both

function as anticausative structures they have to be alike in all relevant respects. Importantly, (10) functions as an anticausative structure and not a passive one if it can be shown that it fails all diagnostics for agentivity (as passives lack an external argument but have agentive features). That is (10) will be considered an anticausative structure if it has the same general properties as the structure in (9). This has been established independently for the languages to be discussed here and I will review this discussion.

The common property shared by passives and anticausatives is the lack of an external argument; the main difference relates to the presence of agentive features only in the former. (10) is thus a case in point where we can see a separation between the semantics of Voice, claimed to introduce the agent argument, and the exponence of Voice. For the morphological realization of Voice, the non-projection of the external argument is sufficient to give passive form. In this sense the morphological realization does not coincide with the expression of agentivity.

(11) illustrates the morphological realization of Voice°, where anticausative Voice° is taken to be realized by non-active (passive, reflexive) morphology; in (11) a verb will be specified as bearing non-active Voice in the context where it appears without an external argument. (11) is supposed to be understood as a morphological spell-out condition that regulates the morphological shape of the individual verbs in syntactic contexts where no external argument is projected:

(11) V -> V-VOC[NonAct]/ ___No external DP argument
from Embick (1998)

Note that the morphology is not necessarily passive. As is well known, it can also be reflexive. Importantly, however, in languages which use reflexives instead of passive morphology for anticausative formation, we again have a reflexive form in the absence of reflexive meaning (see Schäfer 2007 for a recent discussion).

In the next section we see that the morphological patterns found in a number of unrelated languages provide evidence for the existence of both (9) and (10) within the same language.

9.2.2 *The morphological patterns*

In this section, I discuss data from several languages which point to the same conclusion.

9.2.2.1 *Greek*[6] Greek has two morphologically distinct types of anticausatives (see Alexiadou and Anagnostopoulou 2004, 2009; Embick 2004; Theophanopoulou-Kontou 2000; Zombolou 2004; Lavidas 2007, among others). There are verbs, mainly de-adjectival ones, which form anticausatives with active morphology, and verbs which form anticausatives by using non-active morphology. In the former class the transitive and intransitive counterpart are morphologically non-distinct:

(12) *Causative*
a. O Janis katharise ton spiti
the John-nom cleaned-**Act** the house
John cleaned the house
Anticausative
b. To spiti katharise *me to skupisma*
the house cleaned-**Act** with the sweeping
Passive
c. To spiti katharistike *apo to Jani*
the house cleaned-**Nact** from the John

In the latter, the passive and the anticausative are non-distinct:

(13) *Causative*
a. o Janis katestrepse to hirografo
the John-nom destroyed-**Act** the manuscript-acc
'John destroyed the manuscript'
Anticausative
b. to hirografo katastrafike *me ti dinati fotia*
the manuscript-nom destroyed-**Nact** with the strong fire
Passive
c. to hirografo katastrafike *apo to Jani*
the manuscript destroyed-**Nact** from the John

Verbs forming anticausatives on the basis of **active** fall into two groups:[7]

[6] As is well known, non-active morphology is used in a number of environments in Greek, e.g. to also form reflexives (i), middles, and body-action verbs, cf. Tsimpli (1989):

(i) i Maria htenize**te** *Inherent Reflexives*
the Mary-nom combs-Nact
'Mary combs herself'

Embick (1998) argued that non-active morphology does not reflexivize verbs in Greek, but appears on verbs that are syntactically reflexive by other means, i.e. by virtue of being inherently reflexive.

[7] A third type also exists with verbs showing both morphological patterns. I will not discuss these cases here.

(i) a. O sismos gremise to ktirio
The earthquake-nom demolished the building-acc

(1) Those that take non-active morphology in the passive (14a), admitting only an agent *by*-phrase or an instrument but not a causer (14b).

(14) a. Ta mallia mu stegnothikan *apo tin komotria* /
The hair my dried-**Nact** from the hairdresser /
me to pistolaki
with the hair-dryer
'My hair was dried by the hairdresser / with the hair dryer'

b. ?*Ta ruxa stegnothikan *apo ton ilio / me ton ilio*
The clothes dried-**Nact** from the sun / with the sun
'The clothes were dried by the sun'

(2) Those that cannot form a passive, e.g. break (*spa-o* break-**Act** 'break', **spaz-ome* break-**Nact** 'be broken').

Verbs with **non-active** in anticausatives also fall into two groups:
(1) Verbs that can only form the anticausative, e.g. *burn*:

(15) a. O Janis ekapse . . . ti supa
the John-nom burnt-**Act** the soup

b. I supa . . . kaike *me ti dinati fotia/*apo to Jani*
the soup burnt-**Nact** with the strong fire/from the John

As shown by (15b), agentive *apo*-phrases are not tolerated with such verbs.
(2) Verbs that are ambiguous: they can form both the passive and the anticausative, e.g. *destroy*:

(16) a. O Janis / i fotia katestrepse to spiti
The John-nom / the fire-nom destroyed-**Act** the house

b. To spiti katastrafike *me tin fotia/ apo ton Jani*
The house destroyed-**Nact** with the fire/ from the John

In (16b) both the causer *me*-PP and the agentive *apo*-PP are well-formed. Finally, there are verbs where **non-active** morphology only forms the passive. Strongly agentive ones prototypically fall under this category:

(17) a. O Janis dolofonise ti Maria
The John murdered-**Act** the Mary-Acc
John murdered Mary

b. To ktirio gremis**e** apo mono tu
The building collapsed-**Act** by itself

c. To ktirio gremis**tike** apo mono tu
The building collapsed-**Nact** by itself

b. I Maria dolofonithike *apo to Jani/*
The Mary-nom murdered-**Nact** from the John/
**apo to sismo*
from the earthquake

TABLE 9.1 (Alexiadou and Anagnostopoulou 2004)

	Causative	**Anticausative**	**Basic form**
Class I	Active	Active	intransitive
Class II	Active	Non-active	transitive

Thus we can conclude that anticausatives in Greek fall in two main morphological classes, summarized in Table 9.1. The column labelled 'basic form' shows simply which form is taken to be basic on an iconicity reasoning. The same representation will be used for the other languages discussed here, but it involves no theoretical commitment on my side.

9.2.2.2 *Hindi* The facts here are a bit more complex, so I will not go into the details of the paradigm; still the state of affairs seems to point to the existence of two morphological classes (see Bhatt and Embick in preparation, Ramchand 2006b).

(18)

	Causative	Anticausative	
a.	jaag-**aa**-naa	jaag-naa	'wake up'
b.	maar-naa	m**a**r-naa	'die/kill'

One class contains the overt causative morpheme *-aa-* suggesting that the intransitive form is basic; the second class involves a marked anticausative as in Greek, which in this language it is signalled by stem simplification.

Data from Korean, Turkish, Japanese, and Armenian go in the same direction. The subsections 9.2.2.3–9.2.2.6 draw from Volpe (2005, 2007, and references therein).

TABLE 9.2

	Causative	**Anticausative**	**Basic form**
Class I	V-**aa**-naa	V-naa	intransitive
Class II	V–naa	V(stem simplification)-naa	transitive

9.2.2.3 *Japanese* As Volpe (op. cit.) discusses in detail, morphology is involved in the Japanese verbs participating in the causative alternation, as illustrated in Table 9.3:

Table 9.3

	Causative	**Anticausative**	**Basic form**
Class I	V-Affix: kawak-**as**-u	V: kawak-u 'dry'	intransitive
Class II	V: war-u	V-Affix: war-**er**-u 'break'	transitive

According to Volpe, what I describe here as Class 1 anticausative verbs, *kawak-u* 'dry', *wak-u* 'boil' and *ugok-u* 'move', are Ø derived. On the other hand, their lexical causative partners, *kawak-as-u*, *wak-as-u*, and *ugok-as-u* display the morpheme, *-as-*, evidence that the underlying syntactic form is the intransitive. Class 2 unaccusative verbs, *war-e-ru* 'break', *yak-e-ru* '(be) burn(-ed)' and *tok-e-ru* 'melt, dissolve' display an overt morpheme, *-e-*; their lexical causative partners are Ø derived and therefore this class is basic in its transitive form.

Japanese has an impressive number of arbitrary morphological classes; Jacobsen (1985) gives the number of classes as sixteen. Additionally, the majority of morphological classes morphologically mark both the transitive and intransitive partners of a single root (see also Horvath and Siloni, this volume, for discussion). However, the two morphological classes Jacobsen and Volpe use are transparent for our purposes.

9.2.2.4 *Turkish* As Volpe points out, in Turkish, anticausative-causative pairs show similarities to Japanese, although the overt morphological markers are predictably determined by the phonology of the root. Some anticausatives are Ø-marked, a Class 1 pattern; others are the reverse conforming to the Class 2 pattern:

Table 9.4

	Causative	**Anticausative**	**Basic form**
Class I	V-Affix: büyü-**t**	V: büyü 'grow'	intransitive
Class II	V: kapa	V-Affix: kapa-**n** 'close'	transitive

Volpe notes that while the morpheme used for morphological causatives is generally *–dVr*, after a vowel-final root, it is *-t*. He states: 'The productive anticausative/passive morpheme also varies in accord with the phonology of the root and conforms to vowel harmony. Roots ending in a vowel affix *-n-*; stems ending in a consonant other than an *l* affix a vowel with *l*; roots ending

in *l* affix *-Vn*.' Interestinlgy, as he discusses, Turkish also has a number of derived verbs, mostly de-adjectivals, which participate in the causative alternation. These de-adjectival verbs contain the unaccusative/passive morpheme *–l-/-Vl* in their intransitive versions. Together with this morpheme, the causative morpheme *–t-/-Vt* creates the causative, providing further examples of the causative alternation with morphologically simpler intransitives.

9.2.2.5 *Korean* A language that according to Volpe is very similar to the alternating pairs seen in Japanese and Turkish, is Korean. In Korean, certain anticausatives are Ø-derived; their causatives contain overt morphological marking, examples of the Class 1 type. Some causatives are Ø-derived; their intransitive-anticausatives partners are overtly marked examples of the Class 2 type. The morpheme *-(h)i*, and its allomorphs *-li*, *-si*, and *-ki*, is ambiguous. Class 1 verbs affix it to causatives, Class 2 to anticausatives:

Table 9.5

	Causative	**Anticausative**	**Basic form**
Class I	V-Affix: mal-**li**-ta	V: malu-ta 'dry'	intransitive
Class II	V: tat-ta	V-Affix :tat-**hi**-ta 'close'	transitive

9.2.2.6 *Armenian* Finally, Volpe offers a description of the Armenian system, where Class 1 verbs are typically de-adjectival. Their causative partners are created with the causative morpheme *-ats-*. Class 2 change of-state verbs create anticausatives through the affixation of the passive/reflexive morpheme *-v-*:

Table 9.6

	Causative	**Anticausative**	**Basic form**
Class I	V-Affix: cor-**ats**-nel	V: coranal 'dry'	intransitive
Class II	V: batsel	V+Affix: bats-**v**-el 'open'	transitive

9.2.2.7 *Salish* Further (surprising) support for the existence of two classes comes also from St'at'imcets (Salish, Davis 2000), where the claim is that all verbs are basic anticausatives. In this language, all intransitives are unsuffixed, but all transitives contain an overt transitivizer (DIR, which entails agency and CAUS, which does not). Still, however, there is a class of verbs that forms anticausatives on the basis of reflexivization (lec). In most cases there is free variation between Class I and II:

Table 9.7

	Causative	Anticausative	Basic form
Class I	V-Affix	V	intransitive (19a)
Class II	V-Affix	V-Reflexive	transitive (19b)

(19) a. $\sqrt{}$k'ác $\sqrt{}$k'ác-*s*-as $\sqrt{}$k'ác-*an*-as
dry- dry-caus-erg dry -dir-erg

b. non-control (= non-agentive) reflexives
$\sqrt{}$t'up $\sqrt{}$t'up-**lec** 'get twisted'
$\sqrt{}$qwum $\sqrt{}$qum-**lec** 'curl up'
$\sqrt{}$qwts $\sqrt{}$qwts-lec 'go red'

The anticausatives formed with *lec* can be used in a context where there is an external cause bringing about the change of state. I will come back to that in section 9.2.4.

9.2.3 *Marked anticausatives are not passive*

In spite of the presence of a marking that is similar to that of passive verbs in some cases, or at least to a marking related to de-transitivization, the so called Class II anticausatives are not passive. The evidence which substantiates this point relates to the availability of agentive modifiers and of the *by-itself* phrase. As is well known, in e.g. English, an agentive *by*-phrase can appear in the passive, while the *by-itself* phrase is out (see Levin and Rappaport Hovav 1995: *the city was destroyed by John/*by itself*). As (20) shows, in e.g. Hindi, (from Bhatt and Embick in preparation), the anticausative structure is incompatible with an agentive *by*-phrase:

(20) a. Passive:
paanii Ram-dwaaraa ubaal-aa jaa rahaa
water Ram by boil-Pfv passive Prog.M
thaa *compatible with by-phrases*
be.Past.M
'The water was being boiled by Ram'

b. Anticausative:
*paanii Ram-dwaaraa ubal rahaa
water Ram-by boil Prog.M
thaa *incompatible with by-phrases*
be.Past.M
'The water was boiling by Ram'

On the other hand, the *by-itself* phrase is not permitted with passives but is permitted with anticausatives; this is illustrated in (21) with a Greek example:

(21) a. *to vivlio diavas**tike** apo mono tu *Passive*
the book-nom read-**Nact** by itself
'The book was read by itself'

b. To pani skist**ike** apo mono tu *Anticausative*
the cloth tore-**Nact** by itself
'The cloth tore by itself'

In all the above languages there is no grammatical difference between Class I and Class II verbs. They behave alike in all relevant respects; they do not license Agent PPs, and license causer PPs and *by itself*. This is illustrated below with Greek examples from AAS (2006):

(22) a. *I porta anikse *apo ton filaka* *Agent PPs*
The door opened-**Act** by the guardian
'*The door opened by the guardian'

b. *O Janis skotothike apo ton Pavlo
John killed-**Nact** by Paul

(23) a. I porta an ikse *me ton aera* *Cause PPs*
The door opened-**Act** with the wind
'*The door opened by the wind'

b. O Janis skotothike apo ton keravno
John killed-**Nact** by the thunder

c. I porta anikse *apo moni tis* *by itself*
The door opened-**Act** by alone-sg its
'The door opened by itself'

d. To pani skistike *apo mono tu*
The cloth tore-**Nact** by itself

Assuming, following Kratzer (1996), that Voice is responsible for the introduction of external arguments and that the same head that introduces a DP in the active licenses a PP in the passive, the above data suggests that the ungrammaticality of agentive PPs in the case of class I verbs (e.g. 22a) is due to the absence of Voice. This was taken as evidence by AAS (2006) that verbs without special morphology in the anticausative pattern have the structure in (9). However, the above data also show that the anticausatives with passive morphology behave like the ones without (22a vs. 22b). Although the morphological marking is different, the behaviour of the two classes is identical. Assuming, following Embick (1997, 1998), that passive Voice morphology is

the realization of a structure without an external argument, irrespective of the interpretation it receives, this leads to the proposal that class II verbs, the ones with special Voice morphology, have the structure in (10). The two structures are repeated below:[8]

(9) [v [Root]] *Anticausative structure I: Class I verbs*

(10) [Voice (-ext. arg. -AG) [v [Root]]] *Anticausative structure II: Class II verbs*

Naturally the question that arises is: why should marked anticausatives have the structure in (10)? I will come back to this in the next subsection.

So far I established that across languages two morphological patterns are available for anticausatives. The next questions to be dealt with are the following. Do we observe regularity within a language as to which roots will go under which pattern? Do we observe cross-linguistic regularity?

9.2.4 *The distribution of the two patterns makes reference to verb classification*

By surveying the literature on the above distribution, we can establish the following generalization:

(24) Agentive roots never alternate

(24) holds in all languages under discussion. This means that agentive roots only occur in the context of Voice marked [+agentive]. Why should that be so? Recall the way agentive roots were defined: the bringing about of the event makes crucial reference to an external agent. Agentivity, as discussed in Davis (2000) and Doron (2003), cannot be suppressed. If an agent is present in the lexical representation/meaning of the root, there is no mechanism which can remove that. Hence the only possibility for a verbal alternation in the context of agentive roots is the passive formation, where there is a consensus that the external argument is implicit.

The point to be made now is that in all the languages under discussion, anticausative verbs that are characterized as internally caused (*grow, blossom*) and/or caused unspecified in AAS (2006) are Class I verbs, while verbs that are characterized as externally caused are Class II verbs.

Consider Greek. As Alexiadou and Anagnostopoulou (2004) note, mainly de-adjectival verbs, unspecified cause verbs and internally caused verbs go in

[8] Certain verbs can appear in both patterns (potentially with a meaning difference, see Alexiadou and Anagnostopoulou 2004 for Greek; Folli 2002 for Italian).

Class I. The same holds for Korean, Japanese, Armenian and Turkish, as discussed in Volpe (2005, 2007).

Class I verbs

a. de-adjectival_Alexiadou and Anagnostopoulou 2004:

Verb		**Adjective**	
aspr-**iz**-o	'whiten'	aspr-os/i/o	'white'
stroggil-**ev**-o	'round'	stroggil-os/i/o	'round'
plat-**en**-o	'widen'	plat-is/ia/i	'wide'
stegn-**on**-o	'dry'	stegn-os/i/o	'dry'

b. internally caused verbs:

anth-**iz**-o	'blossom'	muhl-**iaz**-o	'mould'

c. unspecified cause verbs:

anigo	'open'	spao	'break'

-iz, -iaz, -ev, -en, -on are taken to be overt reflexes of eventive v.

On the other hand, most class II verbs are those that can be classified as externally caused:

Class II verbs: *verbs that use Nact. morph in the anticausative*

kommatiazo (tear)
miono (decrease)
eksafanizo (diminish)
katastrefo (destroy)
svino (burn)
singentrono (collect/gather)
dhiadhidho (spread a rumor)
vithizo (sink)
giatrevo (heal)

As Zombolou (2004) observes, in the third class of verbs, those that can have both forms, the Non-active form is almost obligatory, if the external force/ cause is contextually salient:

(25) a. *etrehe poli ke zestane i mihani tu aftokinitu
run much and warm-3sg the motor the car-gen
b. etrehe poli ke zestathike i mihani tu aftokinitu
run much and warm-Nact 3sg the motor the car-gen
'He was driving fast and the motor of the car got warm'

In Hindi, as Bhatt and Embick (in preparation) state, with verbs of class II the conceptualization of the event meaning requires an external force. Verbs of

class I do not require this. Examples taken from their manuscript are given below. We do observe a significant degree of similarity to the Greek classification:

(26)	a.	bah-naa (intr)	bah-aa-naa (tr.)	'flow/cause to flow'	*Class I*
		biit-naa (intr.)	biit-aa-naa (tr.)	'elapse/cause to elapse'	
		pahuch-naa (intr.)	pahuch-aa-naa (tr.)	'arrive/cause to arrive'	
	b.	bandh-naa (intr.)	baandh-naa (tr.)	'tie'	*Class II*
		kat-naa (intr.)	kaat-naa (tr.)	'cut'	
		mar-naa (intr.)	maar-naa (tr.)	'die/kill'	

On the view adopted here, the special morphological marking of class II verbs signals the morphological realization of a particular structure, as (10-11) suggest, repeated below:

(10) [Voice (-ext. arg. -AG) [(eventive)v [Root]]] *Class II*

(11) V -> V-VOC[NonAct/+marked]/ ___No external DP argument

It is the absence of an external argument in Voice that results in this particular marking. Since class II verbs are externally caused roots, they are expected to combine with Voice and their anticausatives are built on the basis of (10).[9] Class I verbs do not include Voice, hence they are not found with detransitivization morphology that is located in Voice°.

Three different interpretations appear in the literature to this observed morphology-syntax interaction. On Embick's (1998) view, Nact spells-out a particular structure, hence it is blind as to whether agentive features are present or not. On a slightly different view, Nact prevents the insertion of the external argument, or, in other words, only allows the insertion of the root's argument (Doron 2003). On this view, passive and anticausative are two different instantiations of this property, with one difference. Both Voices derive intransitive verbs, as they only allow the merge of the root's argument into the derivation. Specifically, the anticausative (middle in Doron's terms)

[9] Note that there are always mismatches. So verbs that are class I in one language are class II in another language, e.g. 'open' is a case in point; see Haspelmath (1993). This is why the patterns discussed here are considered to be strong tendencies. Some roots seem to prefer to appear in transitive construals, although there is no a priori reason why this should be so. The main point is that something like that can only happen if two structures are available for anticausative syntax.

voice modifies the root by reclassifying it with respect to its requirement for an external argument. The passive voice-head, on the other hand, doesn't modify the root; rather it modifies the head introducing an additional external argument. On this account, a crucial difference between the two voices is that passive applies to verbs, and is found only if the active exists, whereas the anticausative/middle applies to roots, so that the existence of an anticausative verb does not depend on an active verb.

This latter analysis draws on evidence from de-adjectival verbs, where no external argument is required by the root. It is clear that in Greek (and in Hebrew, as discussed by Doron), an intransitive verb can simply be derived without any voice head. So that when a Nact voice head appears in the derivation, it cannot be anticausative but only passive, since no external argument is required by the root. As can be seen in (27), only the agent is allowed:

(27) Ta ruha stegno**thikan** *apo ton ilio
the clothes dried-**Nact** from the sun
'The clothes were dried (by an implicit agent)'

As Alexiadou and Doron (2007) pointed out, in Greek, there is no morphological distinction between the two operations, while there is in Hebrew. Hence for Greek, and possibly for the other languages, a unique Nact morphology appears in both derivations (and also reflexives and dispositional middles), though on the basis of tests such as agentive *by*-phrase, causer PP and *by-itself* modification, they behave differently from one another.

On yet a third approach (Schäfer 2007), the anticausative Voice is special; it is void of semantic content and functions as an expletive.

Following Doron and Schäfer, I assume that we are dealing with two realizations of Voice: passive Voice and anticausative/middle Voice with distinct properties. The identical morphology that surfaces with both is taken to be an instance of syncretism, which can be easily captured under Embick's rule. It is important to note that languages differ as to whether they will use reflexive clitics/pronouns or non-active morphology to realize this distinction. The intuition is that languages make use of the morphology available to them that signals 'valency' reduction.

I have established thus far two classes of verbs that form anticausatives on the basis of two distinct markings. At first sight, it seems that the pattern makes clear reference to the types of roots involved. The roots in class I of Greek tend to be stative; this means that they are merged at the root level in (9), and v is realized via a special affix. The roots of class II, however, are not

stative. Some of them have a manner component, in which case they can attach to v as modifiers, i.e. they are not the most deeply embedded element.[10] Some of them seem to be denominal. A systematic characterization of this partition awaits further research. Should it turn out to be the correct generalization, it matches the remarks to be made in section 9.4 concerning the productivity of the alternation: both are related to the realization of pieces in the structure that constitutes the building block of (anti)causative verbs.

A potential problem to the view just discussed is presented by Salish languages. Demirdache (2005) notes that the verbs that take reflexive morphology are mainly verbs of bodily change of state. These verbs are internally caused; still they appear with reflexive morphology. In this language bare unaccusatives do exist, so the question is what does the reflexive marking do here? But, as Demirdache says, the two forms cannot be used in the same context. Consider (28), taken from Demirdache (2005):

(28) a. qwtsiqw-lec-kán tu7
red-lec-1sg.subj def.past
I went red lit. If I go out in the sun

b. ka-qwitsíqw-kan-a
OOC-red-1sg.subj-obj
I went red lit. if by accident

In (28a), the stem 'red' is reflexively marked. (28a) can be used in a context where there is an external cause bringing about the change of state of the speaker. On the other hand, (28b) is affixed with 'out of control' morphology (OOC). 'Out of control morphology' signals that the change of state happened accidentally (spontaneously, suddenly). This is similar to the situation described for Greek in (25). If so, then it is compatible with 'transitive' syntax.

9.3 English de-transitivization processes

Let me now turn to English. As we have seen, English only provides morphological evidence for Class I, and hence structure (9). This is so, as English lacks Voice morphology related to detransitivization which is realized in structure (10). (10) is absent from English.

In principle one could argue that (10) is available in English, and it is just that we do not see the difference in the morphology between the two

[10] Thanks to Elena Anagnostopoulou for making this observation.

structures, unlike the situation in the other languages, where an overt reflex is present.

(29) a. The flowers blossom *no Voice present*
b. The window broke *Voice present*

This, however, does not seem right, in view of the fact that verbs like *cut, kill* and *destroy* alternate in all the other languages with special Voice morphology but not in English. That is if (29b) is analysed on the basis of (10), why is (30) out?[11]

(30) *The manuscript destroys

We can conclude that (10) is unavailable in English (AAS 2006). So (29b) is derived on the basis of (9), involving a cause unspecified root; see (Smith 1970). $\sqrt{}$*destroy* is an externally caused root and is incompatible with the intransitive verbal syntax of English (where intransitive means lack of Voice).

This suggests that in English the classification of roots determines their behaviour in alternations. In this language, only cause-unspecified roots alternate. On the other hand, in languages like Hindi and Greek, this does not seem to be the case. There, the root type correlates in part with morphological behaviour. All but agentive roots alternate and externally caused roots bear special morphology. An issue arises with internally caused roots which I will discuss in section 9.4.

[11] Embick (1997) suggests that (30) is out because in a finite clause the external argument cannot be omitted. What, however, could be an anticausative structure with Voice in English, is the middle (Embick 1997), with raising of the internal argument to Spec,VoiceP (Schäfer 2006):

(i) $[_{vP}\ \text{Theme}_i\ [_{v'}\ \text{Voice}_{\{D,\ \emptyset\}}\ [\ V\ t_i\ ]]]$

Since the requirement on voice morphology is one that says Voice should appear as non-active in the absence of a specifier, and English lacks this particular instantiation of Voice, the internal argument must move to Spec,VoiceP. Evidence from this comes from facts discussed in Schäfer (2006), building on observations by Lekakou (2005) and Fellbaum (1986) which involve pairs of verbs in the causative and middle alternation. In the middle alternation the transitive form of the verb is used, suggesting a de-transitivization process.

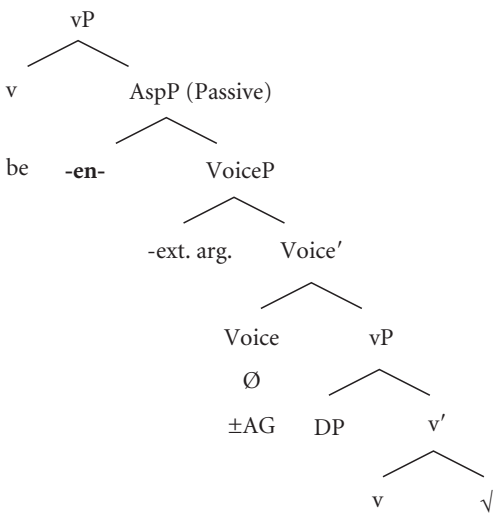
(ii) a. John raises his kids very strictly (Lekakou 2005)
b. The sun rises from the East
c. Obedient daughters *raise* more easily than disobedient sons

Moreover, if we analyse the get-passive as non-agentive (Alexiadou 2005), this could be another environment where externally caused roots of English are intransitive, e.g. *John got killed.*

Note further that (30) can be used as an intransitive in the nominal environment (*the destruction of the city*, Marantz 1997). Such nominalizations were argued to lack Tense and be deeply intransitive (Alexiadou 2001).

But why should that be the case and why can't the English passive function as an anticausative form? I argue that this has to do with the syntax of Voice in English. (10) is not instantiated in English, as it has no overt 'valency reducing' morphology (Reinhart 2000). As Hallman (2000) also points out, middles and nominalizations are cases in point. Here we have processes of valency reduction but no overt morphological reflex. Consider the structure used for English passive formation. On the basis of standard assumptions, this clearly involves a more complex structure than (10), as shown in (31):

(31)



-en is not a valency reducing morpheme, i.e. it does not realize the absence of an external argument. It is rather an aspectual affix (Hallman 2000; Embick 2003). So (morphological) passive in English is spelled-out outside of the domain of Voice and hence (31) cannot be an anticausative structure. In other words, (10) alone does not exist in English, and this is related to the syntax of its Voice system.

9.4 Productivity of the alternation

As already mentioned, in English the alternation is limited to some verbs of change of state. In the languages discussed here a wider variety of verbs can alternate. Recall that cross-linguistically, we find two patterns of variation:

(i) First, we have causativization of verbs that do not have causative counterparts in English, including verbs of inherently directed motion, verbs of appearance and existence and even unergative verbs:[12]

(32) a. √t'q √t'q-s *St'at'imcets*
arrive arrive-CAUS = bring

b. Kotozuke-a kie-ta *Japanese*
message-nom disappear-past
'The message disappeared'

c. Dareka-ga kotozuke-o keshi-ta
Somebody-nom message-acc disappear-cause-past
'Somebody erased the message'

(ii) Second, we find anticausatives of verbs that do not form anticausatives in English, namely externally caused roots:

(33) a. To hirografo katastrafike apo monotu *Greek*
the manuscript destroyed-Nact by itself
'The manuscript got destroyed'

b. ujar-naa ujaar-naa *Hindi*
got destroyed destroy (tr.)

Clearly, this cannot be explained by appealing to the internal vs. external causation distinction (see also Volpe 2005). The internal vs. external causation distinction might be the correct generalization concerning the morphological pattern of anticausative formation in certain languages (unmarked vs. marked), but not concerning the cross-linguistic distribution of the alternation.

The second pattern was explained as follows: if externally caused verbs alternate, then they appear in the marked morphological pattern, i.e. structure (10). (10) is unavailable in English, hence the restrictions observed (though see note 10 on middle formation).[13]

Before I turn to the first pattern, a note is in order. I mentioned that with very few exceptions, Salish languages generally allow their externally caused verbs to appear in structure (9) as anticausatives. Why is this so? I speculate that this is related to the fact that many of these roots in Salish have the form

[12] Internally caused roots can causativize in English, and not only in the periphrastic construction as we will see below, see Wright (2002) for discussion.

[13] The Romance languages and German are restricted in the same way, although they can form anticausatives via se/sich. One could argue that *se/sich* are in Spec,VoiceP, i.e. a specifier is projected in Voice, and hence these languages are more like English and less like Greek with respect to (11).

[verb+instrument], i.e. they include the representation of the cause already in the root meaning, as argued by Demirdache. If this turns out to be correct, then we have a third group of languages, where the alternation correlates with the complex built up of the root and further evidence for a structural approach to the alternation.

But what about the first pattern? Does this suggest that certain verbs are doubly classified in certain languages? I would like to propose that productive causativization has nothing to do with the way languages classify roots (externally vs. internally caused/caused unspecified). In principle all anticausatives can form a causative. This is in a sense straightforward in a system where external arguments are optional and introduced by Voice.

Let us first consider internally caused verbs, before we turn to verbs of appearance and existence. Note that it is not exactly accurate that internally caused verbs do not causativize in English. They do so in two contexts: in the periphrastic causative construction and when they have causers but not agents as external arguments (Wright 2002).[14]

(34) a. The heat caused the flowers to wilt.
b. The bad weather rotted the trees.
c. *The gardener rotted the flowers.

What is the common property unifying these contexts? I believe it is the property of indirect causation (Piñón 2001). The consensus in the literature is that causal chains that can be described by single-clause expressions express a direct relation between the causer and causee. In contrast, when the relation between causer and causee is indirect, the causal chain must be described by a periphrastic expression. In the case of internally caused roots, an agent is not allowed as this cannot be interpreted as indirectly facilitating the change of state of the theme, which is the case for the causer as well as the interpretation of the periphrastic causative. Note also that internally caused verbs appear with causer PPs in languages such as Greek, where the PP is interpreted as an indirect causer. As AAS 2006 note, and Alexiadou and Anagnostopoulou (2009) discuss in detail, *me causer* PPs in Greek introduce indirect causation, while *apo* ones introduce direct causation:

(35) ta luludia anthisan me tin kalokeria/??apo tin kalokeria
the flowers blossomed with the good weather/by the good weather

[14] Restrictions on the type of external argument are not uncommon across languages. See Ritter and Rosen (this volume) who discuss an animacy restriction on the external argument in Blackfoot.

Turning to the restrictions in English causativization, observe first that English used to have causativization morphology which got lost in the course of its history (in support of Reinhart's claim that in certain cases we have accidental lexical gaps concerning the causative variants). Specifically, Old English had productive causativization morphology, the so called *ge*-prefix (Visser 1970; Díaz Vera 2000; Lavidas 2007). Several verbs that do not alternate now did alternate in Old English with this prefix:

(36)	growan	'flourish'	gegrowan	'produce'
	feallan	'fall'	gefeallan	'overthrow'
	limpan	'happen'	gelimpan	'cause someone to start having in perception'
	standan	'stand'	gestandan	'cause to stand'

Another process was *-jan* affixation, which had the result that causative and anticausative verbs that look alike in contemporary English looked different in Old English:

(37)	dúfan	dúf: +jan= dýfan
	dive-non causative	dive-causative
	sincan	sink: +jan = sencan
	sink-non causative	sink-causative

Even after the disappearance of morphology during Middle English (1100–1500), Early Modern English shows interesting patterns of causativization (and in the acquisition literature one finds many examples of innovative causative formation by English children):

(37) a. I have sprouted all kinds of grain 1770, from Visser (1970:120)
b. The strength of affection bloomed them 1597, from Visser (1970:101)

Morphophonological changes blurred this distinction and ultimately led to the system we find today, where a subset of the verbs alternate.

Let us now turn to the other class of verbs, verbs of appearance and existence which do not alternate in English or Greek, but do so in e.g. Japanese and Salish.[15] The idea I would like to put forward here is the

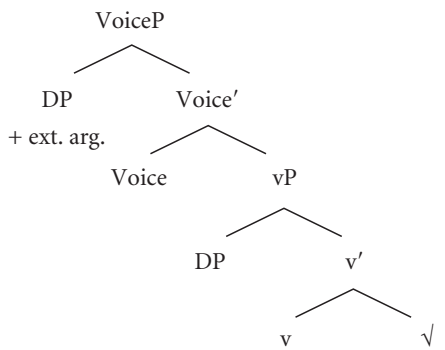
[15] I do not discuss causativization of unergative and transitive verbs here (cf. Horvath and Siloni this volume); the former is possible also in English:

(i) The doctor walked the patient.
(ii) aba heexil et Danny bananot Hebrew (from Reinhart 2006)
Dad caus-eat acc Danny bananas
'Dad fed Danny bananas'

following: the problem is not one of multiple classification of roots. Rather it is a problem of inventory. Languages with productive causativization have a relatively large functional vocabulary, and a relatively small root list. Different meanings come about by combining functional elements with a small set of roots (see Reinhart's 2000 discussion on the Hebrew alternation; see also Arad 2002). English, on the other hand, has a relatively large root list and a small functional vocabulary.

Consider again the structure in (8), that of a transitive causative verb:

(8)



In English the forms $\sqrt{}$ARRIVE or $\sqrt{}$DISAPPEAR can combine with v but not with v and Voice, as the events they refer to do not make reference to external arguments. This is similar in Japanese and Salish. The difference is that when English comes to express the meaning *cause to arrive*, it uses a different element, namely *bring*, and the meaning *cause to disappear* is expressed with the element *erase*. Japanese and Salish do not have extra lexical items, so they use causativization in order to express the same meaning. Why is that so? Presumably the presence of a distinct head realizing 'cause/become/fientive' in Japanese/Salish forces the root to be inserted in the complement of v, and thus receive an interpretation as a change of state, which is not the original interpretation of e.g. *arrive*. This change of state can then be brought about by an external causer (building on Dermidarche 2005). In English, on

The productivity of the process in (ii) could again be an issue of inventory: in Hebrew cause + eat gives rise to the meaning /feed/ in English. Note that originally the English verb /feed/ derives from the noun food in combination with the causative prefix /-jan/: food +jan ? via the process of vowel mutation /feed/. In other words, synchronically the root /feed/ contains the causative component which is compositionally derived in Hebrew. The process in (i) is restricted: as Reinhart discussed, the external argument is preferably an Agent. Why should that be so? Presumably because in such transitivization processes the external argument can only be interpreted as being directly involved in the event, in which case it is most naturally expressed as an Agent. See Levin and Rappaport Hovav (1995) for further discussion of this pattern.

the other hand, the root can only some times be found in the complement of v position, namely when they are clearly stative, see Embick (2004). $\sqrt{}$ARRIVE, not being a stative root, cannot presumably appear in this position, and hence must receive a different structural analysis (see Deal 2008 for extensive discussion that $\sqrt{}$ARRIVE type roots lack a causative component).[16] One can speculate as to whether or not a decomposition analysis of such forms into a PP part and a core root part (ad/r +rive), which is valid from a diachronic perspective, could be used here. If so, clearly, the structure is not a causative one, and some more things need to be said about the non-availability of external arguments in English.

9.5 Conclusion

In this chapter I argued that two stuctures of (anti)causative formation are available within a language and across languages. I presented evidence for two groups of languages: languages like English, where the classification of roots determines their behaviour in alternations and languages like Hindi and Greek, where this does not seem to be the case. There, the root type correlates in part with morphological behaviour. However, the crosslinguistic variation relates to properties and realization of the pieces of the structure that are the building blocks of (anti)causatives.

(9) [v [Root]] *Anticausative structure I: universally available*

(10) [Voice (-ext. arg. -AG) [v [Root]]] *Anticausative structure II: subject to variation*

Variation was argued to depend on properties of Voice and properties of the Root.

[16] In systems like Ramchand's this entails that identification of arguments happens on the basis of one element. So *arrive* identifies all the positions in (10) but co-indexation of the two events ensures that an external argument cannot be added by transitivization. In languages where re-merge is not possible, a Causer can be introduced, and must be introduced in the presence of overt transitivizing morphology (Demidarche 2005).

10

Saturated Adjectives, Reified Properties

IDAN LANDAU

The study of verbal diathesis alternations over the past two decades has produced a wealth of empirical generalizations as well as many theoretical insights (see, among others, Bresnan and Kanerva 1989; Levin and Rappaport 1991, 1995; Hale and Keyser 2002; Reinhart 2002; Borer 2005). In comparison, surprisingly little work has been done during that period on diathesis alternations in adjectives. This is so despite the fact that by now, a number of extremely interesting studies of such alternations are available (Cinque 1990; Stowell 1991; Bennis 2000, 2004). Data uncovered in the last three sources form the basis of the present study. Consider the following three pairs, which are evidently parallel.

(1) a. John was very generous (to Mary).
    b. That tribute was very generous (of John) (*to Mary).

(2) a. John was very confused (about Mary).
    b. John's manner was very confused (*about Mary).

(3) a. John was very irritating (to Mary).
    b. That comment was very irritating (of John (*to Mary)).

Such alternations are quite systematic and productive across languages. They display several puzzling characteristics. First, the external argument of the (a) -variant appears as an optional PP—an *of*-NP sequence—in the (b)-variant, at least in (1) and (3). Second, the internal argument of the (a)-variant cannot appear in the (b)-variant. Third, while the (a)-variant appears to support either an individual- or a stage-level reading, the (b)-variant is necessarily stage-level with respect to *John*.

These are systematic properties that call for explanation. What makes them even more intriguing is the lack of any obvious analogues in the verbal domain: There is no verbal alternation that lumps these properties together, although some alternations may display them in isolation. An important

corollary of the present study is that the theoretical devices needed to explicate the adjectival alternations above are the very same ones that serve to explicate verbal and nominal alternations. In this sense this chapter is a step towards a more category-neutral view of argument structure.

In a nutshell, the analysis I will propose is this. The (b)-variants above are derived from the (a)-variants by two operations: Unselective saturation (SAT) and what I call 'reification' (R). The SAT operator existentially binds all the individual-type variables of the predicate it applies to, sparing only the event variable, if there is one. The R operator applies to a predicate and introduces a novel external argument, construed as a realization or instantiation of the predicate. SAT renders both arguments of the (a)-variants above inaccessible to direct projection in the (b)-variants; the internal argument is excluded and the external one may only be doubled by an adjunct *of*-NP (parallel to the passive *by*-phrase). R introduces the novel external argument of the (b)-variants.

Both SAT and R have independent lives in the grammar. SAT is nothing but the operation deriving passive verbs from active ones, also implicated in so-called 'passive' derived nominals. R is the operator that introduces the external argument of nominals. It is therefore not surprising that certain adjectival predications alternate with synonymous nominal predications.

(4) a. It was *cowardly* of Mulroney to attack a man who's no longer able to defend himself.
b. It was *cowardice* of him to shun away from his fears.

The structure of this chapter is as follows. Section 10.1 describes the syntactic and semantic properties of the adjectival alternation seen in (1), largely covered by Stowell (1991) and Bennis (2000, 2004). Section 10.2 develops the analysis: I define the operators SAT and R, provide explicit derivations for the two adjectival variants, and show how all the major properties fall out of the analysis. Section 10.3 establishes the broader relevance of SAT and R in the grammar. It is shown that these operators are implicated in passive formation, derived nominals, and the adjectival alternations (2) and (3). In the conclusion I consider the general implications of the analysis to linguistic theory; in particular, how it modifies our views on the asymmetries between internal and external arguments and how it blurs our semantic criteria for 'nounhood' as opposed to 'adjectivehood'.

10.1 The basic facts

10.1.1 *The alternation: basic vs. derived EAs*

Evaluative adjectives (EA) typically characterize a person's behaviour or attitude in terms of the speaker's subjective judgment. The class of EAs is quite large, as can be seen from the following English sample.

(5) Evaluative Adjectives in English
rude, mean, clever, smart, nice, kind, silly, imprudent, impolite, generous, courteous, cruel, mad, mischievous, considerate, humane, pretentious, humble, modest, charming, sadistic, masochistic, intelligent, stupid, dumb, idiotic, noble, cowardly, cunning, farsighted, skilful, selfish, crazy, foolish.

The most striking property of EAs, which is the focus of both Stowell (1991) and Bennis (2000, 2004), is their occurrence in two syntactic frames. In one frame, which I will call the *basic* variant, the subject argument is a (sentient) individual, the *possessor* of the property in question. In the second frame, which I will call the *derived* variant, the subject argument is an inanimate entity, usually (but not necessarily) an event, and the possessor argument is expressed as an optional PP. If the event is realized as a clause, it may extrapose. Examples from English, Dutch, and Hebrew are given below.

(6) a. John is clever.
b. That/Punishing the dog was clever of John.
c. It was clever of John to punish the dog.

(7) a. Jan is aardig.
John is nice
'John is nice.'

b. Dat is aardig van Jan.
that is nice of John
'That is nice of John.'

c. Het is aardig van Jan om iets tegen mij te zeggen.
it is nice of John for something to-me to say
'It is nice of John to say something to me.'

(8) a. Gil hu anoxi.
Gil COP selfish
'Gil is selfish.'

b. ze haya anoxi me-cido šel Gil.
it was selfish from-his-side of Gil
'That was selfish of Gil.'

c. ze haya anoxi me-cido šel Gil le'haš'ir lanu
it was selfish from-his-side of Gil to-leave to-us
et kol ha'avoda
ACC all the-work
'It was selfish of Gil to leave all the work for us.'

Both Stowell and Bennis recognize that examples (a) above employ the basic use of EAs whereas those in (b) and (c) employ a less direct, more complex use of the adjective. Both cash out this intuition by placing the latter in a complex syntactic structure, embedding the structure of the former as a subconstituent.

I follow Stowell's and Bennis' basic insight in assuming that the EAs in the (b) and (c) examples above are somehow derived from the basic EAs in the (a) examples. Call the former *DerA* and the latter *BasA*. The details of the derivation, however, are crucially different: I will propose that DerA is formed from BasA by a combination of a lexical operation (saturation) and a syntactic one (reification).

In this connection, one must address the partial productivity of the rule relating BasA and DerA, as seen in (9).

(9) a. John was obese/important/famous.
b. *That was obese/important/famous of John.

I return to this issue in section 10.2.5.

10.1.2 *The possessor role is necessary*

Consider the following sentences.

(10) a. John is very clever/mean.
b. John is very important/famous.

(11) a. That was very clever/mean (of John).
b. That was very important/famous (*of John).

Discussing these facts, Stowell notes that although many adjectives can be predicated of events or actions, only EAs thereby also attribute a property to an individual, namely, the possessor role. Moreover, this is a necessary part of their interpretation. In Stowell's words, '. . . winning an election can be important even if the winner is not important, but punishing a dog cannot be clever without the punisher being clever in performing this action' (p. 111).

While the observation is uncontroversial, it seems to constitute part of the desired explanandum, rather than the explanans. Why can a sentence like **Winning the election was famous of John* not mean 'Winning the election reflected John's fame'? The absence of a possessor role in (11b) should follow from some independent semantic distinction between *important/famous* and *mean/clever*.

The presence of the implicit possessor in DerA can also be detected by obligatory control configurations.

(12) a. It was risky (of Bill_i) [PRO_i to climb that mountain].
b. [PRO_i donating the entire prize] was quite generous (of Tom_i).

PRO in these sentences is obligatorily controlled by the possessor argument, whether syntactically realized or not.

The possessor argument should be contrasted with the event/action argument in this respect. Whereas the former is necessary (if implicit) in DerA, the latter seems to be lacking altogether from BasA. Thus, (10a) does not seem to imply the existence of any action or event in which John's cleverness/meanness is manifested.

10.1.3 *DerA is necessarily stage-level w.r.t. the possessor*

Another observation Stowell makes is that DerA predication is temporally bound in a way that BasA is not.

(13) a. John was clever.
b. It was clever of John to leave the party.
c. Although John is clever, it was absolutely not clever of him to leave the party.

While (13a) could be interpreted either as ascribing a permanent property of cleverness to John, or one that is temporally bounded to some event (given in discourse), (13b) only has the latter reading: cleverness is ascribed to John only with respect to the event of leaving the party. That the temporal property need not coincide with the permanent one is clearly demonstrated in (13c).

Accounting for the loss of the individual-level reading in the derivation of DerA from BasA is a major challenge for any analysis of this alternation.

10.1.4 **Internal arguments in DerA*

In light of the preceding discussion, it is puzzling that the goal argument can never be realized in DerA, as Stowell and Bennis observe. Notice that the *to*-PP is excluded regardless of whether the *of*-NP is realized or not.

(14) a. *That was kind to me (of John).
b. *Fixing my car was kind to me (of John).
c. *It was kind to me (of John) to fix my car.

(15) a. Jan/*Dat is gemeen tegen kinderen.
John/*that is mean to children.
'John/*That is mean to children.'
b. Jan/*Dat is mij gehoorzaam.
John/*that is to-me obedient
'John/*That is obedient to me.'

As Stowell points out, the puzzle is deepened when we realize that DerA are eventive to begin with, so the exclusion of the goal argument cannot be related to the facts discussed in the preceding section. The goal argument is excluded in DerA but not in BasA, despite the fact that both allow stage level interpretations.

The force of the restriction at issue can be appreciated by comparing closely related arguments and adjuncts. As the Hebrew examples below show, only argumental PPs are excluded in DerA. Although the semantic contrast between the argumental P *el* 'to' and the adjunct P *klapey* 'toward' is barely distinguishable in BasA (16a), only the latter may occur in DerA (16b).

(17) a. Gil haya nexmad el/klapey Rina.
Gil was nice to/towards Rina
'Gil was nice to/towards Rina.'
b. Ze haya nexmad klapey/*el Rina (le'hacia la tremp).
it was nice towards/to Rina (to-offer to-her ride)
'It was nice towards/*to Rina (to offer her a ride).'

In section 10.2.3 I propose that the restriction on argument expression in DerA should be seen in the context of the broader phenomenon of saturation.

10.2 The analysis

The first step is to identify the external argument of DerA. I claim that this argument is a 'referential' argument—the same type of external argument that is assigned by nouns. This claim is developed and defended in sections 10.2.1–10.2.2. In section 10.2.3 I argue that the diathesis between BasA and DerA is mediated by a lexical operation that saturates *all* the arguments of the former. This unselective saturation renders both the possessor and the goal arguments inaccessible to direct syntactic projection. Section 10.2.4 spells out in detail how BasA and DerA are put together in the syntax, while section

10.2.5 returns to the properties illustrated in section 10.1 and derives them from the proposed analysis.

10.2.1 *First clue: evaluative nouns*

A striking fact about DerAs, unnoticed before, is that they can often be paraphrased by a morphologically related predicate nominal. The paraphrase is close to a synonym, and is available in many languages. English displays only a residue of this parallelism, as in the following pair, picked from the internet.[1]

(18) a. He realized that it was *cowardice* of him to shun away from his fears instead of helping the people to fight for the rights they deserve.

b. Nevertheless, he didn't mince words when asked if it was *cowardly* of Mulroney to attack a man who's no longer able to defend himself.

(19) *Hebrew*

a. ha-he'ara ha- zot hayta xacufa/xucpa me-cido.
the-comment the-that was rude/rudenes from-his-side
'That comment was rude/rudeness of him.'

b. ze haya mavrik/havraka me-cidam le'hodot.
it was brilliant/brilliance from-their-side to admit
ba- ašma.
in-the-guilt
'It was brilliant/brilliance of them to plead guilty.'

(20) *Hungarian* (J. Horvath, p.c.)

a. Udvariatlan/udvariatlanság volt Páltól ülve maradnia.
impolite/impoliteness was Paul.ABL seated to-remain
'It was impolite/impoliteness of Paul to remain seated.'

b. Kegyetlen/kegyetlenség volt Páltól megvernie egy
cruel/cruelty was PaulABL to-beat a

[1] Most evaluative nouns in English require an explicit action as an external argument, not just a product of an action. Moreover, the possessor adjunct is best expressed as *on-the-part-of* adjunct rather than an *of*-NP. These discrepancies between the adjectival and the nominal variants vary across specific lexical items, speakers and languages; at present I have nothing to say about them.

i. That was selfish of John.
ii. It was selfish (on the part) of John to demand the best seat.
iii. *That was selfishness (on the part) of John.
iv. It was selfishness *(on the part) of John to demand the best seat.

gyereket.
child.ACC
'It was cruel/cruelty of Paul to beat up a child.'

In fact, in certain languages the nominalized adjective is not just a paraphrase—it is the *only* way of expressing the meaning of DerA. Marathi and Hindi are two such languages. In Hindi, three nominal suffixes—*-taa*, *-ii* and *–pan*—are used to derive evaluative nouns from basic adjectives. The choice of suffix is fixed per root.

(21) *Hindi* (A. Mahajan, p.c.)

a. Raam ashisht/acchaa/bholaa thaa.
Raam rude/nice/innocent was
'Raam was rude/nice/innocent.'

b. vah Raam-ki/kaa ashish- taa/acchaa-ii/bholaa-pan thii/thaa
that Ram.GEN rudeness/niceness/innocence was
'That was rude/nice/innocent of Ram.'

I would like to argue that some of the puzzling properties of DerAs cease to be so once we take the alternation between EAs and evaluative nouns (ENs) seriously. In particular, let us consider what we can learn about EAs from what we already know about nominalizations.

As argued by Grimshaw (1990), complex event nominals inherit the argument structure of their source verb—with two important changes. First, a novel argument—the event argument *Ev*—is added as the external argument of the nominal; second, the original external argument of the source verb is suppressed. This is illustrated in (22).

(22) a. Mary assigned problems to the students.
assign: <agent,theme,goal>

b. The frequent assignment of problems to the students.
assignment: <*Ev*,agent-Ø,theme,goal>

Suppose that nominalizations are just one instance of this general process.

(23) There is a class of derivations creating a predicate B from a predicate A, where (i) B acquires a novel external argument; (ii) A's external argument is saturated.

The alternation of EAs seems to fall into this pattern.

(24) a. John was rude (to Mary). *BasA*
b. That comment was rude (of John) (*to Mary). *DerA*

As Bennis (2000, 2004) observed, the external argument of BasA is saturated in DerA, licensing an optional adjunct, the *of*-NP. In its stead, a novel argument appears in the external position of DerA, realized by *that comment* in (24b). Formally, then, the external argument added to BasA in the formation of DerA is analogous to the event argument of verbs which is externalized in the formation of event nominalizations.

To understand this parallelism, we need to address two questions at this point. First, what is the nature of the external argument of DerA? Second, why is the goal argument not expressible in DerA? I take up the first question in the next section and return to the second one in section 10.2.5.

10.2.2 *The R relation (reification)*

The sense of utterances like *That is rude* is something like 'That expresses rudeness', or 'That is an instance/token/realization of rudeness'. This becomes even clearer when we consider the paraphrase *That is rudeness*. Nominal predications like the latter have been analysed by several authors (Williams 1981; Higginbotham 1985; Grimshaw 1990). These authors suggest that the predicative capacity of nouns stems from the fact that they assign a special external θ-role—dubbed *R*. *R* stands for the referential property of nouns, however, a more appropriate rendition of *R*, preserving the initial, perhaps would be the REALIZE relation. This relation holds between any nominal and its external argument. In argument positions, the external slot of the nominal is 'closed off' by the D^o head; in predicative positions, it is predicated of the subject.

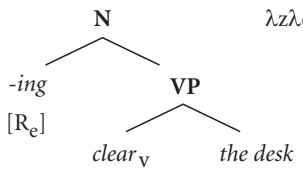
Putting aside concrete and result nouns, consider how the *R* role is interpreted in event nominals (Grimshaw designates this special interpretation as *Ev*).[2] *R* is a relation between an individual z and an event e, holding between them just in case z (which could denote an abstract event itself) instantiates, or realizes e.

(25) The R relation: denotation
Event nominals: $[[R_e]] = \lambda z \lambda e.\text{REALIZE}(z,e)$

R is part of the meaning of any eventive nominalizing affix, and sometimes it exhausts that meaning. It combines with the meaning of the lexical stem through Event Identification (Kratzer 1996). I will use the term *reification* to describe the result of combining R with a predicate. Intuitively, R reifies some object—abstract or concrete—as the embodiment of the predicate.

[2] From this point on I will refer to 'complex event nominals' (in Grimshaw's sense), introducing an event variable, simply as 'event nominals'. Note that for concrete and result nouns, R can be defined to be of type <e,<e,t>> instead of <e,<s,t>>.

(26) Event nominal: *clearing the desk*



'z is a token of clearing the desk iff z realizes an event of clearing the desk'

I propose that the external argument of DerA is assigned the R role, just like the external role of the corresponding evaluative noun.[3] This is the first theoretical consequence of the facts observed in (18)–(21). Somewhat simplified, the result of this combination will look as follows.[4]

(27) That comment is rude.
[[rude]] = λe.rude(e)
[[R_e(rude)]] = λzλe.REALIZE(z,e)∧rude(e)
[[R_e(rude))(that comment)]] = λe.REALIZE(that comment,e)∧rude(e)
'That comment realizes an event of rudeness'

On this analysis, we can understand the alternation between EAs and ENs in many languages. The canonical introducers of the R-argument, in all languages, are the nominalizing affixes; indeed, in some languages (e.g. Marathi and Hindi), *only* nouns project an R argument. Since the external argument of DerA is precisely the type of argument associated with the external role of nominals, it is completely natural to find ENs alternating with EAs.

10.2.3 *Unselective saturation*

As noted above, it is commonly assumed that part of what the passive morpheme does is to saturate the external argument of the active verb. Furthermore, Grimshaw (1990) suggested that the nominal affix in event nominalization is performing precisely the same function.

The proposal I develop in this section attempts to put more flesh on this notion of saturation. We will construct a general operation SAT, that will

[3] Therefore, capacity to assign an R-role is not exclusive to nouns. In the conclusion I return to some broader implications of this claim.

[4] Throughout, I am assuming that (i)- (iii) are all manifestations of DerA. The REALIZER is a DP in (i), a gerund/infinitive in (ii) and (iii), extraposed in the latter. The argument structure of the adjective is the same.

i. That comment is rude.
ii. Making that comment / To make that comment is rude.
iii. It is rude to make that comment.

account for the major types of argument saturation. Crucially, this single operation, interacting with independent principles, will explain why saturation applies to all arguments in some cases (evaluative adjectives) but only to the external argument in others (passive and event nominalization).

Let me start with a key assumption: On natural compositional grounds, SAT should apply to predicates, not to arguments. Thus, it is a property of the passive *predicate* that its external argument is saturated. In particular, reference by SAT to specific arguments of the predicate it applies to is prohibited. In this sense SAT is an unselective operator. Some care must be taken in the precise construal of this statement, though. Saturation, by its very nature, makes an argument inaccessible to syntactic projection. What will then be the fate of an argument that is already, in principle, inaccessible to syntactic projection? We may suppose that such an argument will, ipso facto, be exempt from saturation. The Davidsonian event argument appears to be of this nature—it is never syntactically projected. Plausibly, then, it should not be affected by saturation.[5]

SAT is a lexical operation. The SAT operator has no argument structure in the traditional sense; as we will see below, even its semantic type is flexible. It applies to heads, not to phrases. Furthermore, SAT is unspecified for category. Lacking argument structure and syntactic category, SAT may not project as an independent syntactic head. Therefore, it must attach to its host predicate in the lexicon. The result is a sort of a complex head, perhaps in the sense of Embick (2004).

To be completely general, SAT must be able to apply to predicates of arbitrary valence. A definition meeting all these conditions is given below (D_e is the domain of individuals, D_s is the domain of eventualities).

(28) For any n-place predicate $P(x_1,x_2,\ldots x_n)$, $n\geq 1$,
where for any $i\leq n\text{-}1$, $x_i \in D_e$:
a. If $x_n \in D_e$, then: $SAT(P) = \exists x_1 \exists x_2 \ldots \exists x_n [P(x_1,x_2,\ldots x_n)]$
b. If $x_n = e \in D_s$, then $SAT(P) = \lambda e.\exists x_1 \exists x_2 \ldots \exists x_{n-1} [P(x_1,x_2,\ldots x_{n-1},e)]$

Put simply, SAT existentially binds all the individual-type arguments of the predicate to which it applies. In this sense, saturation is unselective. If there is an event variable, the result of applying SAT to P is a predicate of events (type <s,t>). If there is no event variable, the result is a proposition (type t).[6]

[5] A more liberal execution could allow SAT to select only the *type* of the variables it applies to, thus distinguishing individual arguments from the event argument. Notice that for simplicity, I disregard intensional types.

[6] We need to allow the latter option, since individual level predicates—presumably lacking an event variable—may be saturated in passive (e.g. *This house was owned by Benjamin Franklin*).

My claim is that SAT is crucially implicated in the derivation of DerA from BasA. In particular, before the external role R is introduced, all the original arguments are suppressed. This is why the possessor role can only be expressed as an adjunct (the *of*-NP) and the goal argument is excluded. As I show below, the joint effect of SAT and R explain all the peculiar properties of these constructions.

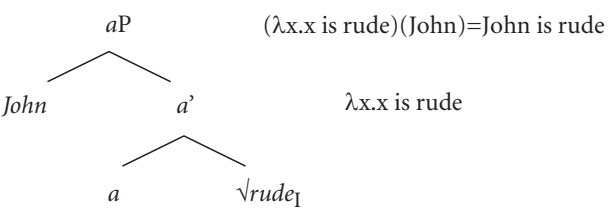
10.2.4 *Building up EAs*

We are now in a position to offer a fully explicit derivation of EAs. I will present this derivation in the standard form of a syntactic tree, in line with the general framework of Distributed Morphology (DM). I will also follow DM practice in assuming that roots and categorial features are combined in the syntax, although this assumption will be of secondary importance.

Consider first the simpler case of BasA. As noted in section 10.1.3, these adjectives are often ambiguous between a stage level and an individual level reading. The former is facilitated, but not forced, by the presence of a goal phrase. I will assume that BasAs appear in two varieties—with or without an event variable. Both types are represented below.

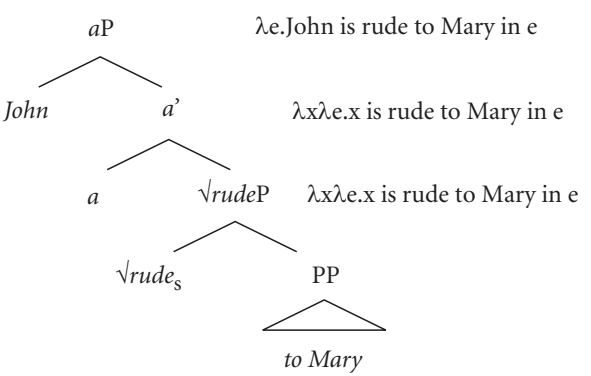
(29) a. John was rude.

$[[\sqrt{\text{rude}_I}]] = \lambda x.x \text{ is rude}$



b. John was rude to Mary.

$[[\sqrt{\text{rude}_S}]] = \lambda y \lambda x \lambda e.x \text{ is rude to } y \text{ in } e$

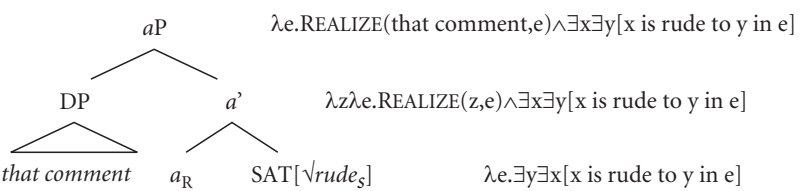


The first thing to note here is that the adjectivizing head *a* does not project any argument. While it is possible (perhaps likely) that it contributes some semantic features to the root (e.g. scalar structure), valency is not one of them. Thus the argument structure of *a*' is inherited from the sister of *a*. Notice that if *John* were made a semantic argument of *a* in (29a), it would no longer be clear what could remain in the denotation of the individual-level root $\sqrt{rude}_I$. Finally, we will see shortly that the semantic transparency of the *a*P layer is actually crucial in explaining the particular saturation effects observed in DerA.

Consider now how DerA is derived. Here I propose that both saturation (SAT) and reification (R) apply. To recall, SAT applies prior to lexical insertion. I will assume that SAT takes the stage-level root as an argument (other possibilities are ruled out, as will be seen below). In contrast, R, introducing the external argument, is the semantic value of the adjectivizing head, which will accordingly be labeled a_R (cf. the verbalizing head *v*, whose semantic value is the AGENT function).

(30) That comment was rude.

$[[\sqrt{rude}_S]] = \lambda y \lambda x \lambda e.x \text{ is rude to y in e}$



The meaning of this structure is: 'events that are realized by that comment, and in which there are x and y, where x is rude to y'. This seems correct. Notice that the order of composition of the operators with the root follows from the sequencing of lexical and syntactic operations. In fact, as we will see in the next section, any other combination will yield an ill-formed result.

The distinction between BasA and DerA crucially rests on the assumption that they are headed by distinct category heads—*a* vs. a_R. We have already seen that in some languages the R operator is carried by a nominal head, n_R, rather than an adjectival one. In fact, even within adjectives, there is morphological evidence for the distinction. A number of BasA-DerA pairs in Hebrew are related by the suffixation of *–i* (*tipeš–tipši* 'stupid', *ga'on–ge'oni* 'genius', *ravrevan–ravrevani* 'boastful'). Unsurprisingly, the morphologically derived form corresponds to DerA.[7]

[7] As a reviewer notes, some *–i* derived adjectives are neutral with respect to the BasA/DerA distinction (*Gil haya yalduti* 'Gil was childish'—*ze haya yalduti me-cido šel Gil* 'That was childish of

(31) a. Gil haya tipeš/ga'on/ravrevan
Gil was stupid/genious/boastful

b. ze haya tipši/ge'oni/ravrevani/*tipeš/*ga'on/*ravrevan
that was stupid/genious/boastful
me-cido šel Gil.
from-his-side of Gil

10.2.5 *Explaining the properties of EAs*

In this section I show how the proposed analysis explains the cluster of properties associated with EAs. The major properties to be explained are these.

(32) *Properties of EAs*

a. There is a systematic, productive alternation between BasA and DerA.
b. Both BasA and DerA are syntactically unergative.
c. DerA is necessarily stage-level, BasA may be individual level.
d. The possessor role in DerA is obligatory, but implicit.
e. DerA cannot take an internal (goal) argument.

Properties (32a–b) follow straightforwardly from the structures in (29) and (30). By applying SAT to BasA and embedding the result under a_R, we derive the corresponding DerA, accounting for the systematic, productive alternation between the two forms. Notice that failure to reify the saturated predicate would leave a predicate whose sole unsaturated argument is an event variable. But event variables are not projectible to syntax, hence the predicate would be unable to license any syntactic argument—by assumption, an illicit situation.

If the criterial property of unergativity is that the highest argument is generated in the specifier of a functional head, then both EA types are unergative. Notice that a semantic notion of unergativity is insufficient, at least for BasA, since the functional head *a* is semantically empty.[8]

Consider the less trivial properties (32c–e). One of the surprising effects of the shift from BasA to DerA is the loss of the individual-level reading. What is

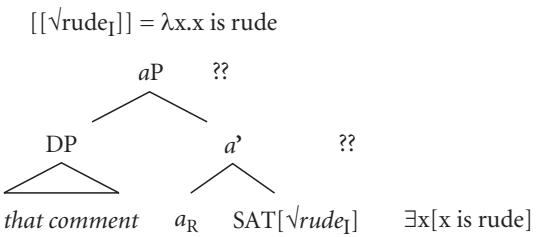
Gil'), perhaps suggesting the relevance of the denominal source (here, from *yaldut* 'childhood') of these adjectives. Indeed, given that a zero derivation from most nouns would not yield a morphologically possible adjective in Hebrew, the *–i* derivation is necessarily recruited to express both meanings. This is entirely analogous to the fact that for most BasA-DerA pairs, *a* and a_R are morphologically nondistinct (expressed as templates rather than affixes).

[8] An implication is that ergative adjectives (Cinque 1990) are formed from adjectival stems intrinsically specified for category.

it about the constitution of DerA that necessarily requires the presence of an event variable?

Although (29) presents two variants of BasA, only one of them—the stage-level root $\sqrt{rude_S}$—forms the kernel of DerA in (30). It turns out that if we plug in instead the individual-level root $\sqrt{rude_I}$, the result is uninterpretable.

(33) That comment was rude



The R operator can relate two individuals, or an individual and an event (by Function Application); it can also relate an individual and a property (by Identification), but it cannot relate an individual and a proposition—the type of SAT[$\sqrt{rude_I}$]. Conceptually, indeed, it is hard to imagine how an individual can realize (express, instantiate) a proposition. Since $\sqrt{rude_I}$ has nothing but individual-type arguments, saturation turns it into a proposition. By contrast, in virtue of harboring an event variable which "escapes" saturation, a saturated $\sqrt{rude_S}$ remains a predicate (of events)—a suitable argument for the R operator. We thus derive property (32c).

If this reasoning is correct, we derive a strong prediction: Adjectives that are unambiguously individual-level will not participate in the EA alternation. The reason is that upon saturation, the root of such adjectives becomes a closed proposition, which cannot be reified by R. Indeed, I suspect that this is the underlying reason for the ungrammaticality of the examples cited in (9), repeated below.

(34) *That was obese/famous/important of John.

Such adjectives, although 'evaluative' in the general sense, are strictly individual-level. This is independently verifiable by the standard methods.

(35) *When John is obese/famous/important, people tend to shun him.
[cf. When John is rude/nice/selfish, people tend to shun him]

Naturally, to the extent that coercion may generate a marginal stage-level reading for these adjectives, they are expected to give rise to marginal DerAs.

Finally, consider properties (32d) and (32e). In the earlier accounts of Stowell (1991) and Bennis (2004), these two were unrelated. The present analysis offers a more parsimonious treatment: *Both* the possessor and the goal slots are saturated in DerA; hence, neither can be projected as an argument. This is an inevitable consequence of the unselective nature of SAT.

The parallelism I would like to highlight is the following.

(36) a. John was rude.
b. *That was rude John.
c. That was rude of John.

(37) a. John was rude to Mary.
b. *That was rude to Mary.
c. That was rude towards Mary.

(38) a. John invited Mary.
b. *Mary was invited John.
c. Mary was invited by John.

Direct projection of the possessor and the goal roles is impossible due to the fact that they are saturated (36b)/(37b). The only alternative is to introduce an adjunct doubling the saturated argument slot, as in (36c)/(37c). The situation is entirely parallel to the doubling of a saturated agent slot in passive by a *by*-phrase (38b–c) (I return to passive formation in the next section).

Property (32e), then, follows from the very architecture of DerA. Suppose we try to generate a goal phrase under a_R. Saturation must be avoided, to allow the goal to be projected. Hence the possessor role is also assigned. That role, however, is external, merged in the specifier of *a*. In order to introduce a Realizer argument, we need the alternative head a_R. Either the *a* head is not projected, then, leaving the possessor role unassigned;[9] or both *a* and a_R are projected, violating morphosyntactic well-formedness.

(39) a. *[*that* [a_R [$\sqrt{rude}_S$ [*to Mary*]]]] → possessor unassigned
b. *[*that* [a_R [*John* [a [$\sqrt{rude}_S$ [*to Mary*]]]]]] → two *a* heads

Other options are excluded as well. SAT(*a*) cannot be used as the head of the AP, since it is semantically undefined (*a* has no denotation). Nor can SAT project independently, for reasons discussed above. The only well-formed

[9] Technically, R in (39a) applies directly to $\sqrt{rude}_S$P. However, R—a type <e,<s,t>> operator—may only apply to individuals (by Function Application) or to one-place predicates of type <s,t> (by Event Identification). $\sqrt{rude}_S$P is a two-place predicate of type <e,<s,t>>; the expression R($\sqrt{rude}_S$P) is thus uninterpretable.

output—(30)—is one in which both the goal and the possessor role are saturated.

To summarize, we have argued that DerA is derived from BasA by successive application of saturation and reification. The former operation existentially binds all but the event variable of the adjective; the latter introduces a Realizer of this event. The order of application need not be stipulated, while the joint effect derives all properties of the alternation.

10.3 The broader relevance of R and SAT

Naturally, the proposed analysis for EAs will gain more plausibility the more we can justify its individual components on independent grounds. Specifically, we ought to be looking for the effects of the two operators involved in DerA—R and SAT—in other environments. In this section I discuss several such cases: verbal passive, derived (event) passive nominals, subject-experiencer and object-experiencer adjectives.

Unselective saturation explains why neither the external argument of BasA nor the internal one are projectible in DerA. Indeed, this uniformity constitutes a strong argument in favour of the unselective nature of saturation. But now we face an obvious challenge: How come saturation *appears* to be selective in verbal passive and in so-called 'passive' nominals, singling out the external argument (e.g. agent), and sparing the rest (e.g. goal)?

(40) a. Money was allocated to grandiose projects.
b. The frequent allocation of money to grandiose projects by government officials.

Recall that on top of the empirical justification, there was an equally strong conceptual argument against selective saturation; namely, an operator applying to a predicate should have no access to particular positions in the predicate's argument structure. The puzzle, then, is this: How can we reconcile the strongly motivated unselective SAT with the equally strongly motivated observation that passive verbs and nominals saturate the external argument slot but not the internal ones?

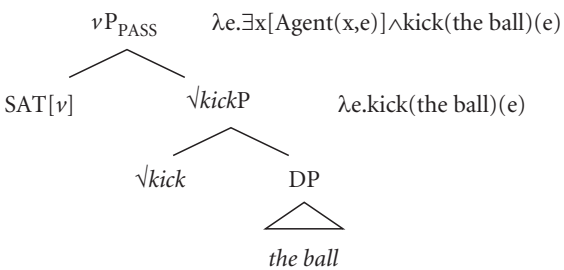
The answer to the puzzle is straightforward if we take account of the fact that the functional category heading the passive verb phrase is semantically contentfull. As such, it is a suitable host to the SAT operator, which need not attach as low as the root. Saturation at the level of light *v* comes 'too late' to affect internal arguments; thus, it leaves its mark on the external argument alone.

Consider first the derivation of passive verb phrases. The result of applying SAT to the agentive *v* is a predicate of events. This predicate combines with the $\sqrt{}$rootP denotation by Predicate Modification, as shown below.

(41) The ball was kicked.

[[*v*]] = λxλe.Agent(x,e)

[[SAT(*v*)]] = λe.∃x[Agent(x,e)]



It is now understood that the appearance of selective saturation in passive is misleading. The saturation operation itself is unselective; it applies to all of the unsaturated argument slots of *v*—which happens to be just the external slot. The internal argument slots are buried too deep in the structure to be visible to SAT.

A similar treatment is readily available to passive event nominalizations. Following the syntactic approach to derived event nominals (Hazout 1991; Valois 1991; Fu 1994; Borer 1999; Fu, Roeper, and Borer 2001; Shlonsky 2004), I will assume that such nominals consist of a nominal head (an affix) embedding a full *v*P structure; the surface word-order is obtained by V-to-*v*-to-N movement. Assume further that derived nominals of type (40b) are really passive—the *v*P they embed is passive (Borer 1999). The structure of such nominals, therefore, is straightforwardly obtained by combining a passive *v*P (as in (41)) with a nominalizing affix that carries the R operator (recall that all nouns project an R argument).[10]

Finally, let us briefly mention two other adjectival alternations that naturally fall under the present account. Subject-experiencer (SubjExp) predicates can be either predicated of a person or of a person's manner/words. Higgins (1973) observed that a complement to the adjective can only appear in the first

[10] In contrast, there is solid evidence from binding and secondary predication that the agent argument in *active* event nominalizations (lacking an overt subject) is not saturated but rather projected as PRO/*pro* (Chomsky 1986; Roeper 1987; Safir 1987).

context (the following examples are adapted and expanded from Pesetsky 1995).

(42) a. John was proud (of his son).
b. Sue was angry (at the exam).

(43) a. John's manner was proud (*of his son).
b. Sue's expression was angry (*at the exam).

This pattern exactly mirrors the EA alternation. (43) further shows that the absence of the internal argument from DerA is not a consequence of its being a goal; even when the internal arguments is a Subject Matter, it is excluded in parallel contexts. I propose, then, that the adjectives in (43) are derived from their counterparts in (42) by the combined application of SAT and R.

A second alternation involves object-experiencer (ObjExp) adjectives.

(44) a. John was appalling (to her).
b. That was appalling of John.
c. *That was appalling to her of John.

(45) a. John was amusing (to her).
b. That was amusing of John.
c. *That was amusing to her of John.

ObjExp adjectives fall under the general pattern of EA and SubjExp adjectives, although they present some additional complexity arising from their fundamental ambiguity. This ambiguity explains why the absence of an *of*-NP enables the internal argument to surface in an ObjExp adjective but not in an EA.

(46) a. That was rude (*to her).
b. That was irritating (to her).

The external argument in (46a) is a Realizer; the external argument of the basic adjective (BasA) has been saturated by unselective saturation—along with the internal argument. Hence, the goal phrase is excluded. By contrast, (46b) is ambiguous between a reading where the external argument is a Realizer (as in DerA) and a reading directly derived from the verb *irritate*, where the subject is the Subject Matter argument. Neither SAT not R apply to produce the latter reading, hence both arguments project freely. It is only on the former, SAT-derived reading that the internal (experiencer) argument becomes unavailable in the syntax.

10.4 Conclusion and further implications

The proposal defended in this chapter consists of one central observation and two theoretical devices. The observation is that in their derived guise, EAs frequently alternate with nominals; this implies that the basic argument structure of the adjective and the noun are similar. The theoretical devices introduced are the SAT operator, which unselectively saturates all argument positions in any predicate it applies to (save for the event variable); and the R operator, which introduces an entity that realizes (or manifests) the property denoted by its complement—a process we dubbed 'reification'. Applied consecutively to a basic EA like *rude* in *John is rude*, they derive an adjective whose meaning is 'realizes an event of rudeness, in which there exist a possessor (the rude person) and a goal (the target of rudeness)'. The saturated goal and possessor argument slots can only be expressed as doubling adjuncts (e.g. *rude of X towards Y*).

It has been shown that all the major properties of EAs follow from the proposed denotations for the operators and the general laws of semantic composition. In particular, two peculiar restrictions on DerA fall out immediately: The obligatory stage-level reading and the exclusion of the goal argument.

SAT and R operate in other areas of the grammar, thus receiving independent support. SAT applies in passive formation, saturating the external argument of the verb; and by extension, in derived nominals that embed a passive *v*P. R applies in any nominal, derived or not. Interestingly, the combined effect of SAT and R can be seen in two other alternations, based on SubjExp and ObjExp adjectives.

The present analysis has some broader implications. Regarding the scope of the SAT operation, a natural question to ask is whether there are any cases of apparent selective saturation of *internal* arguments, just as there are cases of external saturation. Logically, at least, they should exist. Whenever a semantically contentfull categorial head combines with a root, saturation of the root should leave the external argument intact. The first case that comes to mind is object drop (e.g. *Fred pulled __ with all his might, but nothing happened*), although an obvious alternative is to attribute the existential interpretation of the implicit argument to some pragmatic process and not to lexical saturation. Another construction where internal saturation is likely involved is Antipassive, attested in ergative languages. In this construction, a transitive predicate is detransitivized, with the original direct object becoming an

optional oblique, much like the *by*-phrase in Passive and the *of*-phrase in DerAs.

A third potential example of internal saturation involves deverbal adjectives that 'lose' the theme argument of their source verb. Baker (2003: 84) pointed out that many English adjectives derived by the *–ive* suffix have this property.

(47) a. Mark is productive (*of good ideas).
b. This proposal is corrective (*of the situation).
c. Chris is decisive (*of this kind of issue).

The problem is that saturation appears to be over-selective here; as Baker observes, not all the internal arguments are lost in the adjectival variant—only the theme is. This is especially evident in adjectives derived from double object verbs (unmentioned by Baker). Unlike the theme, the goal/source argument remains available.

(48) a. She was envious of him (*of his many talents).
b. That was explanatory (*of the theory) to the students.

Possibly, saturation here spares the goal/source argument for the same reason it spares the external argument—both are introduced by separate, designated heads in an extended *a*P-shell. This would amount to saying that there is a null head—prepositional or applicative—introducing a goal/source specifier and taking a $\sqrt{}$rootP complement, whose single argument is the theme. Notice that this 'complex predicate' analysis has been independently advocated for double object constructions by various authors (Kayne 1984; Marantz 1993; den Dikken 1995; Pylkkänen 2002).

Perhaps the major solid conclusion of this study regarding saturation concerns its unselective character. It has been a standard assumption in the field that saturation is selective; specifically, that it may only target the external argument (Williams 1981; Grimshaw 1990; Reinhart and Siloni 2005). If the argumentation developed in this chapter is correct, this is an illusion. Saturation is confined neither to external arguments nor to categorial heads. It may equally well apply to the root itself, thereby depriving it of all projectible arguments. Saturation can achieve that—in fact, it cannot help but to achieve that—because it is essentially unselective.

Consider now the implications of the second major ingredient in our analysis, the reification operator R. To my knowledge, all previous work has exclusively associated this operator (or more concretely, the argument it introduces) with nominal predicates; see Williams (1981); Higginbotham (1985); Grimshaw (1990). The most sophisticated version of this line is offered in Baker (2003), where the category N is associated with a distinctive semantic

property—a 'criterion of identity'—corresponding to a distinctive syntactic diacritic, a referential index.

We have considered two challenges to this traditional bi- uinque mapping from the category N to the operator R. First, predications that are predominantly adjectival in one language can be predominantly nominal in a different language. The alternation is often found within the same language, as in evaluative adjectives and nouns, with no detectable semantic contrast. If the external argument of evaluative nouns is the standard R-argument of nominals, then at least EAs should be able to select this argument as well.

Second, we have observed that a common 'conspiracy' in the nominal system is replicated in the adjectival system: A 'basic' predicate is saturated and then reified (i.e. acquires an R argument), the novel external argument replacing the former saturated one. This is the well-known pattern of derived nominals. Interestingly, the same combination of saturation and reification is attested in three separate adjectival alternations: EAs, SubjExp and ObjExp adjectives. To the extent that saturation is well-motivated across the categorial distinction, so is reification. At least within these lexical domains, then, our analysis blurs the boundary between nouns and adjectives.

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Part III
Syntactic and Semantic Composition of Event Structure

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11

Incremental Homogeneity in the Semantics of Aspectual *for*-Phrases

FRED LANDMAN AND SUSAN ROTHSTEIN

11.1 Two problems

This chapter discusses two related questions:

(i) *What is the proper notion of homogeneity to use in the semantics of* ***for****-phrases?*
Received wisdom is that *for*-phrases modify homogeneous predicates, in particular states and activities as in (1):

(1) a. *John was happy* for some weeks. (stative)
b. *Mary ran* for two hours. (activity)
c. *Bill pushed three cars* for two hours. (activity)

This means that the italicized sentences in (1) are required to be homogeneously true at subintervals of an interval of the type specified by the *for*-phrase. The examples in (1) already make an appropriate definition of the notion of homogeneity non-trivial, since states are argued to be homogeneous down to instants, while activities are homogeneous down to larger intervals whose

This chapter was *not* presented at the conference in honour of Anita Mittwoch's eightieth birthday from which this volume derives, but had it been written by then, it *would* have been presented at that conference. Instead, each author presented at the time a different paper (papers which, in hindsight, both had some intimate links with the present chapter). However, since both papers presented at the conference already had *handouts* exceeding the page limit of the present volume by far, the authors decided to do everybody a favour, and write for the present volume a different, collaborative paper of limited size, viz. this chapter. We dedicate the present chapter to Anita Mittwoch with whom both authors, separately and together, have discussed the issues in this chapter on many occasions for many years; with our warmest thanks and much affection. Also, many thanks to Edit Doron for her helpful comments. Finally, the authors are happy to have found out that, despite their daughter's fear and trepidation, their relation seems to have survived the writing of this chapter undented. In fact, we rather enjoyed it.

precise size is dependent on the nature of the VP-predicate (see the discussion in Dowty 1979). We will discuss in this chapter a number of other cases for which even the latter notion of homogeneity isn't good enough, including cases of achievements with bare plural subjects and of iterations.

We shall argue that in all these cases, the notion of **incremental homogeneity** defined in Landman 2008 will be adequate to account for the distribution of *for*-phrases.

(ii) *Why do you get modification by* ***for****-phrases with accomplishment predicates which have bare plural or mass objects and with no other DP object?* Look at (2):

(2) a. John ate *apples* for an hour.
b. John ate *bread* for an hour.
c. #John ate *three apples* for an hour.

We shall argue that (2a/b) are acceptable because, even though the interpretation of the VP is episodic, the semantics makes reference to a **kind**, and the predicate involved is incrementally homogeneous.

11.2 Previous accounts

The intuition underlying all accounts of the meaning of *for an hour* is that it means that the predicate it modifies goes on at all parts of the hour. This has been formulated in various ways, both in interval semantics and in event semantics.

To start the discussion let us formulate a semantics for *for*-phrases which makes the homogeneity requirement a presupposition (as in Krifka 1998), and is as yet unspecified as to the notion of homogeneity involved.

When defined:
α *for an hour* is true iff α holds at an interval i of length 1 hour

Defining condition:
α *for an hour* is only defined for interval i if α is homogeneous at i.

Bennett and Partee 1972 and Dowty 1979 take **α is homogeneous at i** to mean: α is true at every subinterval of i (including every point in i). So *John was happy for a week* is true if there was a week during all subintervals of which John was happy.

Since Bennett and Partee and Dowty take accomplishments and achievements to be non-homogeneous in this sense, this explains why *for* phrases do not modify them (as in 2c). However, this requirement is obviously too

strong. While the notion applies naturally to states (and hence accounts for the felicity of (1a), activities can also be modified by *for*-phrases and, as Dowty himself argues, they are not homogeneous in this sense: if John is running at i, then he only counts as running at sufficiently large subintervals; at smaller intervals he may be taking a step or lifting his foot, but these are not big enough to host a running. This suggests that minimally we should replace the above definition by: **α is homogeneous at i** if α is true at every 'sufficiently' large subinterval of i.

However, Landman 1992, 2008 shows that even this modification is inadequate to deal with activities. This is because activities allow for pause stages. So if *John ran for three hours* is true, there may still be subintervals of that three hour interval at which he is not running (waiting for the lights to change at a long traffic light, stopping to take his breath for a minute or two, and so on), and these subintervals may well be 'sufficiently large' (to fit running in).

Krifka 1989 1992, 1998 approaches the problem from another direction. He assumes a semantics for *for*-phrases much similar to a 'every sufficiently large subinterval-definition': for a running event in i, a running event is required to go on at every subinterval of i that is big enough for running to have a measure value. While maintaining such a downward notion of homogeneity in the semantics of the *for*-phrase (with all its problems), Krifka argues that the class of predicates that are felicitous with *for*-phrases coincides with the predicates that satisfy an **upward** notion of homogeneity: cumulativity:

Let P be a predicate of eventualities. Then (ignoring irrelevancies here):

Predicate P is **cumulative** iff if e, $e' \in$ P then e $\sqcup$ $e' \in$ P.
(where e $\sqcup$ e' is the sum of e and e')

Krifka defines a notion of **telic** predicates and shows that the class of cumulative predicates (by and large) coincides with that of **atelic** predicates (under his definition of the latter). This is good, one would think, because the data concerning felicity under *for*-phrases has always been the main diagnostic for atelicity. And indeed, *for*-phrases apply felicitously to activities, since these are cumulative, although they are not divisive down to instants.

Krifka argues that cumulativity explains the contrast between (2a,b) and (2c). He argues that with accomplishment predicates (i.e. those with incremental theme arguments) the cumulativity/non-cumulativity of the theme percolates up to the VP. Since *apples* + *apples* = *apples*, the theme argument in (2a) is cumulative and the predicate *eat apples* is cumulative too (the same for *eat bread* in 2b) and modification by *for*-phrases is possible. When the theme

is quantized (as it is in 2c), the predicate is not cumulative:
eat 3 apples + *eat 3 apples* ≠ *eat 3 apples* (but = *eat 6 apples*).

However, Rothstein 2004 argues that a large number of predicates, that are infelicitous when modified by *for*-phrases, come out as cumulative, hence atelic on Krifka's definition. While *eat (exactly) three apples* is not cumulative on Krifka's definition, *eat at least three apples*, *eat a lot of apples*, *eat many apples* and so on all come out as cumulative predicates, and yet none of them allow modification by *for* phrases, as seen in (3).

(3) a. #John ate (at least) three apples for an hour.
b. #John ate many apples for an hour.
c. #John ate much bread for an hour.

Zucchi and White 2001 try to save Krifka's approach to the licensing of *for* phrases by claiming that the VPs in (3) are non-cumulative, since they assume that DPs are interpreted as maximal objects in particular discourse situations. The idea is that *eat at least three apples* denotes a set of maximal events of eating three apples and pairs of two such maximal events cannot be put together to make a single maximal event relative to the same discourse situation. Rothstein 2004 shows that this cannot work. She discusses examples like those in (4):

(4) a. Lady A: Do you have a chauffeur nowadays?
Lady B: My dear, I*'ve had a chauffeur* for twenty years. Always very competent ones.
b. This bicycle *carried three children around Amsterdam* for twenty years. (Rothstein 2004)
c. #I *caught a flea on my dog* for twenty years (cf. Dowty 1979).

In these examples, a predicate with an indefinite object is in the scope of the *for*-phrase, and, importantly, the predicate itself is stative (4a) or an activity predicate (4b). Rothstein points out that on their natural reading, these sentences allow the objects satisfying the indefinite description to vary in the course of the twenty year interval. In this, the state/activity predicates in (4a,b) differ sharply from achievement predicates like (4c), where that interpretation is lacking, as shown by the oft remarked upon infelicity of (4c).

Thus, as Lady B. indicates in (4a), she has had a series of competent chauffeurs in the course of these twenty years, and the bicycle in (4b) is truly famous: for the first five years, it carried Jan, Ed, and Ruud around Amsterdam, and then for the next five years it carried Ed, Ruud, and Fred around Amsterdam, and then for another five years it carried Ruud, Fred, and Truus around Amsterdam. And then (since it was an amazingly good bicycle

like they don't make them any more) it was given to a neighbour and it carried her three children around Amsterdam for another five years.

What Rothstein points out is that in this case, there is no maximal set of three children which make this sentence true, but a maximal set of eight children, subsets of which make it true at different times.

Coming back to the data in (1-3), it seems clear that what blocks the modification by the *for*-phrases is the presence of a determiner. Only bare plurals and mass noun themes allow *for* phrases to modify accomplishment-headed VPs. Now bare plurals and mass nouns form a natural class of predicates, which Carlson 1977 argued are best analysed as names of kinds. Since proper names of individuals as themes of accomplishments do not result in VPs which allow modification by *for* phrases, it must be the kind term which leads to the atelicity in (2a/b). This is not merely a formal issue: it is not that the kind type as theme of an accomplishment results in an atelic VP. Rather it is the relation between the event and the theme, or **the way in which the kind participates in the event** which results in an atelic VP. This is clear from examples like (5), where the VP is atelic or telic depending on how the kind participates in the event denoted by V.

(5) a. Tolkien invented hobbits in two hours.
b. Tolkien invented hobbits for two hours.

(5a) asserts that Tolkien invented the kind HOBBITS within a certain period. It does not entail that he invented any particular hobbit, since he may have invented the kind by inventing a stereotype. The kind as a whole, independent of any particular instantiations, has the property of having been invented, and is directly affected, as a kind by the predicate *invented*. Since *invent* is an accomplishment, the VP is telic. (5b) asserts that Tolkien invented instantiations of hobbits (the characters Peregrine Took, Frodo Baggins . . .) over a period of two hours, or that he invented sub-kinds such as Tooks and Bagginses. Here the kind HOBBIT is not directly affected, but is indirectly affected by what happens to its sub-kinds or particular instantiations.

With all this in mind, we go back to the question of what definition of homogeneity will identify those VPs which allow modification by *for*-phrases. As was noted in Rothstein 2004, the range of VPs which allows modification by *for* phrases is not confined to statives and activities. In the next section we review the range of constructions which allow this kind of durative modification.

11.3 Predicate types which allow modification by aspectual *for*-phrases

The following VP predicates allow modification by *for* phrases:
-i. **Stative predicates**: *be happy (for a week*) as in (1a) above. The modified predicate is homogeneous down to instants.
-ii. **Habituals** as in (6):

(6) a. John took buses to school for ten years.
b. Buses ran down this street for ten years.
We will analyse these, and other cases, as statives.

-iii. **Activities:** *run, push three carts (for an hour)* as in (1b/c) above. The predicate is homogeneous down to short intervals defined by minimal activities, as discussed in Dowty 1979, Rothstein 2004, and allows pauses (Landman 1992, 2008).
-iv. **Accomplishments with bare plural or mass direct objects:** *eat apples, eat bread (for an hour),* as in (2a/b). These have generally been analysed as a sub-case of (iii). We shall argue that they are to be treated differently, arguing that the kind term plays a crucial role in allowing the predicates to be treated as homogeneous.
-v. **Kind readings with bare plural subjects** as in (7):

(7) a. Dinosaurs inhabited the earth for 200 million years.
b. Dogs barked outside my house for two hours this morning.

(7a) is a gnomic generic, which can presumably be argued to be a stative. (7b) contains a bare plural subject and an episodic predicate; our analysis will not distinguish (7b) from episodic cases with bare plural objects, like (2a.)
-vi. **achievements with bare plural or mass direct objects or subjects:** (cf. Rothstein 2008)

(8) a. English tourists discovered this village all summer.
b. Guests/Help arrived for two hours.
c. John noticed miserable looking people for several hours.

These are not obviously homogeneous at all: If (8b) is true, then there were a number of events of individual guests arriving spread out over a two-hour period, but there will usually be long intervals during which no guests arrived. (8c) illustrates a similar problem: while *notice miserable looking people* is modified by a *for*-phrase, the sentence is true if John has the property of being the subject of a series of disconnected events of noticing miserable people. Unlike the cases in (7a), these cases cannot be analysed as generic

events, nor can they be analysed as habits. While (6a) has an appropriate explicitly habitual paraphrase, 'For a period of 10 years, John under normal circumstances usually took a bus to school' there is no such plausible paraphrase involving *usually* for (8b). It means, simply, that over a period of two hours, a plurality of guests arrived gradually.

-vii. **Iterations of accomplishments.**

(9) Susan drank half a glass of orange juice every twelve minutes for twenty-five hours the Yom Kippur she was pregnant.

These cases are standardly analysed as iteration-complexes, but, of course, they raise the same question as the cases under (vi) in that they allow for long (11 minutes) periods in which no drinking goes on, yet the *for*-phrase is felicitous.

11.4 Our proposal

11.4.1 *Aspectual* for*-phrases in event semantics*

We assume an event semantics based on a domain of eventualities, where eventualities are states or events. Eventualities have running times: the running time of eventuality e, $\tau(e)$, is the time interval at which e goes on. We interpret verbs, verb phrases, and sentences as **event types**, sets of events; the event type corresponding to a verb phrase like *eat an apple* is the set of apple eating events. With **verb phrase** *eat an apple* we also associate the event type EAT of the **verb it is based on**, we call the latter the **verbal event type** corresponding to *eat an apple*. The interpretation schema for *for an hour* is given the following form in our event semantics:

Let α be a verb phrase with event type α and verbal event type V.
When defined:
α *for an hour* $= \lambda e.\alpha(e) \wedge \text{LENGTH}(\tau(e)) = \langle 1,\text{HOUR}\rangle$
(the set of events in α that last an hour)
Defining condition (preliminary):
α *for an hour* is only defined if α is homogeneous.

The crux will lie in the notion of homogeneity. We assume that the relevant notion is the notion of incremental homogeneity introduced in Landman 2008. Thus the defining condition becomes:

Defining condition: α *for an hour* is only defined
if α is **incrementally homogeneous with respect to** α and V.

Event type α is incrementally homogeneous with respect to α and V if **every event in α is incrementally homogeneous wrt. α and** V.

Thus we need to explain the notion of incremental homogeneity.

11.4.2 *Incremental homogeneity*

Incremental homogeneity, introduced in Landman 2008, is incremental preservation of cross-temporal identity of an event, and of its event type, between the running time of the onset of that event and the running time of that event itself. These notions are explained in the following subsections.

11.4.2.1 *Incrementality* **Incrementality** is a temporal notion: interval j **incrementally extends** interval i if i is an **initial subinterval** of j: $i \subseteq_{in} j$ iff i is a subinterval of j that starts at the same time as j.

11.4.2.2 *Cross-temporal identity* As explained in Landman 2008, **cross-temporal identity** is a notion which the semantics cannot do without in a theory which assumes **both** that eventualities are **temporal particulars** (go on at one and only one running time) **and** that eventualities have aspectual substructure. The reason is that in such a theory we need to be able to express that if I am in Tokyo for a week, the state of me being in Tokyo on Tuesday and the state of me being in Tokyo on Thursday **count as the same state** as the state of me being in Tokyo that whole week (though they are three states, they don't count up to three: I've only been in Tokyo once). Similarly, if you and I dance the Emperor's waltz together, and no other dance, we waltz once: the waltzing at the beginning of the Emperor's waltz, and the waltzing towards the end do not count as separate waltzings.

This can be expressed by using an **equivalence relation of cross-temporal identity:**

e_1 **is cross-temporally identical to** e_2, $e_1 \sim e_2$ iff e_1 and e_2 count as 'one and the same event', i.e. for counting purposes e_1 and e_2 count as **one** event.

This is not a definition: Landman 2008 treats cross-temporal identity as a primitive which is to be axiomatically constrained by the event theory (see Landman 2008 for some suggested properties).

11.4.2.3 *Event onsets* Following Landman 2008, we introduce for event e of verbal event type V the notion **onset** of e:

Let e be an eventuality of **verb type** V.
The **onset** of e, relative to V, O(e,V) is the smallest eventuality of type V such that: $O(e,V) \sim e$ and $\tau(O(e,V)) \subseteq_{in} e$.

As an example, if e is an event of waltzing, then O(e,WALTZ) is the smallest initial event in τ(e) that is big enough to count **both** as waltzing **and** as cross-temporally identical to e. The onset is the first stage where the incremental sequence of events cross-temporally identical to e reaches a stage big enough to count as waltzing. (We **do** assume a full incremental sequence of cross-identical events inside the onset interval, just too small to be waltzing.) The notion of onset corresponds to Dowty 1979's notion of initial intervals minimally big enough to host an activity.

As another example, if e is an event of eating three apples, O(e,EAT) is the smallest event which is big enough to count **both** as eating **and** as cross-temporally identical to e. It is, intuitively, the most initial bit of the eating of those three apples. Importantly, the onset of the event of eating three apples is required to be an eating event, but not required to be itself an eating three apples event. Thus the onset of a telic event is the onset of the activity it is based on.

Technically we postulate for states (and some activities like *move*) a null-onset, at the beginning time or initial limit of that state. So we assume V-onsets for any eventuality of verb type V.

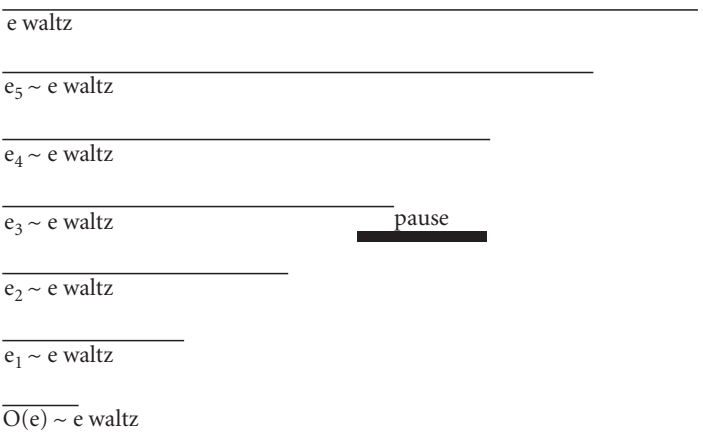
11.4.2.4 *Incremental homogeneity* With this we define the notion of incremental homogeneity:

> Let α be a VP with event type α and verbal event type V,
> Let $e \in V$ and $e \in \alpha$.
> e is **incrementally homogeneous wrt.** α and V iff
> for every interval i: if $\tau(O(e,V)) \subseteq_{in} i \subseteq_{in} \tau(e)$
> then there is an eventuality e' of event type α such that:
> $e' \sim e$ and $\tau(e') = i$

We will see below that using a notion of incremental homogeneity dependent on event type and verbal event type allows us to distinguish between telic and atelic predicates. The notion of incremental homogeneity was developed in Landman 2008 (building on ideas in Landman 1992) to deal with the fact that activities (unlike states) naturally allow gaps and pauses (see Landman 2008 for discussion). The main idea of that paper was that activity events allow gaps if you look at them segmentally, **but not** if you look at them incrementally.

The lexical requirement on the verb *waltz* that the events in the verb type WALTZ are incrementally homogeneous means intuitively that we impose upon the event e of us waltzing an **incremental-event-identity-and-event-type-clock**: the clock tells us that we find at each initial subinterval (bigger

than the onset) a waltzing event cross-temporally identical to e, which, so to say, represents **how far 'e' had got at that point:**



The notion of incremental homogeneity will allow waltzing events to have gaps and pauses (subintervals where no event cross-identical to e and of the type WALTZ goes on). In the first place, if e is incrementally homogeneous, there is no requirement that an event cross-temporally identical to e goes on at any interval properly inside the onset of e. More generally, any **very small** subinterval of τ(e) is going to be too small to be the running time of a waltzing event. Secondly, subintervals much bigger than that may not have any waltzing event in them: dancing a Vienna waltz is physically exhausting, hence it includes regularly sections where the dancers stand still, catching their breath. Such segments are pause segments. The above picture shows that the existence of pause subintervals is quite compatible with incremental homogeneity.

What counts then for homogeneity is the incremental preservation of event identity and event type, i.e. along growing initial subintervals.
-We allow for onsets in activities because we carry, incrementally, the event identity across them (i.e. inside the onset we do find incrementally events cross-temporally identical to the main event, but not yet of the verb type V).
-We allow for pauses in activities because we carry, incrementally, the event identity across them.

In both cases **contextual naturalness** plays a central role: if we stretch out the onset or the pauses for too long we may loose the **willingness** to regard what goes on as an event, as one event, as an event of type α, as one event of type α.

The notion of incremental homogeneity as defined here differs from the one in Landman 2008 in two important respects:

1. Our variables here range over eventualities, hence over events or states. Technically this means that states which are required by the semantics of stative verbs in Landman 2008 to satisfy a **stronger** constraint of **segmental homogeneity,** provably also satisfy the present notion of incremental homogeneity. This motivates the earlier statement that in the theory of Landman 2008 stative predicates and activity predicates satisfy incremental homogeneity.
2. It is not just the cross-temporal event identity which is preserved incrementally, but also the event type α. This was not important in Landman 2008, since that paper was only concerned with states and activities, and the progressive, but it is central here. The incremental preservation of the event type α is precisely what arguably accomplishments and achievements fail to do.

11.4.3 *Interpretation of sentences with bare plurals*

We have now made our proposal to deal with what we called problem One above, the proper definition of homogeneity, and in the next section we will show how this proposal accounts for the distribution of aspectual *for*-phrases. In this section we make some specific proposals concerning the semantics of *bare plurals* which will allow us to deal with problem Two above, why accomplishment verbs with bare plurals are atelic.

We assume, with Carlson 1977, that bare plurals like *apples* can denote kinds, and we take this to mean that the sentences in (10a) and (11a) have event type interpretations as in (10b) and (11b):

(10) a. Cats purr.
b. $\lambda e.\mathrm{PURR}(e) \wedge \mathrm{Ag}(e) = k_{\mathrm{CAT}}$

(11) a. John ate apples.
b. $\lambda e.\mathrm{EAT}(e) \wedge \mathrm{Ag}(e)=j \wedge \mathrm{Th}(e) = k_{\mathrm{APPLE}}$

We claim, then, with Carlson, that sentences with bare plurals involve derivationally event types with roles filled by kinds rather than individuals. We say, *derivationally*, because it is essential to our analysis that the event type with the kind is input for the aspectual *for*-phrases. It is important to stress that this signals an important difference with Carlson's approach. Carlson assumes that for **episodic predicates**, like the verbal predicate *ate* in (11a), the kind-interpretation is actually analysed away out of the derivation. This is because Carlson **defines** *eat kind k*, for episodic verb *eat*, as: *eat some instance of kind k*. We do **not** make that assumption.

We **will**, for clarity, assume with Carlson, a **gnomic-episodic ambiguity**. That is, we will assume that in the event type $\lambda e.\mathrm{EAT}(e) \wedge \mathrm{Th}(e) = k_{\mathrm{APPLE}}$, EAT is unspecified for one of two values: $\mathrm{EAT}_{\mathrm{GN}}$, an event type of gnomic eating events, and $\mathrm{EAT}_{\mathrm{EPI}}$, an event type of episodic eating events. Thus we assume that in *eat kind k*, (i.e. 'be an eating event with k as theme') *eat* means **either** *gnomic-eat kind k* (i.e. 'be a gnomic eating event with k as theme') or

episodic-eat kind k (i.e. 'be an episodic eating event with k as theme'). This means that the most plausible readings of (10a) and (11a) reduce to:

(10) a. Cats purr.
c. $\lambda e.\text{PURR}_{\text{GN}}(e) \wedge \text{Ag}(e) = k_{\text{CAT}}$

(11) a. John ate apples.
c. $\lambda e.\text{EAT}_{\text{EPI}}(e) \wedge \text{Ag}(e)=j \wedge \text{Th}(e) = k_{\text{APPLE}}$

So the interpretations in (10c) and (11c) are the ones we assume the grammar operates on.

Now, Carlson argues extensively against trying to **define** PURR_{GN} in terms of purring events with **individual instances of the kind** as themes (i.e. defining away the kind). The reason is that such a definition—if possible at all—could only be a disjunction of the most uninspiring and uninformative kind. That is, what supports the truth of the generic, what we may call the **episodic event witnesses**, may vary wildly from context to context (although in all these cases the interpretation has a 'universal flavour'):

e is a *gnomic-purr* event with theme k_{CAT}:
Possible episodic event witnesses:
1. Sufficiently many individual purring events of individual cats took place over a sufficiently long period of time (inductive reading)
2. Individual cats have individual dispositions to events as under 1.
3. Cat-physiology includes a purring-reflex, related to events under 1.
4. Purring often stands on the cat-activity menu. etc. etc. etc . . .

Carlson assumes that this multiplicity of interpretations is absent for the episodic cases: they have just existential interpretations lexically induced by the episodic meaning of the verb:

e is an *episodic-eat* event with theme k_{APPLE}
Necessary episodic event witnesses:
some episodic eating event with individual theme d, where d is an apple, a plurality of apples, a piece of apple, etc, . . .

We accept all of this from Carlson, with one exception: we assume that the existential interpretation of EAT_{EPI} is a **correspondence postulate** just as it is in the case of the gnomic interpretation: an episodic eating a kind event **will**, in context, correspond to episodic eatings of individuals, its episodic event witnesses. But (as in the case of the gnomic event), we assume that the grammar specifies this as a one-way inference from the event with kind theme to its episodic witnesses. The inverse inference,

which introduces reference to a kind from assertions about individual events is not, on our view, a principle of sentence semantics (but is available in discourse, as in *There are three beavers in my garden. They are destructive little beasts.*)

Two things are important for us:

1. The episodic sentence with the kind theme in (11a) directly involves the kind k_{APPLE}. The semantics of the aspectual *for*-phrase will make use of this.
2. Episodic sentences without kind terms, like the accomplishments in (2c) do not in the **semantic derivation** make reference to the kind k_{APPLE}. Hence, the semantics of the aspectual *for*-phrase will not be able to access that kind in these cases.

To summarize, we assume the following semantics:

(10) a. Cats purr.
c. $\lambda e.PURR_{GN}(e) \wedge Ag(e) = k_{CAT}$
Episodic event witnesses: if e is of this type and $\tau(e)$=i then e has gnomic properties in i

(11) a. John ate apples.
c. $\lambda e.EAT_{EPI}(e) \wedge Ag(e)=j \wedge Th(e) = k_{APPLE}$
Episodic event witnesses: if e is of this type and $\tau(e)$=i then some episodic eating of individual apple must take place corresponding to this inside i.

11.5 Accounting for the facts about aspectual *for*-phrases

11.5.1 *States/activities and accomplishments/achievements*

We assume, with Bennett and Partee 1972; Dowty 1979, and most authors since, that **stative predicates** are lexically constrained as being homogeneous down to instants in the sense of Bennett and Partee: formulated in our event-theory, the event type α of a stative predicate consists of states s such that **every sub-interval** of $\tau(s)$ is the running time of a state of type α which is cross-temporally identical to s (including at singleton intervals, i.e. points). Obviously, if a predicate is homogeneous in this strict sense, it is also incrementally homogeneous.

Secondly, we assume with Landman 2008 that **activity predicates** are lexically constrained as being incrementally homogeneous (as discussed for *waltz* above). With this, we predict that aspectual *for*-phrases are compatible with stative predicates and activity predicates:

(12) a. I lived in Amsterdam for three years.
b. I waltzed for two hours.
c. I pushed a cart for two hours.

The situation is different for accomplishments and achievements. We make the argument for accomplishments, but the case is analogous for achievements. Let us consider (13): Let APPLE be the set of singular apples.

(13) a. John ate an apple.
b. $\lambda e.EAT(e) \wedge Ag(e)=j \wedge Th(e) \in APPLE$

The event type in (13b) is **not** incrementally homogeneous. This is easy to see: take an event e in event type (13b), say: $Th(e) = d$ where $d \in APPLE$. Already the **onset** of e, O(e,EAT) is **not itself** an event in event type (13b), and no event of type (13b) goes on at $\tau(O(e,EAT))$. This violates the definition of incremental homogeneity which would requires an event of type (13b) to go on at event incremental interval from the time of the onset to $\tau(e)$. Consequently, we predict, correctly, that (14) is not felicitous:

(14) #John ate an apple for an hour.

Note that you can replace in (14) *an apple* by *three apples*, *at least three apples*, *a lot of apples*, *the apples*, *every apple*, *most apples* . . . and the argument stays exactly the same: all of these constructions involve event types that are not incrementally homogeneous. This, then, also accounts for the infelicity of the examples in (3), repeated here:

(3) a. #John ate (at least) three apples for an hour.
b. #John ate many apples for an hour.
c. #John ate much bread for an hour.

Downward entailing cases are somewhat subtle here. On any standard analysis of plurality, (15a) comes out as equivalent to (15b), which is not incrementally homogeneous for the same reasons as above, and hence (15c) is predicted to be infelicitous, correctly, we think:

(15) a. John ate at most three apples.
b. John ate 0 apples or John at 1 apple or John ate 2 apples or John ate 3 apples.
c. #John ate at most three apples for an hour.

However, you may wonder whether the equivalence between (15a) and (15b) isn't too strong (is (15a) false if John ate a little chunk of one apple?) We will

not argue this case here, but only note that Landman 2000 argues that the event type involved in the semantics for (15a) is not simply the event type:

$\lambda e.EAT(e) \wedge Ag(e)=j \wedge Th(e) \in APPLES \wedge |Th(e)| \leq 3$

but a more complex event type that involves maximalization. The latter event type is distinctly not incrementally homogeneous.

All in all then, we see that all of the event types corresponding to sentences of the form:

John ate DET apple(s)

are of the accomplishment type, and are predicted (correctly, we think) to be incompatible with aspectual *for*-phrases. (Note that, as argued in Rothstein 2004, included here are cases with determiners and mass nouns like (16):

(16) #John ate a lot of/a little apple for an hour.

The argument that shows these mass cases infelicitous is essentially the same as the argument in the count cases above.)

11.5.2 *Cases that are analysed as statives*

We assume that stative predicates are homogeneous down to instants, hence *a forteriori* incrementally homogeneous, and hence compatible with aspectual *for*-phrases. In the semantic literature, a good case has been made, for various **complex** constructions, that the constructions in question are stative (see, for instance, the discussion in Landman 2008). Examples involve:

(17) **Progressives**:
   a. *I have been driving* for an hour.
   Habituals:
   b. *I smoked* for twenty years.
   Modals:
   c. Our teacher doesn't allow eating in class, but she's not there this week, and the replacement teacher is softer, so for a whole week *we may eat an apple in class*. [on the interpretation where the **modal** is in the scope of the *for*-phrase]

We are not analysing these constructions in this chapter, but assume that homogeneity down to instants is a **defining characteristic** of all stative predicates. This means that we assume that the semantics for the constructions in (17) must make these predicates homogeneous down to instants. For instance, the semantics of the habitual operator involved in (17b) must be

made to guarantee that in the twenty years interval in (17b) the **smoking habit** holds at every sub-interval (this doesn't necessarily mean much about how **actual** smoking is distributed over the interval: that depends on the correspondence between the habit and its event witnesses, which, of course, highly depends on lexical and contextual information).

With that, our semantics for aspectual *for*-phrases predicts that the sentences in (17) are felicitous. We assume that cases like example (4), discussed above, also fall under this heading, since they are habitual:

(4) This bicycle carried three children around Amsterdam for twenty years.

(4) involves the habit of carrying three kids around Amsterdam. The habit may be instantiated by witness events involving different children at different times, but the habit is realized at each instant of the twenty year interval.

11.5.3 *Gnomic readings of predicates with bare plurals*

(18) a. *Dinosaurs ruled the world* for 200 million years.
b. λe.RULE-THE-WORLD$_{GN}$(e) $\wedge$ Ag(e) = $k_{DINOSAUR}$

It is straightforward to require event types of the sort (18b) to be homogeneous, even homogeneous down to instants, just like habituals. We do not think, however, that this should be imposed as a general across-the-board principle. Rather, in (18b) we must think about **what it means** for an event to be a gnomic event of ruling the world with kind dinosaurs as agent.

For (18a) this means that, say, in enough relevant situations, instances of the kind dinosaur come out on top in relevant fighting battles, or they have a disposition to do so. If, in this case, we let the gnomic events be witnessed by a habit or a disposition, then we can take it to be the stativity of the habitual or dispositional predicate which accounts for the incremental homogeneity, and hence for the felicity of (18a). Obviously this requires more details of a theory of generics.

But these are not the only cases. Gnomic predicates are not necessarily interpreted habitually, and whether or not you should expect event types of the form in (18b) to be homogeneous depends strongly on the verb involved, the kind involved, and the context. For instance, look at the cases in (19):

(19) a. #Tolkien invented Hobbits for a week.
b. #Rats/the rat reached Australia for a century.

As discussed above, (19a) has a **felicitous** reading, where we interpret *invent* $_{GN}$(e) $\wedge$ Th(e)=k_{HOBBIT} as *invent characters instantiating the kind HOBBIT*, i.e. Frodo, Sam, . . . This reading is much like that of (18a). But (19) has a more prominent

reading, on which *for a week* is infelicitous: the reading where the relation of *inventing* is directly to the kind: *bring the kind HOBBIT into existence*. On this reading, the gnomic interpretation affects the kind itself, rather than the instances of the kind, and the gnomic event type is an accomplishment event type, and not incrementally homogeneous. Hence, on this reading, *for a week* is infelicitous, but, as argued for (5a) above, *in two hours* **is** felicitous.

Case (19b) is similar. Whether or not (19b) is felicitous depends on the interpretation of the gnomic-predicate/kind complex: as a statement about instances of the kind it is similar to (18a), but as a statement expressing *where-The-Rat-boldly-went-where-no-rat-had-gone-before*, it is interpreted as a non-homogeneous predicate.

11.5.4 *Episodic readings of predicates with bare plurals*

We are now concerned with (20):

(20) a. John ate apples
b. $\lambda e.EAT_{EPI}(e) \wedge Ag(e)=j \wedge Th(e)=k_{APPLE}$
c. John apples for an hour.

We make two assumptions about the event types involving an episodic predicate and a kind theme like (20b). The first is that we assume that this event type is indeed incrementally homogeneous. This means that we assume that when (20a) is true at an interval of time i, this means that there is an event e such that $EAT_{EPI}(e)$ and $Ag(e)=j$ and $Th(e)=k_{APPLE}$ and $\tau(e)=i$ and there is for each incremental sub-interval j of i, bigger than the time of the onset of e, an event e' such that $EAT_{EPI}(e')$ and $Ag(e')=j$ and $Th(e')=k_{APPLE}$ and $\tau(e')=j$ and $e' \sim e$.

The second assumption is the witness assumption of this sort of predicate that if event e in event type (20b) is realized at interval i, this realization **entails** the realization of **some** event witness $e'' \in EAT$ with $Ag(e'')=j$ and $Th(e'') \in APPLE \cap APPLE_{mass}$ and $\tau(e'') \subseteq \tau(e)$. Thus the episodic kind reading is witnessed by events of eating specific apples or apple-parts.

Now note the following. By incremental homogeneity, we have kind-eating events (cross-temporally identical to e) relating John to the kind k_{APPLE} incrementally within the interval $\tau(e)$. This means that **each** such kind-eating event at an incremental sub-interval must satisfy the witness requirement at that interval, i.e. must be witnessed by some actual apple-eating. But, and this is the crux of the analysis, since these intervals are **incremental**, for two such events e_1 and e_2 either $\tau(e_1) \subseteq_{inc} \tau(e_2)$ or $\tau(e_2) \subseteq_{inc} \tau(e_1)$, and this means that

these events may well use **the same** bit of actual apple eating as their witnessing individual event. This means that if $\tau(e_1)$ is a proper initial sub-interval of $\tau(e_2)$, then $\tau(e_2)$ need not necessarily contain more apple eating than $\tau(e_1)$.

This has the following consequence. We predict that (20c) is felicitous and that if (20c) is true, **some** apple-eating must take place during that hour. This much is required by the semantics. Next let us ask: yes, but **how much** apple eating must take place during the hour, or rather, how soon and how often must there be apple eating? And the answer of our analysis is: that depends on our intuitions concerning the notion of event identity in this case.

First: how big is the onset of an episodic kind event of apple eating? Answer: how long are you prepared to wait till the first apple eating is required to take place for you to call it apple eating? That's how big you will allow the onset to be. Secondly, suppose the event starts with a little bit of apple eating. How long till the next bit of apple eating must take place? Answer: how long are you prepared to wait without apple eating and still call it **the same event** of apple eating?

For a predicate like *apple eating* and an interval of an hour, probably you will be variably strict: the first bit of apple should come fairly soon, and then next bits should come with some regularity, or else we run the risk that you call the process off, i.e. decide that the process of apple eating, the episodic-eat events with kind object connected by event identity, stops before the hour is over.

In other words: we predict **semantically** that some apple eating must take place, and contextually, in relation to the notion of event identity, that there must be some spread of apple eating through the interval. This seems to be just what we want.

How much instantiation is required is, once again, highly variable. For instance look at (21):

(21) I woke up in the middle of the night. Something was going on, dogs howled for an hour.

How much howling does this require? Well, if the sentence is said by my light-sleeping elderly neighbour of the complaining type, it would be enough to have a bit of howling to start off the hour, a bit of yelping after half an hour and one more bark later on. This may be stretching things, but it is compatible with our analysis. Note that incrementality plays a central role here. In theories that use a notion of homogeneity in the spirit of Bennett and Partee, or Dowty, there should be an event of the episodic howling type with kind agent at **every** sufficiently large sub-interval of the hour. Each such event would, by the episodic witness connection, be required to correspond to some

individual dog-howling. But that means that the interval is **semantically** required to be homogeneously packed with dog-howling, and it is hard to see how there could be any serious gaps in the howling.

On the incremental theory gaps are not only possible but **natural** in these cases: the episodic howling events with kind subjects can be thought of precisely as **stages in an abstract process connecting different instances of dog-howling through event identity**. As long as the gaps are naturally bridged by process-identity they are indeed natural. On this idea the process is carried forward by producing incrementally more instances, but it is completely natural in that to assume that what you have gathered so far can be used **as credit** to continue to assert that the process continues, even if for some time no instances follow.

There is a clear analogy between these chains of witness-events and the chain of witness events which justify the use of a progressive such as *John has been writing a book for twenty years* (see Landman 1992, 2008 for discussion of the progressive cases).

We have presented here our proposal for episodic event types with bare plural kind-denoting themes. Though we do not give an analysis here, we assume that the ideas presented here carry over to episodic event types with mass noun themes, like (2b). Treating mass nouns as kind-denoting expressions, as in Krifka 1995, Chierchia 1998 suggests how such an extension may take place.

11.5.5 *A note on **eating for three hours***

Why is (22a) felicitous?

(22) a. John ate for three hours.
b. John ate.
c. $\lambda e.EAT(e) \wedge Ag(e)=j \wedge \exists x[Th(e)=x]$

(23) a. John ate something.
b. #John ate something for three hours.

Anita Mittwoch argued many years ago, in Mittwoch 1982, that if (22b) is analysed with the event type in (22c), then (22b) is given the same interpretation as (23a). But (23a) is an accomplishment, as shown by the infelicity of (23b). So this analysis of (22b) wouldn't predict that (22a) is felicitous. Mittwoch concluded that (22b) must be distinguished semantically from (23a). This can be done either by assuming an **intransitive** verb *eat* with a verbal **activity** event type for which the theme role is not defined (as in 22b):

(22) b. John ate.
d. $\lambda e.EAT_{ACT}(e) \wedge Ag(e)=j$

A more attractive possibility is to assume that (22b) allows an analysis with a null object with a **kind interpretation,** as in (24):

(24) a. John ate *e*.
b. $\lambda e.EAT_{EPI}(e) \wedge Ag(e)=j \wedge Th(e) = \mathbf{k}$

By our analysis, this is predicted to be semantically existential (i.e. existentially witnessed), but compatible with *for an hour*, just like episodic event types with bare plural objects.

11.5.6 *Achievements*

The achievement cases in (8) are interesting in that they have been a stumbling block for most analyses of atelicity.

(8) a. *English tourists discovered this village* all summer.
b. *Guests arrived* for two hours.
c. *John noticed miserable looking people* for several hours.

(8a), from Verkuyl 1972, has, of course, played a noble role in arguing against theories that allow aspectual notions only to be defined at the V or at the V/VP level. (There is no such problem in our analysis, since we associate event types with V, VP, and IP.) Independent of that problem, these cases have been difficult to analyse semantically, because of the achievement predicates involved. In cases like (21)—with a bare plural subject and an activity predicate—once could, in principle try to attribute the compatibility with *for an hour* to the interpretation of the activity predicate *howl* and not to the presence of the bare plural subject *dogs*. We think that both strategies (*via* activity predicate or *via* bare plural subject) are available, and the activity predicate strategy is what accounts for the felicity of (25):

(25) Three dogs/the dogs howled for an hour yesterday night.

However, because achievement predicates are interpreted as sets of **punctual** events, the predicate strategy is unavailable, and we are forced to attribute the felicity of the cases in (8) to a kind interpretation of the bare plural subject, as evidenced by the fact that (26) is infelicitous:

(26) #Three guests/the guests arrived for two hours.

The central fact about the interpretation of achievement cases like (8b) is that on anyone's intuition about its truth conditions, there will be intervals

between the guest-arrival events within the relevant interval at which no guests arrivals take place. This is because arrivals are punctual. It is easy to see that for sets of punctual events a requirement of *homogeneity up to 'sufficiently' large sub-intervals*, as Dowty and Krifka have it, **coincides** with *homogeneity up to instants*. This means that Dowty and Krifka's requirement, as applied to cases like (8b) would predict that (8b) is felicitous only on an interpretation where at every point of time during the relevant two hours individual guests arrived; similarly, the truth of (8a) would require a continuous sequence of tourists standing waiting in line for their turn to discover the village throughout last summer. This is, of course, ridiculous. Hence, even with a kind subject, standard notions of homogeneity are untenable. An appeal to gnomic properties to explain the spread seems out of the question, since the achievement cases in (8) seem to be distinctly episodic. Taking all this together this points at episodic predicates, kind subjects, and incremental homogeneity.

And indeed, our analysis deals with these cases readily and smoothly. Since the cases in (8) are all cases with bare plurals, we can assume for each of the cases in (8) an interpretation with an episodic event type with a role specified as a kind (i.e. $k_{\text{ENGLISH TOURISTS}}$ in 8a). With that, the analysis of these cases is exactly the same as the analysis of the accomplishment cases with bare plurals in section 11.5.4. And the discussion of how the howling of *dogs* is spread over the relevant interval in example (21) carries over straightforwardly to the spread of individual guests arriving within the two-hour interval in (8b).

The point of our analysis of (8b) should be familiar by now: (8b) doesn't express **at all** semantically that punctual arrival events of individual guests were **spread** over the two-hour interval. What it expresses is that these punctual arrival events are presented as if they are part of an incremental process of more and more instances of kind GUEST arriving. The spread—how many guests are required to arrive when—is part of the cross-temporal identity conditions of that process: just as many guests are required to arrive at different times in this interval as **you** need in order to think of this as **one** coherent process. In this particular case, it is natural that this requires the interval to be punctuated with arrival events with some frequency, but nothing requires the interval to be densely packed with arrival events. And this is as should be.

11.5.7 *Iterations*

The felicity of (8a), *Guests arrived for two hours*, raises the question of why accomplishments with kind subjects are not compatible with aspectual

for-phrases, as in (27), with the interpretation that complete glass-of-juice-drinking events were spread over the two-hour interval?

(27) #Girls drank a glass of juice for two hours.

Our answer is that such incrementally homogeneous predicates with accomplishments **do** occur, but only when the VP is in the scope of an iteration-creating quantificational operation, as in (28a). However, in this case the felicity of the aspectual *for*-phrase depends purely on the presence of the iteration operation, and is independent of the bare plural subject, as shown by the felicity of (28b):

(28) a. Girls drank a glass of juice *every twenty minutes* for two hours.
b. Susan drank half a glass of orange juice *every twelve minutes* for twenty-five hours the Yom Kippur she was pregnant.
c. The jogger arrived at a kilometre pole *every ten minutes* for an hour.

The cases in (28) show the same spreading effect as the achievements discussed in the previous subsection, but in the present cases, there is no felicity without the explicit iteration-phrase. Note that in the scope of an iteration phrase, also individual subject-**achievements** are compatible with aspectual *for*-phrases, as in (28c). All this leads to two questions: Why are the cases in (28) felicitous? and: Why is (27) infelicitous?

We do not give a worked-out analysis of the cases in (28) here, but we will sketch one. We propose to take the oft-given description of these cases as involving iteration completely literally: we think that the predicates in (28) denotes sets of **iterations**.

What is an iteration? We propose that an iteration is a **singular**, **abstract**, **event** e, which corresponds to a temporally ordered plurality of events: the latter events can be seen as the temporally ordered **witnesses** of e.

Thus, we assume that the semantics of (28b) involves an iteration **e** which (28b) claims lasts twenty-five hours, and which is a singular sequence of drinking-orange-juice events at twelve- minute temporal intervals. Now **e** is an abstract event, like the episodic kind *eat* events with kind-theme k_{APPLE}, and we assume that iterations are constrained analogously. What this means is that we assume that there is a grammatically accessible operation ITERATE which forms (sets of) iterations out of (sets of) pluralities. We assume that the operation ITERATE is constrained in such a way that, for felicitous input α, ITERATE(α) is incrementally homogeneous.

The intuition underlying this constraint is that the iteration event e can be regarded as an (abstract) incremental process of producing more and more witnesses for the iteration. In this case, one would think that the requirements on cross-temporal event identity would be very minimal: *being an initial*

sub-sequence of this iteration. Since that is easy to satisfy, there need not be more requirements on the spread of witnessing events than just the spread that the **formation** of the iteration entails: an event of drinking half a glass of orange juice every twelve minutes.

Importantly, we assume that the incremental homogeneity of the iteration process requires, for the singular abstract iteration event, an onset to be set which is **not** determined by the verb, as in the cases we have discussed so far, but by the size of the iteration-chunks: in (28b) the onset of the iteration is the first twelve- minute chunk.

With this we come to the final comparison:

-In (8b), the achievement case, since achievement events are punctual, the onset will naturally contain a complete arrival event, and the event type will be preserved incrementally: (8b) is incrementally homogeneous and felicitous.
-In (27), the accomplishment with the individual theme, as in all other cases of accomplishments, the onset is too small to be of the event type, and the event type is not preserved incrementally: (27) is not incrementally homogeneous and thus infelicitous.
-In (28b), with the onset reset by the iteration operation, the onset event **is** big enough to be of the iteration event type: the event type is preserved incrementally, and (28b) is incrementally homogeneous and felicitous.

Of course, the analysis of iteration needs to be worked out and neatly and compositionally implemented in a grammar, but we think that this can be done, and we think that, once done, the ideas concerning incremental homogeneity apply to such iterative cases in a completely natural way.

12

Event Measurement and Containment

ANITA MITTWOCH

Discussions of lexical aspect (Aktionsart) abound in minimal pairs like those in (1) and (2), in which the two types of adverbial serve as a useful diagnostic tool for the telic/atelic distinction.

(1) a. Jane walked *for* an hour.
    b. Jane was here for an hour.

(2) a. Jane walked five miles *in* an hour.
    b. Jane wrote twenty-five pages in an hour.
    c. Jane arrived in an hour.

Both adverbials seem to denote the length of an eventuality: *for*-adverbials for an atelic one, *in*-adverbials for a telic one.[1] For this reason they are often

I am indebted to Edit Doron, Malka Rappaport Hovav, Susan Rothstein, and Roger Schwarzschild for valuable input to this chapter.

[1] What I have called *in*-adverbials correspond to Krifka's (1998) 'interval adverbials'; and Thompson's (2006) 'time frame adjuncts'.

This chapter will have nothing to say about *in*-adverbials with achievements, as in (2c). Nor will it deal with the two uses of *in* + an interval-denoting NP which are exemplified below:

(i) He will arrive in an hour.
(ii) This is her first novel in ten years.
(iii) This is her third novel in ten years.

(i) exemplifies a deictic construction: *in an hour* in (i) means 'at the end of an hour from now'. For some speakers it can also have a contextually given past reference point, with *would* in place of *will*. This construction is related to the one that is the subject of this chapter. In particular, it shares many of the properties that will be discussed in section 12.4. For an informal attempt at a unified analysis of the adverbials in (2) above and (i), see Kearns (2003: 607) and Mittwoch (to appear).

The adverbials in (ii) and (iii) also seem to imply that the writing or publication of the novel occurs at the end of the interval; in (iii) there is the further implication that the first novel appeared at the beginning of the interval.

treated together in the literature. (Dowty 1979; Krifka 1998; Alexiadou *et al.* 2003; Rothstein 2004) There are, however, significant differences between them, only some of which have been discussed in the literature. This chapter aims to draw attention to the less obvious ones, and to offer an explanation for them.

The chapter is organized as follows: section 12.1 consists of a fairly traditional analysis of the semantics of *for*-adverbials as expressing a measure function and the scalar implicatures which follow from this analysis. Section 12.2 addresses the question why both the spatial and temporal length of an event cannot easily be given in one simple clause. I suggest that this is because measure phrases can be applied only to homogeneous predicates. This will lead to the conclusion that *in*-adverbials do not directly measure the non-homogenous predicates they appear with; rather *in* adverbials measure a containing interval, thereby only indirectly measuring the event contained in it. Section 12.3 shows how the more obvious properties of *in*-adverbials, in particular, the reversal of scalar implicatures, follow from this conclusion. The longest part of the chapter, section 12.4, presents an array of data illustrating constraints that are peculiar to *in*-adverbials, and shows how they mostly follow from the properties discussed in section 12.3. The last section draws a comparison between *in*-adverbials and the *take* construction, as in

(3) It took Jane an hour to walk five miles.

and suggests that this is, in fact, the unmarked way of expressing the length of telic eventualities.

12.1 The length of atelic eventualities

In this section, I offer a semantics for *for*-adverbials, like the one which appears in (1a), as expressing an (extensive) measure function in the sense of Krifka 1998. For an eventuality e, τ(e) is the running time of e. τ(e) can be conceived of as the sum of the temporal intervals where e unfolds, and one might define a function f which measures the temporal extension of events e by measuring τ(e). The measure function f is expressed by a *for*-adverbial. A well-known characterization of predicates P which can appear with *for*-adverbials is that they are homogeneous, in the sense that they satisfy the subinterval property. Therefore, we include a presupposition on the application of f to events described by a predicate P, requiring that all intervals contained in τ(e) are also running times of events described by P (the subinterval property). Presupposing that walking by Jane is a homogeneous

predicate of events, the logical form for (1a) without tense can be represented as

(4) $\exists e$ (walk (e, Jane) & f(e) = one hour)
homogeneity presupposition required for the application of f:
$\forall e$ walk (e, Jane) $\forall i \subseteq \tau(e)$ $\exists e'$ (walk (e', Jane) & $\tau(e') = i$)

In prose, the presupposition states that for every event e which is a walking by Jane, every interval i contained in τ(e) is also the running time of a walking by Jane.[2]

f satisfies the expected properties of measure functions. For example, (1a) entails (5a) and is not falsified by (5b):

(5) a. Jane walked for half an hour.
b. Jane walked for an hour and a half.

The (Num + N) phrase in the adverbial behaves in the same way as in, for example, *Jane has four children*. The 'exactly' inference is a scalar implicature, (Grice 1975, Horn 1972 and others) based on

(a) the Maxim of Quantity: say as much as you can;
(b) the Maxim of Quality: do not say anything for which you lack evidence.

The Maxim of Quantity would stop you from saying (1a) if you knew that the stronger assertion in (5b) is true. But if you have evidence only for (1a), the Maxim of Quality would stop you from asserting (5b). One hour in (1a) is the lower bound on its scale in terms of the strength of the assertion; it is the minimum that the speaker can confidently assert.

12.2 Why no double measuring?

When the clock strikes 7, Jane goes for a brisk walk. She stops an hour later. Looking at her watch, she can say

(6) I have walked for an hour.

After checking her pedometer she can also say

(7) I have walked five miles.

What she cannot say is

(8) #I have walked five miles for an hour.

[2] For a more fine-grained treatment of the homogeneity presupposition, see Landman and Rothstein (this volume).

According to (4), (8) is ill-formed because the *for-* adverbial is applied to a property that is quantized and therefore non-homogeneous; both miles and hours are (extensive) measure functions that apply to homogeneous predicates and yield non-homogeneous predicates; no proper part of an event of walking for an hour can be described as an event of walking for an hour, and no proper part of walking five miles can be described as walking five miles.

Unlike homogeneous predicates, non-homogeneous ones have a terminal point beyond which the process involved cannot go. The endpoint may, but need not be, intrinsic to the process. In building a house one may have an exact blueprint to work from and be able to envisage the endpoint right at the start. This is less likely for the process of writing a novel. In our case let us assume that Jane had no plan whatsoever regarding the spatial or temporal length of her walk. The endpoint is only established when she stops. She cannot describe what she has done by saying

(9) #I have finished walking five miles.

since only for events, specifically actions, with an intrinsic endpoint can the agent be said to finish them. It seems that there is a process of Jane walking, but no process of her walking five miles; if you happened to catch a glimpse of her during her walk and learnt subsequently that she had walked five miles you could not say

(10) #Jane was walking five miles when I saw her.[3]

The presupposition in (4) reflects our knowledge of how *for*-adverbials behave, but one might still ask why they behave as they do. Why can they not apply to a quantized predicate? The answer, I suggest, is that normal measuring or counting presupposes the possibility of alternatives: what is being measured or counted could have been longer or shorter / reached a higher or lower number; the value reached is arbitrary. Jane could have walked more or less, a longer or shorter distance. In the same way, if we do not know how many miles she walked, the value of one hour for the temporal length of the walk is arbitrary. Could one argue that even if we know that she walked five miles, the temporal length is still arbitrary since it depends on the

[3] For similar examples see Mittwoch (1988: 226). Declerck (1979: 771) stars *John was drinking three cups of tea*. Are sentences like *Jane walked five miles* or *John drank three cups of tea* in contexts where no planning is involved accomplishments? If cooccurrence with the progressive is considered criterial for accomplishments, the answer is obviously no; they are delimited activities. But if the decisive criterion is cooccurrence with *in*-adverbials, then, equally obviously, the answer is yes.

average speed of her walk? I think not; overall speed is calculated as a function of distance and time, and by the end of the five-mile walk it is fixed.

It is for this reason that measure adverbials cannot be applied to predicates that are already measured in another dimension or quantized in some other way. It follows that the temporal length of telic predicates cannot be directly measured at all, as exemplified by the ill-formed (8).[4] An analogous example involving spatial length is

(11) #They planted three thousand trees along the road for two miles.

What (8) tries to say can be approximately expressed by means of conjunctions:

(12) a. My walk covered five miles and lasted an hour.
b. I walked five miles and it/ the walk ?lasted/took an hour.

In (12a) the occurrence of the event is presupposed, the two measure phrases are parallel, and so the verb *last*, which is appropriate for homogeneous eventualities, can be used for the temporal one. In (12b) the antecedent of *it* or *the walk* is a telic predicate and *last* would, in my judgment, be inappropriate.

There are two indirect strategies for saying in one clause what (8) can't say. One is by means of the *in*-adverbial, as exemplified in (2a) *Jane walked five miles in an hour*. But if (2a) is felicitous, and two measure phrases are not allowed, it follows that *in*-adverbials are not ordinary measure phrases. Rather, they package the temporal length of the walk into a frame or container which can be measured; this explains the peculiar properties of this way of measuring, which will form the main topic of sections 12.3 and 12.4.

The other, illustrated in (13), will be mentioned by way of comparison in section 12.5:

(13) It has taken me an hour to walk five miles.

In this construction *take* is a highly specialized light verb, as also in (12b), and the event is split between an agent argument of the verb functioning as indirect object of *take,* a measure phrase, functioning as direct object, and an extraposed infinitival predicate.

[4] Similarly Higginbotham (2000: 64–5) on the contrast between the two adverbials in *Mary drew a circle in/for an hour*: 'with *for* the sentence is false since a circle once drawn cannot be drawn again'.

12.3 The length of telic eventualities

Since the predicate *walk five miles* does not satisfy the homogeneity presupposition, as explained in the previous section, we cannot apply the measure function f to events described by this predicate, and this is why *for*-adverbials are excluded. On the other hand, intervals are homogeneous and we can therefore apply f to intervals. Thus we can measure e indirectly by measuring an interval i containing e. This is precisely what *in*-adverbials do (cf. Krifka 1998; Kearns 2003). The untensed representation of (2a) is given in (14):

(14) $\exists e$ (walk-5-miles (e, Jane) & $\exists i$ (f(i)= one hour & $\tau(e) \subseteq i$))

There is an event of Jane walking five miles and an interval of one hour, such that the running time of the event is included in the interval.

The analysis in (14) is based on the assumption that *in* has its normal meaning here, that semantically it is the same as in *Jane walked five miles* ***in*** *the morning*. Accordingly, (14) does not specify that the running time of the event *must* be equal to the interval, in other words that the five-mile walk completely fills the hour.[5] There is indeed a very strong implication that the walk from beginning to end completely filled an hour, but if this were an entailment, one should be able to deny (2a), repeated as (15a), by (15b), whereas the appropriate response is a milder correction, as in (15c)

(15) a. Jane walked five miles in one hour.
b. #No/ that's not true, she did it in fifty-five minutes.
c. Actually, she did it in fifty-five minutes.

In fact (15a=2a) entails (16a) and is compatible with (16b)

(16) a. Jane walked five miles in an hour and five minutes.
b. Jane walked five miles in fifty-five minutes.

We see that the scale here is a descending one, and so the Gricean maxims also apply upside down. The Maxim of Quality stops you from saying (16b) if you have insufficient evidence for its truth; the Maxim of Quantity stops you from saying (16a) if you know (15a=2a) to be true. The stronger statement is the one according to which the event is completed in the shorter interval. Hence in (2a) one hour is the upper bound of the descending scale; the speaker

[5] I have deliberately chosen an example that would be conceptualized as continuous, so that it counts as one event. With a plurality of events, e.g. *Jane composed four sonatas in one year*, there would of course be gaps, possibly long ones.

cannot take responsibility for a lower value, which would produce a stronger statement.

This reversal of the more familiar ascending scale that we associate with measuring and counting derives from the fact that we are measuring the containing interval, as can be shown graphically in relation to concrete containers. Consider

(17) The marbles will fit into (i) box B (ii) box C[6]

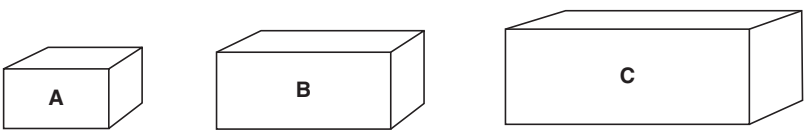


FIGURE 12.1

(17i) makes a stronger statement than (17ii). If you want to store something in a container, you would normally choose the smallest container that would hold it. If we assume that the marbles will completely fill box B, then (17ii) would still be true, though less informative; but (17iii) would be false:

(17iii) The marbles will fit into box A.

In determining what interval would contain an event, the shortest interval, i.e. the one that is completely filled by the event, would be the most informative. This is what gives rise to the 'exactly' implication, which seems to be stronger for these adverbials than for measuring or counting that operates on a rising scale.

12.4 Further peculiarities of telic adverbials

In this section it will be shown that *in*-adverbial are subject to a large number of restrictions that do not apply to *for*-adverbials. I will show that they all follow from assuming that *in*-adverbials are container measures and thus operate on a descending scale.

12.4.1 *Constraints on modifiers of the numeral*

Consider

(18) a. Jane walked for at least an hour.
b. Jane walked for at most an hour.

[6] Compare the causative use of the verb *fit* in *I managed to fit in a visit to the theatre.*

(19) a. #Jane walked five miles in at least an hour.
b. Jane walked five miles in at most an hour.

In (18a) *at least* is what Krifka (2006/7) calls a lower bound superlative; the speaker who utters (18a) makes a stronger statement than one who utters (1a) *Jane walked for an hour*; s/he suggests that there is a reasonable chance that a higher value on the scale is justified. Accordingly, (18b) makes a weaker claim than (1a). (19b) displays the expected reversal: it makes a stronger claim than (2a=15a). So why is (19a) not well-formed? Why can't it function as an upper bound superlative, so that the speaker would be making a weaker claim, saying that Jane walked five miles in an hour or more?

The reason is that since, as we saw in the previous section, *Jane walked five miles in one hour* in fact entails *Jane walked five miles in n hour(s) for* $n > 1$, the effect of the adverbial would be vacuous (Roger Schwarzschild p.c.).[7] *In*-adverbials are uninformative if they do not have a fixed upper bound, or one that can be roughly computed through the context.

Next consider

(20) a. Jane walked five miles in less than /under an hour.
b. #Jane walked five miles in more than /over an hour.

(21) Jane walked five miles in a little over an hour.

(22) a. Jane walked five miles in less time than Joan.
b. #Joan walked five miles in more time than Jane.[8]

[7] *At least* is compatible with decreasing scales when there is movement along the scale. But in these cases *at least* functions as it does for rising scales; it leads to a stronger statement. For example, when cooling a liquid one might say

(i) By now the temperature must be at least 15 degrees, perhaps even 12.

And with respect to the diagram in Figure 12.1 above

(ii) The marbles will fit at least into Box B, perhaps even into Box A.

where one envisages the marbles being put into one of the boxes. Thus also

(iii) By the year 2030 the world's top athletes will run a mile in at least 3 minutes and 50 seconds, maybe even less.

Here the implicit movement on a scale is the constant improvement in the athletes' performance.

[8] Some of my #examples might be acceptable in reports of performance in sports competitions, especially with the verb *finish* rather than *walk*, *run* etc. Thus if a runner is disqualified from taking part in a race of running a mile if he achieves less than four minutes in the preliminaries, one might say *He finished in more than four minutes.*

(23) a. What is the shortest time that you have ever run a mile in?
b. #What is the longest time that you have ever run a mile in?[9]

The problem with (20b) is similar to the one with (19a). The containing interval has no fixed upper bound, and so in this example too the adverbial is vacuous. For (20a) the upper bound is not fixed but we know that it is lower than for (2a=15a). (21) has an approximate upper bound, provided by the addition of *a little*, say up to five minutes. The two sentences in (22), despite appearances, are not truth-conditionally equivalent. The comparative clause in (22a) is satisfied by the smallest interval such that Joan's five-mile walk filled it; the one in (22b) suffers from the problem that we encountered with (19a) and (20b)—the absence of an upper bound for the interval. And something similar applies to (23b); any answer specifying an interval of n minutes filled by a one-mile run will entail analogous sentences with an infinite number of intervals higher than n minutes, so that, strictly speaking, there cannot be a longest time.

The example below confronts us with a trickier problem:

(24) #Jane walked five miles in almost an hour.

One possibility suggested to me would be to treat *almost an hour* here in the same way as in *Jane walked for almost an hour*, which entails *Jane did not walk for an hour*. Hence (24) would entail *Jane did not walk five miles in an hour*. But this would lead to a contradiction, since, as noted above, sentences containing *in*-adverbials entail analogous sentences with higher values on the temporal scale denoted by the NP. If so, however, one must ask why this line of reasoning does not apply to

(25) a. Jane walked five miles in no(t) more than an hour.
b. Jane walked five miles in only one hour.[10]

[9] According to Thompson (2006) *in*-adverbials do not allow preposition stranding, her only example being

(i) *How many hours did you read that book in?

(This example is ruled out independently for reasons that will become apparent in section 12.4.5) I think that the availability of preposition stranding depends on context. (23a) presents an acceptable example of a preposition stranded out of an *in*-adverbial. Takami (1992: 36) states the following principle:

(ii) An NP can be extracted out of a PP only when the NP may itself be interpreted as being more important than the rest of the sentence.

[10] Many scholars have treated the negative implication of *almost* as some kind of implicature rather than an entailment; one of their main arguments is that *almost* does not license Negative Polarity

A second possibility might be that *almost* is inappropriate on a descending scale, where it might not be clear whether *almost n* would mean 'slightly less than n' or 'slightly more than n'. For obvious reasons, the latter is the only option for *almost nothing* or *almost zero*, said of, say, the rate of interest; it is suggestive that *almost zero* of temperature or of one's bank balance can also mean 'slightly above zero'. And if we say of an athlete *he almost did it in an hour*, with *almost* having scope over the VP, the implication would certainly be *he did it in a little over an hour*. I am doubtful however whether (24) could be interpreted that way. I shall come back to this example in the next subsection.

12.4.2 *Relative shortness*

The constraints exemplified in the previous subsection revolve round the absence of a fixed upper bound for the adverbial. The immediate result of these constraints is that there is no way of weakening the value on the scale specified by the numeral in an *in*-adverbial. A statement of the form *She did it in n hours* must be interpreted as a strong statement (even if not the strongest), and this would naturally lead to an 'exactly' implication, i.e. that the event completely fills the containing interval.

From there it is only a short step to a further result. In addition to the 'exactly' implication', *in*-adverbials tend to suggest that the speaker considers the interval to be relatively short for the contained event, or—what amounts to the same thing—that the speed with which the event unfolded was relatively great. *She walked a mile in an hour*, said of a healthy, unencumbered adult might well elicit the response *I would call that rather long, actually*. And *She did it in a short time* sounds more natural than *she did it in a long time*. Similarly the sentences in (26a) are considerably better than those in (26b):

(26) a. She walked five miles in only / no more than / as little as an hour.
b. She did it in no less than / as much as an hour.

Consider also

(27) #Jane wrote the letter in hours.

Items. See Horn (2002) for a thorough discussion and evaluation of the arguments in favour of this position. Horn agrees with Sevi (1998) in nevertheless regarding it as entailment, albeit an atypical one. Sevi calls it backgrounded. For Horn it is an entailment that is not part of the speaker's assertion:

Semantically entailed material that is outside the scope of the asserted, and hence potentially controversial, aspect of utterance meaning counts as **assertorially inert** and hence as effectively transparent to NPI-licensing and related diagnostics of scalar orientation. (p.62)

Almost, according to Horn, is rhetorically oriented to the positive component of its meaning, the one that, in our example, would say that the length of Jane's five-mile walk came close to one hour.

(27) lacks an upper bound, which should be sufficient reason to rule it out. Without further context the example either suggests a long interval—compare *for hours* with atelic predicates—or the adverbial is vacuous. Nevertheless, there are contexts where *in hours* with an extended telic predicate is acceptable. The examples below were found on the British National Corpus:

(28) a. In good conditions diatons may double their weight in hours.
b. Their dragonriders could ravage a foe's armies and lands in hours.
c. Time-consuming and costly negotiations . . . can be over and done with in hours instead of weeks
d. If swallowed it kills in seconds, if absorbed through the thinner membranes of the mouth . . . it kills in hours.

Note that in the first three examples the base sentence is in the scope of a modal, and in the last one is lawlike. I have not found a single example where *in hours* occurs with a simple episodic predication. The contexts of (28a,b) suggest speed for pragmatic reasons. In (28c) there is overt comparison with a longer interval, which in any case puts an upper bound on the interval. In (28d) there could theoretically be an implied upper bound (24 hours), but this is most unlikely to lead to an 'exactly' interpretation; the example seems to be neutral as regards the speed of the process.

Compared with *in hours*, *in minutes* is much more common and usually suggests speed; the examples below are from Google:

(29) a. 'Fakeproof' e-passport is cloned in minutes.
b. Write a CV in minutes as a Microsoft Word document.
c. The daring raid was executed in minutes.

Most of the examples are also in the scope of modals or lawlike, or else in advertisers' imperatives. *In*-adverbials modifying a DP are also popular with advertisers, e.g. *a meal in minutes.*[11]

The ultimate claim for speed is made with *in no time*, as in the title of a book *Organize Your Office in No Time.*

Viewed in the light of the discussion in this section, we see that the bad examples discussed in 12.4.1 all carry implications of a relatively long interval, as indicated by *at least, more than, longest* in these examples, while the good examples suggest a relatively short interval.

[11] Examples reporting single events found in the BNC mostly involve the idiomatic use in narratives of a stative predicate, interpreted as an inchoative, for which a preceding interval has to be accommodated by the hearer/reader.

Even *almost* in the problematic sentence (24), *#Jane walked five miles in almost an hour,* conforms to this generalization; though interpreted as entailing 'less than', it is 'rhetorically oriented' to a higher value rather than a lower one, according to Horn (2002, cf. Note 10). In support of this observation note that if you wanted to correct an utterance of (2a) *Jane walked five miles in one hour* you could say (30a) but not (30b):

(30) a. Actually, she did it in a little under an hour.
b. Actually, she did it in almost an hour.

See also Mittwoch (to appear).

12.4.3 *Modified quantifiers inside the incremental argument of the verb*

What happens when there are quantificational modifiers inside the incremental theme? There the scale is of course a rising one:

(31) a. Mary walked at least / more than five miles in one hour.
b. Mary walked at most / less than / only five miles in one hour.

The effect in (31a) is to reinforce the relative shortness implication of the adverbial. But in (31b) we see that the spatial measure phrase, which functions like an incremental theme argument here, takes precedence over the *in*-adverbial; the shortness implication is overridden by the weakening effect of the modifiers in the spatial measure phrase. Not only do these modifiers cancel the shortness implication; they seem to reverse it; the sentences seem to imply that the interval is near the top end of the scale, that it is relatively long.

What happens if there are modifiers in both NPs? Let us first consider an example with two occurrences of *at most*:

(32) Jane walked at most five miles in at most one hour.

(32) is hard to interpret; it seems to send contradictory messages with regard to the shortness implication; *at most five miles* suggests a relatively modest achievement, whereas the strengthening effect of *at most* in the adverbial suggests speed. The corresponding sentence with two occurrences of *at least* would have the same problem and the additional one of *at least* inside the adverbial (cf. (19a) above).

With opposite modifiers there should be no such problem:

(33) Jane walked at least five miles in at most one hour.

In (33) *at least* in the complement NP reinforces the shortness implication inherent in the adverbial. What is really startling is what happens if we reverse the modifiers:

(34) Jane walked at most five miles in at least one hour.

Not only does *at most* in the complement NP override the shortness implication, so that the container interval will be regarded as relatively long and, correspondingly, the event as relatively slow; but, more surprisingly, the normally banned modifier *at least* can actually pop up in the adverbial. The only explanation for this curious phenomenon that I can suggest is that with these opposite implications (length and slowness) the absence of an upper bound loses its relevance.

12.4.4 *Discontinuity*

If Jane worked on her book for six months in 2002 and for another six months in 2004, we can say

(35) She worked on the book for six months / a year.

But if she finished the book at the end of the second stint, we cannot say (36):

(36) She wrote the book in twelve months / a year.

If a telic event is spread over two non-adjacent intervals, these cannot be summed.

12.4.5 *Questioning*

Questioning an *in*-adverbial with *how long* is completely ruled out:

(37) #In how long did she do it? / #How long did she do it in?

How long seems to be restricted to measuring intervals for which there could be alternative values. *In how much time, in how many minutes/hours/days*, etc., are less crashingly bad, but the only contexts in which I have encountered them are exam-type questions, with the adverbial in final position, as in *The earth rotates in how many hours?* The reason for the constraint is not clear to me.

12.5 Comparison with the *take* construction

As noted in Sections 12.1 and 12.2, there is an alternative construction for indirectly measuring the length of telic eventualities, as in (3), repeated below:

(38) It took Jane an hour to walk five miles

In this construction the interval is not a container. *Take* has the sense of 'need' or 'require' as in *It takes four people to lift the piano.*[12] The construction measures the length of the interval required for the event to unfold from beginning to end. Hence the scale is a rising one: (38) entails (39a) and is compatible with (39b):

(39) a. It took Jane 55 minutes to walk five miles.
b. It took Jane 65 minutes to walk five miles.

The sentences in (40) show that the construction is not subject to the constraints that apply to *in*-adverbials:

(40) a. It took Jane at least an hour to walk five miles.
b. It took Jane more than an hour to walk five miles.
c. It took Jane more time than Joan to walk five miles.
d. It took Jane almost an hour to walk five miles.
e. It took Jane hours to walk five miles.
f. How long did it take Jane to walk five miles?

And in the scenario given in section 12.4.4 we can say

(41) It took Jane twelve months / a year to write the book.

The construction is also completely neutral regarding the speed of the event.

The *take* construction is more cumbersome than the *in*-adverbial as a means of giving the length of telic eventualities, but in view of the absence of constraints restricting its distribution it must be regarded as the unmarked option; I would hazard a guess that it is also the more common option.

12.6 Conclusion

This chapter has argued that while *for*-adverbials denote measure functions, *in*-adverbial are not measure functions, but rather denote container-intervals. This difference has served to account for the peculiar reversal of implicatures

[12] Alternatively

(i) It took an hour for Jane to walk (the) five miles.

The *for…to…*alternative is used especially for non-agentive verbs

(ii) It takes six weeks for this kind of fracture to knit.
(iii) It will take two weeks for the snow to melt

but even for these it is not mandatory.

which follows from the use of these adverbials. *Jane walked for an hour* implies she did not walk for more than hour. *Jane walked five miles in an hour* implies that she did not walk that distance in less than an hour. The chapter has uncovered further differences in the properties of *for*- and *in*-adverbials which have not previously been mentioned in the literature. For example, the reversal of implicatures does not automatically translate into the reversal of lower and upper bounds for these adverbials. Though *for*-adverbials are felicitous with both upper and lower bounds (*Jane walked for at most/at least an hour*), *in*-adverbials require an upper bound (*Jane walked five miles in at most/#at least an hour*). This in turn indicates that the speaker using an *in*-adverbials considers the container-interval to be relatively short for the contained event. Finally, the *in*-adverbial was compared with the *take x time* construction which is argued to be an alternative means to indirectly measure an event, but not through a container interval. This explains the fact that this construction is associated with the expected rising scale and doesn't share the range of implicatures with *in*-adverbials.

13

Draw

CHRISTOPHER PIÑÓN

At first glance, the verb *draw* appears to be a garden-variety verb of creation, just like *build* is:[1]

(1) a. Rebecca drew a house.
b. Rebecca built a house.

However, in (1b), Rebecca brought a real house into existence by building one, whereas in (1a), she brought a drawing of a house (or a house drawing) into existence by drawing one. It is clear that she created something in both instances, but a significant difference is whether the object noun phrase *a house* designates a real house (*build*) or a house drawing (*draw*).

If a definite object noun phrase is chosen, another difference may be observed:

(2) a. Rebecca drew the yellow house on Isabella Street.
b. Rebecca built the yellow house on Isabella Street.

A natural way of contextualizing (2b) is that there is a real yellow house on Isabella Street and the implicit question is who built it. In this context, the subject noun phrase *Rebecca* would be focused:

(3) (Who built the yellow house on Isabella Street?)
$[_{[+f]}$ Rebecca] built the yellow house on Isabella Street.

I am grateful to Anita Rákóczy for helpful discussions of the data and to the editors for their faith and patience. I also thank two anonymous reviewers for their comments even if I cannot address all of their points here. After submitting the final version of this chapter, I had the opportunity to present this material in Frankfurt (on 3 Feb 2009) and Düsseldorf (on 8 April 2009). I thank those audiences, in particular, Ede Zimmerman and Sebastian Löbner, for their questions and reactions, which I hope to address more adequately elsewhere.

[1] See von Stechow (2001) and Piñón (2008) for two recent accounts of verbs of creation, though I quickly add that neither really does justice to the particularities of verbs of depiction.

However, in contrast to (1b), it seems difficult to understand (2b) as neutrally describing an event of building by Rebecca.[2] This contrast is seen more sharply if the background question is *What happened?*:[3]

(4) (What happened?)
✓ Rebecca built a house.
✗ Rebecca built the yellow house on Isabella Street.

Turning to (2a), there are basically two interpretations available. Probably the most natural reading out of context is that Rebecca produced a drawing of the real yellow house on Isabella Street, i.e. she depicted this house in a drawing—imagine that she sat across the street from the house and drew it. This is a neutral description of an event of drawing by Rebecca, just as (1a) is:

(5) (What happened?)
✓ Rebecca drew a house.
✓ Rebecca drew the yellow house on Isabella Street.

The other way of reading (2a) is similar to the way of understanding (2b), namely, as a non-neutral description of a drawing event. Imagine that there is a drawing of the yellow house on Isabella Street on the table and the implicit question is who drew that real house:

(6) (Who drew the yellow house on Isabella Street?)
$[_{[+f]}$ Rebecca] drew the yellow house on Isabella Street.

Observe, though, that in either reading of (2a), the object noun phrase *the yellow house on Isabella Street* refers to a real house, in contrast to *a house* in (1a).

The difference between (2a) and (2b) can also be brought out with the help of negation:

(7) a. Rebecca didn't draw the yellow house on Isabella Street.
b. Rebecca didn't build the yellow house on Isabella Street.

[2] In another context, of course, another constituent could be focused, e.g. the object noun phrase:

(i) (What did Rebecca build?)
Rebecca built $[_{[+f]}$ the yellow house on Isabella Street].

But this does not affect the point being made, namely, that (2b) is not a neutral description of an event of building by Rebecca in the way that (1b) is.

[3] When evaluating (4), bear in mind in that *the yellow house on Isabella Street* should refer to a real house.

Ignoring the possibility of assocating the negation with the object noun phrase,[4] (7b) implies that there is a real yellow house on Isabella Street, Rebecca did not build it, but someone else did. In contrast, the natural reading of (7a) is that there is a real yellow house on Isabella Street, Rebecca did not draw it, and perhaps no one else did either.

Returning to (1a), it is possible to understand *a house* as a specific indefinite noun phrase, referring to a particular real house, in which case (1a) would pattern like (2a), which has a definite object noun phrase. To bring out this reading, it helps to extract the indefinite noun phrase to give it scope over the verb:

(8) There is a yellow house on Isabella Street that Rebecca drew.

Thus, the contrast given at the outset between (1a) and (1b) depends on a non-specific interpretation of *a house*, for in this case there need not be a real house in (1a) but there does need to be one in (1b).

Consider, finally, the following parallel between *draw* and *build*:[5]

(9) a. Rebecca received a worded description of a house. Then she drew the house.
b. Rebecca received a worded description of a house. Then she built the house.

In both (9a) and (9b), the object noun phrase *the house* refers to the house that Rebecca received a worded description of and not to a real house. In (9a), she produced a drawing of the house determined by the description; and in (9b), she built a house based on the description. Notice also that the second sentence in (9b) is a neutral description of an event of building by Rebecca, despite the definite object noun phrase (cf. (2b) and (3)–(4)):

(10) Rebecca received a worded description of a house.
(What happened then?)
✓She built the house.

As expected from (2a), the second sentence of (9a) is also a neutral description of a drawing event by Rebecca.

In sum, there appear to be three uses of *draw*. Its first, illustrated in (1a), is for expressing that a kind of drawing (e.g. a house drawing) is produced, but of no object (e.g. no house) in particular—there need not be any object that the drawing produced is a drawing of. Its second use, illustrated in (2a)

[4] For example: *Rebecca didn't build the yellow house on Isabella Street (but rather the brown house on King Street)*.

[5] In (9), *a worded description of a house* should be understood as 'a worded house description.'

and (8), is for asserting that a drawing is produced of some object (e.g. a certain house) that is seen—intuitively, this is a kind of 'copying' of an image. Finally, its third use, shown in (9a), is for stating that a drawing is made of an object (e.g. a house) based on a certain description of that object (e.g. a house description). In contrast to the second use, the third use lacks the idea of a 'copying' of an image.

In this chapter, my aim is to propose a preliminary semantic analysis of *draw*. In section 13.1, I broaden the empirical coverage by examining how *draw* is rendered in Hungarian. This will corroborate the idea that three senses need to distinguished. In section 13.2, I propose semantic representations for these three meanings. In section 13.3, I briefly compare my analysis with the one advocated in Forbes (2003) and suggest that mine is more successful than his in certain respects. Finally, in the conclusion, I summarize the results of the chapter.

13.1 Drawing in Hungarian

In this section, I broaden the empirical study of *draw* by considering how it is expressed in Hungarian. The choice of Hungarian is apt because, as I will argue, the three uses of *draw* identified in the previous section are morphologically distinguished.

Draw may be rendered by three verbs in Hungarian, one unprefixed and two prefixed. The unprefixed verb is *rajzol* and the two prefixed versions are *lerajzol* and *megrajzol*. The prefix[6] *le-* preserves its original spatial meaning 'down' with verbs of motion (e.g. *lemegy* 'go down', lit. 'down.go'), whereas the prefix *meg-* lacks a spatial meaning in modern Hungarian and functions as a kind of perfective prefix.[7]

The unprefixed verb *rajzol* would be used to express (1a) on the non-specific reading of *a house*:[8]

(11) Rebeka rajzolt egy házat. (Cf. (1a))
Rebecca draw.PAST.INDEF a house.ACC
'Rebecca drew a house.'

Out of context, the most natural interpretation of (11) is as a neutral description of an event of drawing by Rebecca. In this case, the object noun phrase

[6] Verbal prefixes in Hungarian are also known as preverbs because they are syntactically separable.
[7] Historically, *meg* is derived from *mögé* 'to behind', lit. 'behind.to'.
[8] The abbreviations used in the glosses are: ACC accusative; COMP complementizer; DEF definite object conjugation; INDEF indefinite object conjugation; PAST past tense; PERF perfective prefix.

egy házat 'a house.ACC' is understood as non-specific, i.e. (11) does not entail that there is a particular house which she made a drawing of—she just drew a house, but no house in particular. Like *a house* in (1a), this object noun phrase does not designate a real house but instead the house drawing that she made.

When used as in (11), *rajzol* does not tolerate a specific reading of an indefinite object noun phrase, contrary to what was seen with *draw* in (8).[9] The surest way of testing this is to embed *rajzol* in a relative clause which its indefinite object noun phrase has been extracted out of:

(12) #Van egy sárga ház az Izabella utcában, amit
there.is a yellow house the Isabella Street.in which.ACC
Rebeka rajzolt.
Rebecca drew.PAST.INDEF

The problem in (12) is there should be a real yellow house in Isabella Street that Rebecca drew, and yet the object of *rajzol* cannot refer to such a house.

Consistent with this pattern is the observation that definite object noun phrases are also excluded:

(13) #Rebeka rajzolta az Országházat.
Rebeka draw.PAST.DEF the Hungarian-Parliament-Building.ACC

In sum, if *rajzol* is used to neutrally describe a drawing event, its object noun phrase must be indefinite with a non-specific reading and cannot refer to a real object that the drawing produced is a drawing of.[10]

The prefixed verb *lerajzol* would be the prime choice for rendering the use of *draw* illustrated in (2a):

[9] *Rajzol* belongs to a class of *definiteness effect* verbs in Hungarian, which contains more than just verbs of creation. There is by now a significant literature on this class: see e.g. Szabolcsi (1986), Bende-Farkas (2001), Piñón (2006), and the references therein.

[10] It is important that the description be neutral, for in a non-neutral description *rajzol* accepts a definite object noun phrase:

(i) (Ki rajzolta az Országházat?) ('Who drew the Hungarian Parliament Building?')
[$_{[+f]}$ Rebeka] rajzolta az Országházat. '[$_{[+f]}$ Rebecca] drew the Hungarian Parliament Building.'

In (i), *Rebeka* is focused. The contrast between (11) and (13) can be brought out against the background of the implicit question *Mi történt?* 'What happened?':

(ii) (Mi történt?) ('What happened?)
✓ Rebeka rajzolt egy házat. 'Rebecca drew a house.'
✗ Rebeka rajzolta az Országházat. 'Rebecca drew the Hungarian Parliament Building.'

Unlike the second answer in (5) with *draw* (13) cannot serve as a neutral description of a drawing event by Rebecca, whereas (11) can. In my view, the use of *rajzol* in (i) has to be distinguished from its use in (11) in the sense that a single semantic analysis cannot do justice to both. However, it suffices for present purposes simply to distinguish these two uses of *rajzol* and to set aside its use in non-neutral descriptions.

(14) Rebeka lerajzolta az Országházat.
Rebeka down.draw.PAST.DEF the Hungarian-Parliament-Building.ACC
'Rebecca drew the Hungarian Parliament Building.'

In (14), there is a real building, the Hungarian Parliament Building, that Rebecca made a drawing of, and the object noun phrase refers to this building. Naturally, *lerajzol* also permits indefinite object noun phrases, but then a specific reading is required. Observe that the interpretation of (15a) is equivalent to that of (15b).

(15) a. Rebeka lerajzolt egy sárga házat az
Rebecca down.draw.PAST.INDEF a yellow house.ACC the
Izabella utcában. (Equivalent to (15b))
Isabella Street.in
'Rebecca drew a yellow house in Isabella Street.'

b. Van egy sárga ház az Izabella utcában,
there.is a yellow house the Isabella Street.in
amit Rebeka lerajzolt. (Cf. (8))
which.ACC Rebecca down.draw.PAST.INDEF
'There is a yellow house on Isabella Street that Rebecca drew.'

Crucially, *lerajzol* cannot be used to express that Rebecca drew a house, but no house in particular, unlike *rajzol* in (11):

(16) Rebeka lerajzolt egy házat. (Cf. (11))
Rebecca down.draw.PAST.INDEF a house.ACC
'Rebecca drew a house.'
✓ 'There is a house and Rebecca drew this house.'
✗ 'Rebecca drew a house, but no house in particular.'

Although *lerajzol* is prototypically used to describe events in which a drawing is made of an ordinary individual (e.g. a real physical house), it can also be used to describe events in which a drawing is made of a physical image or picture or even a mental image or picture:[11]

(17) a. Rebeka látott egy képet egy házról.
Rebecca see.PAST.INDEF a picture.ACC a house.about
Aztán lerajzolta a házat.
then down.draw.PAST.DEF the house.ACC
'Rebecca saw a picture of a house. Then she drew the house.

[11] Hungarian allows for subject and object pronouns to be dropped, hence the absence of an overt object pronoun in (17b).

b. Rebeka elképzelt egy házat. Aztán
Rebecca imagine.PAST.INDEF a house.ACC then
lerajzolta.
down.draw.PAST.DEF
'Rebecca imagined a house. Then she drew it.'

Finally, the prefixed verb *megrajzol* would be the appropriate choice for rendering the text in (9a):

(18) Rebeka kapott egy szöveges leírást
Rebecca receive.PAST.INDEF a worded description.ACC
egy házról. Aztán megrajzolta a házat.
a house.about then PERF.draw.PAST.DEF the house.ACC
'Rebecca received a worded description of a house. Then she drew the house.

Observe that, in the context set up by the first sentence of (18), *lerajzol* would be a less natural choice for the continuation:

(19) Rebeka kapott egy szöveges leírást egy
Rebecca receivePAST.INDEF a worded description.ACC a
házról. ?#Aztán lerajzolta.
house.about then down.draw.PAST.DEF

Intuitively, the clash witnessed in (19) is due to the fact that *lerajzol* makes reference to something (a real physical object or an image of an object) that is seen and then depicted in a drawing. However, in (19), such an object or image is not immediately given—what is immediately given is a description of a house. At the same time, since it is feasible to construct an (intermediate) image of a house from a description of a house, the use of *lerajzol* in (19) is not strictly ruled out, but it would not be the natural choice in this context.

The contrast between *lerajzol* and *megrajzol* can be sharpened by choosing a context in which the former is the natural choice:

(20) Rebeka látott egy sárga házat az Izabella
Rebecca see.PAST.INDEF a yellow house.ACC the Isabella
utcában. Aztan lerajzolta.
Street.in then down.draw.PAST.DEF
'Rebecca saw a yellow house in Isabella Street. Then she drew it.'

In (20), Rebecca saw a yellow house in Isabella Street and then made a drawing of it—this is a canonical context for the use of *lerajzol*. Observe that *megrajzol* would not be appropriate here:

(21) Rebeka látott egy sárga házat az Izabella
Rebecca see.PAST.INDEF a yellow house.ACC the Isabella
utcában. #Aztan megrajzolta.
Street.in then PERF.draw.PAST.DEF

In (21), the intended referent of the implicit definite object pronoun ('it') of *megrajzolta* is the yellow house in Isabella Street that Rebecca saw. However, this clashes with the idea that *megrajzol* makes immediate reference to a description of an object as opposed to the object itself or an image of it. Indeed, the effect of using *megrajzol* in (21) is precisely that the implicit definite object pronoun ('it') of *megrajzolta* does not refer to the yellow house on Isabella Street that Rebecca saw but rather to some house description that should otherwise be salient in the broader context.

As a final contrast, consider what happens if *rajzol*, *lerajzol*, or *megrajzol* takes a reflexive pronoun as its object noun phrase:[12]

(22) a. #Rebeka rajzolta magát.
Rebecca drew.PAST.DEF self.ACC
b. Rebeka lerajzolta magát.
Rebecca down.drew.PAST.DEF self.ACC
'Rebecca drew herself.'
c. ?#Rebeka megrajzolta magát.
Rebecca PERF.drew.PAST.DEF self.ACC

In (22a), *rajzol*, which does not tolerate a definite object noun phrase, is clearly incompatible with a reflexive object pronoun, which co-refers with the subject *Rebeka*. In (22b), by comparison, there is no such difficulty, and Rebecca made a drawing of herself. She may have done so by looking in a mirror as she drew, but she may also have based her drawing on a mental image of herself. Out of context, (22c) is unnatural because the reflexive pronoun does not naturally refer to a description of Rebecca. A possible context for (22c) might be one in which Rebecca made a drawing of herself based on a description of how she would look ten years later:

(23) ?Rebeka megrajzolta magát, hogy hogy fog kinézni
Rebecca PERF.drew.PAST.DEF self.ACC COMP how will look
tíz év múlva.
ten year in
'Rebecca drew herself as she would look in ten years.'

[12] This was prompted by an anonymous reviewer.

To the extent that (23) is natural, it works because *megrajzol* implies a drawing based on a description and the description in question is signalled by how Rebecca would look in ten years.

In conclusion, Hungarian employs three verbs for *draw*: *rajzol*, *lerajzol*, and *megrajzol*. Setting aside the use of *rajzol* in non-neutral sentences (see fn. 10), each of these verbs has a distinct meaning. What they share is that they all denote drawing events; what distinguishes them is how the drawings produced are characterized. With *rajzol*, the drawings are of a certain kind (e.g. house drawings), but they are drawings of no individual or image in particular. With *lerajzol*, in contrast, the drawings are precisely of particular individuals or images (e.g. real houses), and an intuitive notion of 'copying' is present (to be captured via depiction). Finally, with *megrajzol*, the drawings are based on or fit descriptions of individuals or images (e.g. house descriptions), where the descriptions are propositional in character and are not themselves ordinary individuals or images.

13.2 Analysing *draw*

In this section, I propose three preliminary semantic analyses of *draw*. Not surprisingly, these are also analyses of *rajzol*, *lerajzol*, and *megrajzol*, respectively. The analyses are formulated in a so-called neo-Davidsonian event semantics, but I believe that the interest of the analyses proposed has less to do with events than with the other sorts of entities appealed to. Although I lack the space to say much about the underlying ontology adopted here, I assume that any adequate semantic treatment of *draw* has to come to terms with *drawings*, *depicting* (e.g. a drawing may depict an individual),[13] *images* (physical or mental), *descriptions* (which are propositional in character), and *fitting* (e.g. a drawing may fit a description), in addition to the more familiar assortment of ordinary individuals, events, and times.

The first meaning of *draw*, designated by $draw_1$, is the same as the meaning of *rajzol*:

(24) $\text{draw}_1(\text{rajzol}) \Rightarrow$
$\lambda P \lambda x \lambda e.\mathbf{make}(e) \wedge \mathbf{agent}(e)(x) \wedge$
$\exists y(\mathbf{incremental\text{-}theme}(e)(y) \wedge \mathbf{drawing}(y) \wedge P(y))$

In prose, $draw_1$ denotes a three-place relation between properties P of drawings, ordinary individuals x, and events e such that e is a making event, x is the

[13] See Peacocke (1987) for a philosophical account of depiction.

agent of *e*, and there is a *y* such that *y* is the incremental theme[14] of *e*, *y* is a drawing, and *y* has the property *P*. Crucially, the internal argument of $draw_1$ is a property of drawings and not an ordinary individual (like a real house or a house drawing). It is this feature of the meaning of $draw_1$ that captures its role in asserting that a drawing is made but of no individual in particular, as illustrated in (1a) and (11). The derivation of (1a) (ignoring tense) is as follows:

(25) a. $\text{a house}_{dr} \Rightarrow \lambda y.\mathbf{house}(y) \wedge \mathbf{drawing}(y)$
b. $\text{Rebecca} \Rightarrow \mathbf{rebecca}$
c. $\emptyset_{\exists e} \Rightarrow \lambda E.\exists e(E(e))$
d. $\emptyset_{\exists e}\ \text{Rebecca drew}_1\ \text{a house}_{dr}\ (= \text{(1a)}) \Rightarrow$
$\exists e(\mathbf{make}(e) \wedge \mathbf{agent}(e)(\mathbf{rebecca}) \wedge$
$\exists y\,(\mathbf{incremental\text{-}theme}(e)(y) \wedge \mathbf{drawing}(y) \wedge \mathbf{house}(y)))$

The formula in (25d) is obtained by functional application of the relation representing $draw_1$ in (24) first to the predicate representing $a\ house_{dr}$ in (25a) and then to the individual constant ***rebecca*** representing Rebecca in (25b), followed by functional application of the default existential quantifier over events in (25c) to the ensuing event predicate. It says that there was an event in which Rebecca made a house drawing.

Note that $draw_1$ as analysed in (24) is not really a verb of depiction after all, precisely because no notion of depiction is appealed to in its meaning. Rather, it is a pure verb of creation, where the individuals created are drawings and where its internal property argument serves to characterize these drawings.

Why does *rajzol* not tolerate a specific reading of an indefinite object noun phrase (cf. (12)) or a definite object noun phrase (cf. (13))? The short answer is that insofar as such noun phrases are analysed as terms referring to ordinary individuals, they are simply not of the correct logical (or sortal) type for the internal argument of *rajzol*, which is a property of drawings. However, a complication would arise if such noun phrases were represented as properties of (unique) drawings. Take, for example, *az Országházat* in (13), and suppose that it is analysed as the property of drawings that are identical to the Hungarian Parliament Building drawing: $\lambda d.d = \iota d'(\mathbf{h\text{-}p\text{-}b}(d'))$. Assuming this analysis of *az Országházat*, the conflict in logical (and sortal) type would be resolved. At this point, the place to look for a conflict would be between the idea that the meaning of *rajzol* introduces a novel drawing into the discourse context and the idea that a definite description of drawings refers to a familiar (unique) drawing already present in the discourse context. Since the meaning

[14] See Dowty (1991) for the notion of incremental theme.

of *rajzol* introduces a novel drawing into the discourse, a conflict arises if its object noun phrase refers to a familiar (unique) drawing in the discourse. To express this conflict formally, a dynamic semantics would be required, but for present purposes it suffices to point out the source of the conflict.[15]

Consistent with *rajzol*'s not allowing for a specific reading of an indefinite object noun phrase or a definite object noun phrase, observe that it is also incompatible with 'strong quantifiers' such as *minden házat* 'every house', lit. 'every house.ACC':

(26) #Rebeka minden házat rajzolt.
Rebecca every house.ACC drew.PAST.INDEF

Again, a simple explanation for the unacceptability of (26) turns on a type conflict between the type of *minden házat* (a generalized quantifier) and the type of internal argument (a property of drawings) that $draw_1$ requires.

The second construal of *draw*, $draw_2$, which is that of *lerajzol*, receives the following analysis:

(27) $\text{draw}_2(\text{lerajzol}) \Rightarrow$
$\lambda a \lambda x \lambda e.\mathbf{make}(e) \wedge \mathbf{agent}(e)(x) \wedge$
$(\mathbf{ordinary\text{-}individual}(a) \vee \mathbf{physical\text{-}image}(a) \vee \mathbf{mental\text{-}image}(a)) \wedge$
$\exists y(\mathbf{incremental\text{-}theme}(e)(y) \wedge \mathbf{drawing}(y) \wedge \mathbf{depict}(a)(y)) \wedge$
$\exists t\,(\mathbf{see}(a)(x)(t) \wedge \neg\tau(e) \prec t)$

In prose, $draw_2$ denotes a three-place relation between entities a, ordinary individuals x, and events e such that e is a making event, x is the agent of e, a is an ordinary individual, a physical image, or a mental image, there is a y such that y is the incremental theme of e, y depicts a, and there is a time t such that x sees a at t and t does not follow the time of e ($= \tau(e)$). In saying that a is an ordinary individual, a physical image, or a mental image, I am distinguishing between (e.g.) real houses, physical images or pictures of houses, and mental images or pictures of houses. For this to work, the notion of seeing invoked (denoted by see) should cover both visual perception and the perception of mental images or pictures.[16] The need for the perception of mental images or pictures is motivated by the text in (17b), which would be perfectly coherent even if Rebecca were congenitally blind and had never visually perceived a real house before—in this case, a could only be a mental image of a house. The

[15] See Heim (1982) for an account of indefinites and definites in terms of novelty and familiarity that would be relevant here. In Piñón (2006), I attempt to spell out certain details for definiteness effect verbs in Hungarian in this spirit. See also fn. 9.

[16] However, it is not intended to cover understanding or the grasping of something mentally—I am concerned with seeing in the sense of seeing something by sight or as if by sight.

time t of x's seeing of a (visually or mental-visually) should not be later than the time of e, because x makes a drawing of a based on the experience of seeing a (visually or mental-visually). In short, the meaning of $draw_2$ denotes an agent's making of a drawing depiction of an ordinary individual (e.g. a real house), a physical image or picture (e.g. a real picture of a house), or a mental image or picture (e.g. an imagined house) that the agent has (visually or mental-visually) seen.

In contrast to $draw_1$, $draw_2$ is a true verb of depiction, as witnessed by the relation **depict** as a component of its meaning. The idea here is that the drawing created depicts a particular ordinary individual, physical image, or mental image.

The analysis of (16) is as follows (again, ignoring tense), assuming that a real house (i.e. an ordinary individual) is at issue:

(28) a. egy házat$_{oind} \Rightarrow$
$\lambda R \lambda e . \exists a (R(e)(a) \wedge \textbf{house}(a) \wedge \textbf{ordinary-individual}(a))$

b. $\emptyset_{\exists e}$ Rebeka lerajzolt egy házat$_{oind}$ (= (16)) $\Rightarrow$
$\exists e \exists a (\textbf{make}(e) \wedge \textbf{agent}(e)(\textbf{rebecca}) \wedge \textbf{house}(a) \wedge$
$\textbf{ordinary-individual}(a) \wedge$
$\exists y (\textbf{incremental-theme}(e)(y) \wedge \textbf{drawing}(y) \wedge \textbf{depict}(a)(y)) \wedge$
$\exists t (\textbf{see}(a)(\textbf{rebecca})(t) \wedge \neg \tau(e) \prec t))$

The formula in (28b) asserts that there was an event in which Rebecca made a drawing that depicts a real house that she had seen.

Finally, the third meaning of *draw*, designated by $draw_3$, reflects the content of *megrajzol* (cf. (18)):

(29) draw_3(megrajzol) $\Rightarrow$
$\lambda a \lambda x \lambda e . \textbf{make}(e) \wedge \textbf{agent}(e)(x) \wedge \textbf{description}(a) \wedge$
$\exists y (\textbf{incremental-theme}(e)(y) \wedge \textbf{drawing}(y) \wedge \textbf{fit}(a)(y)) \wedge$
$\exists t (\textbf{be-acquainted-with}(a)(x)(t) \wedge \neg \tau(e) \prec t))$

In prose, $draw_3$ denotes a three-place relation between entities a, ordinary individuals x, and events e such that e is a making event, x is the agent of e, a is a description, there is a y such that y is the incremental theme of e, y fits a, and there is a time t such that x is acquainted with a at t and t does not follow the time of e. This meaning makes reference to descriptions (which I take to be propositional in character, in contrast to images or pictures) and to a drawing's fitting a description. For example, a house description is a (typically partial) description of a house, indicating e.g. the kind of roof, how many stories, how many windows, etc. Given such a description, it is possible to make a house drawing that fits the house description. (It is also possible to go

in the other direction, to produce a house description on the basis of a house drawing so that the latter fits it.) In contrast to the meaning of $draw_2$, which is about making a drawing of a particular individual or image, that of $draw_3$ is about making a drawing that conforms to a particular description—the drawing should fit the description. The description a is also one that the agent x should be acquainted with no later than the drawing event, which helps to exclude as irrelevant those descriptions that would merely 'accidentally' fit the drawing made by a.

Strictly speaking, $draw_3$ is not a verb of depiction, because its meaning does not include the relation **depict** as a component. Essentially, the meaning of $draw_3$ is about creating drawings that fit (perhaps partial) descriptions of individuals.

The second sentence of (18) receives the analysis in (30b) (ignoring *aztán* and tense). This analysis presupposes that the definite object noun phrase *a házat* can be treated as a definite description of house descriptions, as shown in (30a).[17]

(30) a. a házat$_{desc} \Rightarrow \iota a$(**house**$(a) \wedge$ **description**(a))

b. $\emptyset_{\exists e}$ Rebeka megrajzolta a házat$_{desc} \Rightarrow$
$\exists e$(**make**$(e) \wedge$ **agent**(e)(**rebecca**) $\wedge$
ιa(**house**$(a) \wedge$ **description**(a)) $\wedge$
$\exists y$(**incremental-theme**$(e)(y) \wedge$ **drawing**$(y) \wedge$
fit(ιa(**house**$(a) \wedge$ **description**(a)))(y)) $\wedge$
$\exists t$(**be-acquainted-with**(
ιa(**house**$(a) \wedge$ **description**(a)))(**rebecca**)$(t) \wedge$
$\neg\, \tau(e) \prec t$)

The formula in (30b) states that there was an event in which Rebecca made a drawing that fits a house description that she was acquainted with.

13.3 A comparison with Forbes (2003)

Forbes's approach to verbs of depiction is quite different from mine and one which I cannot do full justice to here. In this section, my aim is rather to zoom in on a significant point of difference and to suggest that my approach is more successful than his with regard to this point, but this will still leave a number of issues undiscussed.

[17] For the derivation of (30b) (cf. (29)), observe that **description**(ιa (**house**(a) $\wedge$ **description**(a))) reduces to ιa(***house****(a)* $\wedge$ ***description***(a)).

As a general remark, Forbes is largely concerned with how what he calls the *notional* reading of verbs of depiction should be analysed and appears much less concerned with how what he calls their *relational* reading (or readings) should be treated. In present terms and with reference to *draw*, the notional reading corresponds to the case in which a kind of drawing is made but of no individual in particular, as e.g. is the case with $draw_1$/*rajzol* (see (24)). In contrast, the relational reading corresponds to the case in which a drawing is made of a particular individual, as e.g. is the case with $draw_2$/*lerajzol* (see (27)). Forbes also does not seem to be especially concerned with the representation of verb meanings per se, e.g. the question of how many analyses are required for *draw* or *sketch*.[18] Consequently, his concerns and mine only partially overlap.

To set the stage, consider the following text:

(31) Rebecca drew a house. The house measured 10 cm high by 5 cm wide and was shaded pastel yellow with a coloured pencil.

In (31), the notional reading of *draw* is relevant, i.e. the reading on which Rebecca drew a house but no house in particular. According to the analysis proposed in (24)–(25), the meaning of $draw_1$ asserts that a drawing is made and the meaning of *a* $house_{dr}$ is treated as a property of drawings, namely, the property of those drawings that are house drawings. If correct, there is no special difficulty in taking *the house* in the second sentence to pick out the house drawing made by Rebecca.

Forbes's analysis of (1a) would be as follows:[19]

(32) Rebecca drew a house $\Rightarrow_{\text{Forbes}}$
$\exists e(\mathbf{making}(e) \wedge \mathbf{agent}(e)(\mathbf{rebecca}) \wedge$
$\exists x(\mathbf{drawing}(x) \wedge \mathbf{char}(\lambda P.\exists y(\mathbf{house}(y) \wedge P(y)))(x) \wedge$
$\mathbf{theme}(e)(x)) \wedge \mathbf{culminated}(e))$

[18] As far as I can determine from the two analyses in his (16) (for *Guercino is sketching a dog* and *Guercino sketched a dog*, respectively), Forbes would require a different analysis of *sketch* in the progressive (*is sketching a dog*) than in a simple tense (*sketched a dog*), even when keeping the notional reading of *sketch* constant. This is because, for him, there is no theme argument in the former, whereas there is one in the latter. But what should the presence or absence of a theme argument depend on, if not on the meaning of the verb? This seems to me to be a weakness of his account because there seems to be only one notional reading of *sketch*, and not two.

[19] Forbes's actual example is *Guercino sketched a dog* (see his (16c)–(16d)), but I trust that *Rebecca drew a house* is amenable to the same kind of analysis. I have also modified his notation to bring it more in line with the notation used here.

In prose, the formula in (32) states that there is an event of making by Rebecca that culminated and there is a drawing which is the theme of the event such that this drawing is characterized by the property of being a property of a house. Clearly, the novel clause here is:

(33) **char**($\lambda P.\exists y($**house**$(y) \wedge P(y)))(x)$
'x is characterized by the property of being a property of a house'

If x is a drawing, as it is in (32), what does it mean for x to be characterized by the property of being a property of a house? According to Forbes, this means that x is a drawing of a house, but of no particular house.

The first argument of **char** in (32), $\lambda P.\exists y($**house**$(y) \wedge P(y))$, is the generalized quantifier contributed by the meaning of *a house*: it is the property of being a property of being a house. Significantly, the houses existentially quantified over are real houses. This is an important difference from my analysis in (25d), where there is existential quantification over house drawings but not over real houses. Forbes's use of existential quantification over real houses in the analysis of (1a) leads to two technical difficulties, though neither is insurmountable.

The first is that if there were no real houses, there would be no house drawings, precisely because the property of being a property of being a house would be empty, therefore (1a) would plausibly be false. But this is intuitively incorrect: even if there were no real houses, one could still draw a house, but no house in particular, therefore (1a) could still be true.[20]

The second difficulty is that if there were exactly one real house, then the notional reading of (1a) would be hard to distinguish from its relational reading, because the drawing in this case would indeed be a drawing of a particular house. However, intuitively, this is incorrect: even if there were exactly one real house, one could still draw a house, but no house in particular, hence (1a) could still preserve its notional reading.

The way out for Forbes would be to take the first argument of **char** to be the *intension* of a generalized quantifier, i.e. a function from indices (worlds) to generalized quantifiers. Although this would probably work, my point is that the analysis in (25d) does not need to be 'intensionalized' to handle such scenarios, given that no existential quantification over real houses is introduced to begin with.

However, even setting these two technical difficulties aside, I do not find it so conceptually clear what it means for a drawing to be characterized by the

[20] Substitute *draw a mermaid* to make this objection more realistic.

property of being a property of a house. Real houses may have many properties. For example, there are houses with slanted roofs and those with flat roofs. Thus, the property of being a property of a house includes the property of having a slanted roof and also the property of having a flat roof, even though (let us assume that) no single house has both of these properties simultaneously. Now, if a drawing is characterized by the property of being a property of a house, does it depict a house with a slanted roof and a flat roof? Presumably not, given that these (by assumption) are mutually exclusive properties, but then it remains unclear to me what it means for a drawing to be characterized by the property of being a property of a house. The way out for Forbes here would be to try to characterize in more detail the intended meaning of **char** in (33).

Finally, to return to the text in (31), what does *the house* pick out in Forbes's account? Recall that, according to the analysis proposed in (25c), it picks out the house drawing introduced by the meaning of the first sentence. But for Forbes, *the house* has to pick out a real house, not a house drawing. To handle a comparable example, he suggests (p. 27) that when a physical depiction (e.g. a drawing) is brought into existence, 'something we can call *the world of the picture* is created by the artist'. Applied to (31), the idea is that in the world of the drawing made by Rebecca, there is a house, and it is that house that is picked out by *the house*. While I do not take issue with 'the world of the picture' per se, I feel less confident about finding a real house in there, especially a real house that measures 10 cm high by 5 cm wide and is shaded pastel yellow with a coloured pencil. Admittedly, this objection depends on how pictures are thought of, namely, on whether 'the world of the picture' contains real individuals or not.

Differences in details of implementation aside, a major difference between Forbes's analysis and mine is that Forbes wants to have *house* (and *dog*, etc.) denote real houses (and real dogs, etc.), whereas I allow for these nouns to be sortally ambiguous, denoting real objects or drawings. Although I do not take this issue to be fully settled, I have argued that making the notional reading of *draw* depend on the property of being a property of real objects is less successful than allowing for nouns to be sortally ambiguous.

13.4 Conclusion

I have argued that *draw* has three meanings, all involving drawing events. The three meanings are morphologically distinguished in Hungarian, which makes them easier to identify. The first meaning, denoted by $draw_1$, involves the creation of a kind of drawing, ex nihilo as it were, because it is a drawing

of no object in particular. The second meaning, designated by $draw_2$, is about the creation of a drawing that depicts a particular ordinary individual, physical image, or mental image that the agent has (visually or mental-visually) seen. Finally, the third meaning, signaled by $draw_3$, involves the creation of a drawing that fits a particular description that the agent is acquainted with. I have also argued that the present account is more successful than Forbes's (2003) analysis of verbs of depiction in certain respects, but the price of this comparative success (assuming that it is real) is that a richer, more complex ontology is presupposed than by Forbes's approach.

14

Morphological Aspect and the Function and Distribution of Cognate Objects Across Languages

GEOFFREY HORROCKS AND MELITA STAVROU

Much published work on cognate objects (COs) is devoted to arguments intended to show whether these are adjuncts with a manner–adverb type of function (e.g. *she smiled a winning smile throughout the interview = she smiled winningly throughout the interview*), as supported by the preferred presence of an adjective or other modifier (e.g. Jones 1988; Moltmann 1990; Zubizaretta 1987), or genuine syntactic objects (i.e. internal arguments) that receive case and/or a theta-role from the co-occurring verb (e.g. Hale and Keyser 1993; Massam 1990; Macfarland 1995). By contrast, our main purpose here is to investigate why 'aspectual' COs of the type *smiled a winning smile (and left)*, *coughed a sinister cough (and pulled the trigger)* are present in some languages but not all. To this end we explore the differences between COs in English and Greek, and relate our findings to earlier work on the presence or absence in languages of telicity-shifting constructions, specifically resultative adjectives with activity verbs and goal PPs with verbs of manner of movement (Horrocks and Stavrou 2003, 2007). We show that English-style CO constructions (COCs), properly understood, pattern with these other constructions cross-linguistically, and that the availability of such shifts correlates with whether or not a language has grammaticalized viewpoint aspect in the form of sets of contrasting verb stems. We then offer an explanation for why this should be so.

We are extremely grateful to Anita Mittwoch for her insightful critique of an earlier draft of this chapter, which has led to many significant improvements. Any deficiencies that remain are, of course, the authors' responsibility alone.

Section 14.1 examines the Greek data (ancient and modern), comparing these briefly with similar phenomena in Hebrew. We then contrast the use of COs in English and summarize the differences. In section 14.2 the ramifications of our findings are explored. In section 14.3 we offer a solution to the problem of why languages with morphologized viewpoint aspect reject telicizing constructions, and in section 14.4 we conclude our discussion and set the ground for further study.

14.1 Cognate objects across languages

14.1.1 *Greek and Hebrew*

In Greek there are at least two subclasses of COCs, and possibly a third. The examples in (1) involve transitive verbs which, among the direct objects (marked accusative) they may occur with, also take ones that happen to be morphologically cognate (AG = Ancient Greek, MG = Modern Greek):

(1) AG

a. phóron phérein. cf. hóplon phérein: phóros/hóplon phéretai.
tribute to-bear weapon to-bear: tribute/weapon is-borne

b. pompè:n pémpein. cf. epistolè:n pémpein: pompè:/epistolè: pémpetai.
procession to-send letter to-send: procession/letter is-sent

MG

c. ′Efaje to fa′i. cf. ′Efaje to ′milo: to ′milo fa′ghothike.
s/he-ate the food s/he-ate the apple: the apple was-eaten

d. ′Eghrapse to ′ghrama. cf. ′Eghrapse to ′arthro: to ′ghrama/′arthro ′ghraftike.
s/he-wrote the letter s/he-wrote the article: the letter/article was-written

We regard such data as essentially uninteresting, in that no special properties attach to the cognate cases distinct from the non-cognate ones. In particular, passivization is freely available and the object can be any type of DP (definite/indefinite, singular/plural, modified by strong or weak determiners). In other words, these COs, just like other possible objects for these verbs, typically have concrete meanings, with their referents affected in some way by the action. In particular, action/event nouns are excluded, cf.

Mittwoch 1998: 312: '. . . some morphologically cognate objects do not denote events (. . .) *build a building, sing a song* . . . '

In (2), by contrast, we have examples of mainly intransitive verbs[1] with marginal transitive uses, as evidenced once again by the possibility of passivization:[2]

(2) AG

a. toùs . . . **tàs eukhàs** hupèr humôn pròs toùs theoùs **eukhoménous**
those . . . the prayers for us to the gods praying-PPLE
'those praying the prayers to the gods on our behalf'
(Aeschines *In Ctesiphontem* 3.1)

b. kaì nunì **meízdona kíndunon** he: boulè: **kinduneúei** <Active>
and now greater danger the Council risks
'and now the Council is taking a greater risk'
(Dinarchus *In Aristogitonem* 1.7)
skopeîn . . . mè:-ouk en tô:i Karì **ho kíndunos kinduneúe:tai** <Passive>
look out-INF . . . not in the Carian the risk is-taken-SUBJUNCTIVE
'to take care that the risk is not taken in the person of the Carian slave'
(Plato *Laches* 187b1)

c. **tò â:isma** hò . . . **á:idousin** <Active>
the song which they-sing
'the song they are singing' (Lucian *De Salutatione* 11.1)
â:isma kalô:s **â:isthen** <Passive>
song well sung-PPLE
'a song well sung' (Xenophon *Cyropaedia* 2.3.55)

[1] There are a number of transitive verbs that take a personal direct object but also have absolute/intransitive uses that allow for a TCO Transitivizing Object Construction (see discussion below) and sometimes the two objects are combined. A sentence in which one or other object occurs alone may be passivized normally, but if both objects occur together only the personal object may be made subject in a passive sentence, with the TCO left unchanged. Thus *kri:no:* 'judge X/give a judgement' takes either a personal object or a TCO like *krísin/díke:n* 'judgement', and we therefore get passives like *hétoimoi ê: san…krínesthai* 'ready they-were…to-be-judged' (Thucydides 4.122,4–5) and *he: krísis…krínetai* 'the judgement…is judged' (Clement of Alexandria *Stromata* 1.1.4.1.5). But when both objects appear, we find only passives like *hè: krísis hè:n ekríthe:* 'the judgement which (acc) he was judged' (Lysias 13.50). Similar are *hubrízo:* 'insult X/commit an outrage, *therapeúo:* 'treat X/perform a service', *gráphomai* 'indict X/make a charge'. In this respect they behave exactly like double object verbs such as *didásko:* 'teach (someone something)'.

[2] In cases where the verb has active morphology. Verbs which are lexically 'middle' in form cannot readily be passivized, since middle and passive verb morphology are largely identical (the relevant forms are in fact traditionally described as 'medio-passive'). Only if the active and middle forms represent two different verbs with different meanings can the middle verb also have a passive meaning: e.g. active *hairô:* 'I take', middle *hairoûmai* 'I choose', passive *hairoûmai* 'I am taken/I am chosen'.

humnoùs . . . toùs **aeidoménous** en Dé:lo:i <Not strict CO>
'hymns . . . those singing-PPLE in Delos'
'those singing hymns on Delos' (Herodotus 4.35)

MG

d. **Tra′ghudhise** to ′neo **tra′ghudhi**/ti ′nea melo′dhia. <Active>
s/he-sang the new song/ the new tune
To ′neo **tra′ghoudhi**/i ′nea melo′dhia **traghu′dhithike**. <Passive>
the new song/ the new tune was-sung

e. **′Xorepse** ′ena pro′totipo **xo′ro/vals**. <Active>
s/he-danced an original dance/waltz
Xo′reftike ′enas pro′totipos **xo′ros /vals** **xo′reftike** o′rea. <Passive>
was-danced an original dance/ waltz was-danced beautifully

In line with their marked status, transitive uses are less common than intransitive, and passive examples are rare. Such constructions have been called transitivizing object constructions (e.g. Massam 1990; Pereltsvaig 2002), but for explicitness we call them transitivizing cognate object constructions (TCOCs), since here cognateness of the object is characteristic, unlike in (1), though hyponyms, synonyms and plesionyms are possible, at least in some cases (e.g. (2)c, d, e). If the relevant noun is singular, indefinite and adjectivally modified, a TCOC may be virtually synonymous with examples in which the verb is modified adverbially, serving as a stylistically marked variant, e.g. *eúkhomai semnè:n eukhé:n* 'I pray (a) solemn prayer' = *eúkhomai semnô:s* 'I pray solemnly', etc.

These COs, though closely related to verbs formally and semantically, are not headed by activity or event nouns[3] any more than those in (1). Greek action nouns typically end in *-sis* (AG)/*-si* (MG), e.g. AG *poíe:sis* 'making/creation (of)' < *poiô:* 'make/do'. Members of this class do not appear as COs, though product/result nouns in *-ma*, often with additional specializations of meaning, are permitted. AG *ptô:ma* 'a fall, misfortune, corpse', for example, but not *ptô:sis* '(a) falling', may be combined with *pípto:* 'fall', e.g. *peseîn . . . ptó:mat' ouk anaskhetá* (Aeschylus, *Prometheus Bound* 919), 'to-fall . . . falls not-tolerable' = 'to suffer intolerable misfortunes'. All the DPs in (2) similarly refer to countable 'things', as the unmodified definites and plurals

[3] We use 'activity/event' and 'result' here purely descriptively and commonsensically, i.e. without any specific commitment as to the technical content of these terms. We do not, for example, enter into the dispute whether the CO is of the 'eventive' or 'result' type in Grimshaw's (1990) tripartition of deverbals (see also Mittwoch 1998).

confirm (see 14.1.2 for discussion of these criteria in connection with English data).

This rather large AG class has been greatly reduced in MG, and the survivors, like 'sing' and 'dance', all allow a wide range of different objects, perhaps indicating that this greater assimilation to 'normal' transitivity was the key to their retention. Note too that any subclass of verb may in principle take a TCO: unergative, e.g. *mákhe:n mákhomai* (Xenophon *Agesilaus* 55), 'fight (a) fight'; unaccusative, e.g. *ptô:ma pípto:* (Euripides *Electra* 686), 'fall (a) fall'; or, in specific cases (cf. note 1), transitive, e.g. *krí:no X krísin* (Lysias 13.50), 'judge X (person) (a)-judgement'), with a double-object construction rather like that in 'teach X (person) Y (thing)'.

Before analysing TCOCs further it will be useful first to consider Mittwoch's suggestion (p.c.) that the data in (2) might in fact be considered as involving the lexicalization of light verb constructions (LVCs, i.e. VPs comprising a verb with low-to-zero descriptive content plus a direct object, see Grimshaw and Mester 1988; Kearns 1988; Mulder 1992; Macfarland 1995; Mittwoch 1998).[4] Mittwoch summarizes the properties of LVCs in Hebrew as follows:[5]

> A verb occurs with an event nominalization as object; the understood agent (or, sometimes, patient) role of the nominalization is identical with that of the verb; verb and object appear to be one lexical unit at lexical cognitive structure, with the verb acting as a kind of skeleton and most of the lexical information being carried by the nominalization. (1998: 311)

For example, a VP translated as 'fail a complete failure' may be taken to mean '*experience/ have* a complete failure in/through failing' = 'fail completely', etc. This adverb-like use of singular, indefinite (event-noun) COs with adjectival modification is routine in Semitic languages, where conventional adverbs are poorly represented (see Mittwoch 1998 for further discussion).[6]

[4] The connection between the relevant CO and LV constructions can be traced back to Jespersen 1942:117. Fillmore 1968:85 makes the same point. Massam 1990 and Jones 1988 question the parallelism, however.

[5] Kearns 1988 distinguishes two types of light verb construction: those with vague action verbs (*make an inspection*) and those with true light verbs (*give a groan*). The complement of a VAV is a regular object, that of a TLV an event nominal. Mittwoch argues that 'proper' COCs pattern with the TLV construction, the 'objects' in both exhibiting striking similarities (1998: 311–12 and *passim*): in particular, the verb and its object share the same agent. Macfarland, however, argues that COCs pattern like VAV constructions, citing examples like those in (2) (e.g. with *dream*, *dance*, etc.). Here we refer generically to both VAV and TLV constructions as LVCs, and argue that LVCs underlie both types of COC, calling Mittwoch's type 'activity/event-noun COCs' (see below) and Macfarland's type 'TCOCs' (as above).

[6] Consider also the following examples from Standard Arabic (from Badawi, Carter, and Gully 2004: 145–9):

We therefore extend the light-verb approach to the analysis of referential TCOCs in Greek, in that these also regularly co-occur with 'light' verbs (specifically VAVs, cf. note 5): 'pray a prayer (to X)', for example, could be taken to mean '*offer* a prayer (to X) through praying' (the AG verb is *anékho:* 'hold up/offer').[7] This analysis is very close to the traditional treatment of COs in AG as externally realized 'internal objects', i.e. as patient-like elements inherent to the performance of particular activities: so 'praying' entails 'uttering a prayer', 'sinning' involves 'committing a sin', etc. (see Weir Smyth 1920: sections 1563–77). We do, however, distinguish such 'referential' LVCs from the 'non-referential' type underlying Hebrew COCs, and in 14.1.2 and 14.1.3 consider further the basis for this distinction with respect to English data, arguing with Mittwoch that the latter type (viz. those involving Kearns' TLVs, again see note 5), are complex predicates in which the grammatical and lexical information normally combined in a single verb form is distributed, with grammatical features (tense etc.) carried by the verb and lexical content by the nominal head of its object. By contrast, the LVCs potentially underlying Greek TCOCs contain DPs referring to countable reifications of actions and events, like prayers, songs, battles, dangers, misfortunes etc., as noted.

Note now that the transitivization in (2) does not affect the lexical aspectual character (Aktionsart) of the verbs involved. In previous work (Horrocks and Stavrou 2003, 2007) we introduced a distinction between verbs that are lexically terminative in aspectual character and those that are non-terminative. Thus *melt*, for example, is terminative in that the process it denotes has a built-in end-point (i.e. the moment when an affected object can melt no more), while *wash* is not, in that the activity may continue indefinitely (i.e. an

i. ka:na l-damu yanSabbu min Dira:'ihi nSiba:ban
was the-blood pouring from his-arm a-pouring
'the blood was pouring from his arm'

ii. dhahaba dhaha:ba:n sari:'a:n
he-went a-going quick
'he went quickly'

iii. ibtasamat lahu btisa:matan kabi:ratan
she-smiled to-him a-smiling big
'she gave him a big smile'

iv. wa-qahqaha DaHkan biSawtin 'a:lin
and-he-chuckled a-laugh loud
'and he chuckled loudly'

v. yata?TTaru ta?TTuran wa:DiHan
is-affected (stem V) an-affecting (stem II) clear
'is clearly affected'

vi. wa-qabbalaha: qublata l-wida:
and-he-kissed-her (stem II) a-kiss (stem I) goodbye
'and he kissed her a goodbye kiss'

[7] When *eukhé:* means 'vow/promise', it may also appear with verbs meaning 'make, fulfil, repay'.

affected object can in principle be washed for ever).[8] While terminative verbs appear only in telic predicates,[9] non-terminative verbs may appear in either class of VP: thus *washed the car in ten minutes* is telic and *washed the car all day* is atelic. It is the option of viewing *the car* not just as a thing to be acted on but as a physically finite entity that can be progressively washed until there is nothing left to wash that allows for the telic reading. But the telicity here derives from this reading of the properties of the affected object and has no impact on the status of *wash* as a non-terminative verb. The same applies to TCOCs. Thus both *dance* and *eúkhomai* 'I pray' are non-terminative, though *dance the last dance/a waltz* and *eúkhomai semnè:n eukhé:n* 'I-pray (a) solemn prayer' are potentially telic VPs. The importance of this point will become apparent below.

Before leaving the AG data, we should also note examples like those in (3), where an adjective or noun is modified by a DP containing a cognate accusative nominal:

(3) a. **kakòs** pâsan **kakía:n**
evil (ADJ) every evil (N)
'evil in every possible respect' (Plato, *Republic* 490b)

b. **doûlos** tà:s megísta:s **douleía:s**
slave the greatest slaveries
'a man enslaved to the greatest possible degree' (Plato, *Republic* 579d)

The accusatives here are clearly adverbial, i.e. function as adjuncts. Specifically, they may be taken as special cases of a construction widely employed in AG in which accusatives of 'extent' or 'respect' specify a domain of relevance for the head of the phrase containing them (also Mittwoch 1998: 316 for Hebrew). When the accusative is morphologically cognate, pragmatic considerations dictate that it will normally be modified by an adjective. There is no corresponding usage in MG, but this is probably to be explained on the basis of a historical accident whereby the very large set of adverbial uses of bare case forms in AG was radically reduced. The elimination of these particular adverbial accusatives may then be seen as part of a larger pattern of change in case usage.

[8] Though in much of the literature on 'aspect' it is standard to refer to this type of Aktionsart as telicity, we reserve the terms telic/atelic (as in Horrocks and Stavrou 2003, 2007) to refer to situation types denoted by whole VPs (predicates)—viz. by the verb plus any complements/adjuncts (cf. Verkuyl 1972, 1993).

[9] We take telicity to be the property of having a *telos*, not that of attaining it. Thus the grammaticality of *John was melting the chocolate when…* does not indicate that 'melting chocolate' is sometimes atelic, but only that the inherent *telos* was not attained on this occasion because the action progressing towards it was broken off prematurely.

Data such as those in (3) raise the possibility that at least some COs might be similarly analysed. Take (4)a–c (which lack MG analogues, cf. (4)d):

(4) AG

a. tû só:matos **noûson** megále:n **noséontos**
the body illness big being-ill-ACT PLE
'with his body suffering a great illness' (Herodotus 3.33)
noseî . . . ánthropos **ophthalmoús** <non-CO>
is-ill . . . (a) man eyes
'a man has an eye infection' (Plato *Gorgias* 496a)

b. epeì **e:utúkhe:san** toûto tò **eutúkhe:ma**
when they-were-lucky this the good-luck
'when they had experienced this good fortune'
(Xenophon *Anabasis* 6.3.6)
állous **polémous eutukhéontes** <non-CO>
other wars being-lucky-ACT PPLE
'enjoying success in other wars' (Herodotus 1.65)

c. pá:sa:s **he:donà:s hé:desthai**
all pleasures to-take-pleasure-INF
'to take delight in every pleasure' (Plato *Philebus* 63a)
tò d′ **épos** houxerô: tákha **hé:doio** <non-CO>
the but word that-I-shall-say perhaps you-would-take-pleasure-OPTATIVE
'but perhaps you would take pleasure in what I will say'
(Sophocles *Oedipus Tyrannus* 936)

MG

d. ***Ef′tixise** ′ena me′galo **ef′tixima**
s/he-was-lucky a big piece-of-luck

e. ***A′rostise** ta **′matja** tu (cf. (4a))
he-got-ill the eyes of-him

These could be understood to mean not '*experience/suffer* a great illness in being-ill', '*have/enjoy* this good-luck in being-lucky' etc., but rather 'be ill in respect of a great illness', 'be-lucky in respect of great good-luck' and so on.[10] In other words, the 'COs' in such examples may not be objects but adjuncts as in (3). In support, note that unrelated nominals, denoting other domains in which illness is suffered or good fortune/pleasure experienced, also appear with these verbs in just this function, as in the second example in each case.

[10] The absence of MG equivalents follows either way, because MG has reduced both the set of verbs taking TCOs and the set of adverbial case uses.

Clearly no light-verb analysis is possible for these (i.e. * '? the eyes through being ill', *'*wage* a war through being-fortunate', *'*utter* a word through enjoying-oneself' are not plausible bases for a TCOC), and it is therefore debatable how far one should insist on one for the cognate cases. One argument for retaining the TCO analysis is that, even though examples with overtly cognate subjects are lacking, passives are attested for at least some of these verbs and adverbials cannot be involved in passivization by definition: e.g. *hikanà toîs polemíois e:utúkhe:tai* (Thucydides 7.77), 'enough (?pieces of luck) the-DAT enemy-DAT have-been-lucked' = 'enough good fortune has been enjoyed by the enemy'. For the present, however, we leave open the possibility that some potential TCOs may in fact be adverbial adjuncts.

Turning finally to Hebrew, the data in (5) are taken from Mittwoch 1998: 314:

(5) a. Hu xiyex xiyux muzar.
he smiled smile strange

b. Le-hagiv teguva holemet.
to react reaction appropriate

c. Hu met mavet klini.
he died death clinical

d. Hu nafal nefila kaša.
he fell falling hard

e. Hu nixšal kišalon gamur.
he failed failure complete.

f. Hezinu oto hazana melaxutit.
they-fed him feeding artificial

We endorse Mittwoch's light-verb approach here, noting however that the cognate nominals in these examples are in fact either activity nouns (non-terminative) or event nouns (terminative) in our terminology, depending on the aspectual character of the related verb:[11] 'smile', for example, is non-terminative, 'die' is terminative. Taking the LVC template here to be '*do/have* a $[_{N}V]$ by/through V-ing', it seems to be the case that the lexicalized light verb and the cognate nominal denote one and the same activity/event, the purpose of the duplication being to facilitate adjectival modification in a language in which adverbs are rare (cf. Mittwoch 1998, section 9). The

[11] We do not believe such nominalizations carry viewpoint aspect in any language (unlike the associated verbs in languages like Greek, where there is a clear morphological opposition of perfective/imperfective), and that any 'aspectual' distinctions here are necessarily lexical.

examples, then, are rather like English COCs of the type *smile a knowing smile* (on its adverbial reading), viz. '*do* a knowing smiling-activity in/through smiling' = 'smile knowingly' (see 14.1.2 and 14.1.3 for discussion of the possible readings of English COCs). What these adverbial readings of activity/event-noun COs share with TCOs, however, is that there is again no shift of aspectual character: '*do/have* an $[_{N}X]$' is synonymous with $[_{V}X]$, with the aspectual character of the verb retained in the derived activity/event-noun.

Note finally that there are again no restrictions on the verb classes that take activity/event-noun COs in Hebrew, as expected, given their essentially adverbial function: thus unaccusatives ('fall'), unergatives ('smile') and transitives ('feed') may all be modified in this way. This is similar, *mutatis mutandis*, to the situation for Greek TCOCs, but contrasts markedly with English, where activity/event COs are associated only with unergatives (see 14.1.2 and 14.1.3). We argue below that this reflects some fundamental differences in the core function of COs between languages.

Summarizing, the productive class of CO constructions in AG is of the transitivizing object kind, though there may also be a productive use of cognate adverbial accusatives with at least some verbs. Greek, however, seems not to have 'adverbial' activity/event-noun COCs of the kind seen in Hebrew (and Arabic), though English does, albeit only with unergatives. Conversely, there are no restrictions in Greek or Hebrew on the verb classes that take a CO, and COs have no impact on lexical aspectual character in either language (though there may be a shift of telicity in the case of Greek TCOCs). We are now ready to compare the situation in English.

14.1.2 *Cognate objects in English*

Leaving aside data analogous to those in (1) (*they drank their drinks*, etc.), we note that English has both TCOCs and activity/event-noun COCs, as exemplified in (6) and (7) (see Jones 1988; Moltmann 1990; and Pereltsvaig 1999, 2002; Massam 1990 and Macfarland 1995 argue against this distinction):

(6) TCOCs:
  a. She dreamed the most wonderful dream.
  b. They danced all sorts of dances at that party.
  c. Mary sang her favourite song on Peter's birthday.

(7) Activity/event-noun COCs:
  a. He smiled an enigmatic smile.
  b. She slept a dreamless sleep.
  c. John coughed a sinister cough.

In (6) we are once again dealing with a set of basically intransitive verbs that also have marginal transitive counterparts (cf. (2)), taking either strict COs or objects with related meanings (hyponyms, plesionyms, etc.). Syntactically, such TCOCs are indistinguishable from examples with regular transitive verbs, cf. (8), where the referentiality of the relevant COs and their 'normal' argument/object status is amply confirmed:

(8) TCOCs:

a. A song was sung by the revellers.	+ Passivization
b. A patriotic song, everyone wanted to sing.	+ Topicalization
c. What did everyone sing?	+ Questioning
d. They sang (all the, some, many…) songs.	+ Plural (and quantification)
e. They sang a (patriotic) song.	Opt. qualification (indef.)
f. They sang the/this/that (famous) song.	Opt. qualification (def.)
g. They sang a song, an anthem, an aria, …	Not nec. strict cognates

Activity/event-noun COCs are quite different across the board, as (9) shows:

(9) Activity/event-noun COCs:

a. A (winning) smile was smiled by the winner.	− Passivization
b. *A (winning) smile, no one smiled.	− Topicalization
c. *What did she smile?	− Questioning
d. ?She smiled (all the, some, many…) smiles.	− Plural (and quantification)
e. ?She smiled a smile (cf. a winning smile).	Qualification preferred (indef.)
f. ?She smiled the smile (cf. the smile she was famous for).[12]	Qualification preferred (def.)

[12] We take it that the preference for qualification arises here because the definite DP is not headed by an activity/event noun, as is the case in indefinites, but rather denotes a 'thing'—i.e. the definite cases are marginal cases of TCOCs (they are clearly referential, for example—cf. *she smiled the smile for which she was famous and it raised everyone's spirits*—even though passivization etc. remain difficult; see, however, Macfarland 1995 for a different claim supported by a collection of written data). As such, they are acceptable without qualification if, for example, 'the smile' in question is the famous one that everyone knows about already, but *the smile* is much less likely, pragmatically, to be an established discourse topic than e.g. *the song*, precisely because the activity/event-noun meaning is the basic one.

g. She smiled a (winning) smile (*a grin, *a laugh, …). Strict cognates only

In particular, the evidence of (9)a–d suggests very strongly that English activity/event-noun COs are not referential arguments, while (9)g shows that the choice of object is fully determined by the verb. We take these points up below.

Both types of CO, however, occur with what are normally, i.e. outside these constructions, intransitive verbs with thematic (agentive/volitional or experiencer) subjects, that is with unergative verbs denoting non-terminative activities:

(10) a. Kate smiled a winning smile/sang a song. intransitive-unergative
b. *Kate fainted a dramatic faint. intransitive-unaccusative
c. *Kate wiped the table a quick wipe. transitive

This restriction has been explained on the basis that COs are objects, despite the failure of activity/event nouns to behave like normal thematic arguments, cf. (9) (Hale and Keyser 1993; Massam 1990; Macfarland 1995): i.e., since verb classes other than unergatives already have argument DPs in post-verbal position, they cannot take further objects, while unergatives, in the absence of subcategorized VP-internal arguments, are free to take a CO. But from the cross-linguistic evidence discussed above, it is not at all clear that unergatives are *in principle* distinct from other verb classes in their capacity to take a CO, whether of the TCO type as in AG or activity/event type as in Hebrew. We therefore suggest in 14.1.3 that the reason for this restriction in English is functional rather than structural.

14.1.3 *Activity/event COs and LVCs*

On the basis of (9), we take it that the syntactically defective behaviour of activity/event COs is due to their non-referential nature: note in particular their resistance to questioning in (9)c and their failure to serve as antecedents, as in *??Sarah grinned a cheesy grin and it* [i.e. *the cheesy grin*] *annoyed everyone.* However, *it* is readily understood to mean '(the fact) that Sarah grinned a cheesy grin', just as it means '(the fact) that Sarah grinned cheesily' in *Sarah grinned cheesily and it annoyed everyone.* This suggests quite strongly that *grin a grin* is actually a kind of complex predicate, denoting no more than a particular type of 'grinning' in which the syntactic object lacks normal argument status.

Pursuing this point, nouns like *grin* may well denote things (*she had a grin on her face that angered everyone*), but also denote non-terminative activities (*she smiled a cheesy grin from dawn till dusk*, where, as noted, the COC is a variant of the more usual adverbial modifier), or terminative processes/events (*she smiled a cheesy grin and left at once*).[13] Following Tenny 1994, Levin and Rappaport Hovav 1995, Macfarland 1995, we take the last of these to be the one involved in the 'core' COCs of English. The parallels between event-noun COCs and 'true' LVCs (cf. note 5) like *Sarah gave (us) a cheesy grin*, whose objects are similarly defective, are striking: in particular, the tests in (9), *mutatis mutandis*, give identical results. We take it that the primary purpose of these LVCs is to license the presence of a terminative event-noun object; see in particular Mulder 1992, Kearns 1988 (especially her 'True Light Verb Construction'), and Mittwoch 1998: 311. Whereas the lexical aspectual character of the vast majority of unergatives like *[to] grin* is non-terminative, i.e. they denote open-ended activities, the corresponding deverbal event nouns like *[a] grin* are most naturally understood, in the absence of strong contextual cues to the contrary (e.g. a durative adverbial), to denote inherently limited events with beginnings and ends, as in *she gave us a grin*, etc. This property characterizes the relevant LVCs, and it is the change of default aspectual character *vis-à-vis* the simple verb that gives the construction its principal *raison d'être*.

In support of this point consider (11):

(11)	a. Kate grinned all week.	simple activity, no built-in limit.
	b. Kate grinned and left.	simple activity, no built-in limit.
	c. ??*Kate gave (us) a grin all week.	naturally limited event.
	d. Kate gave (us) a grin and left.	naturally limited event.

There is no difference of aspectual character between the verbs in (11a) and (11b) in that both denote non-terminative activities that simply stopped at some arbitrary point (i.e. after a week, or just before Kate left), even if pragmatic considerations require the 'grinning' in (11b) to be brief, cf. *grinned for a while (*all week) and left*. By contrast, the incompatibility of the LVC in (11c) with the durational adverbial shows that *a grin* denotes a pre-packaged amount of 'grinning' of minimal duration (normal 'grins' are virtually punctual, cf. *??*gave (us) a grin for a while and left*). (11d) is therefore fine, but it differs from (11a) and (11b) in having a predicate with inherently terminative

[13] To the extent that activity and event readings occur only with light verbs (including light verbs lexicalized as to manner with a cognate verb), it is immaterial whether we regard the wider context as disambiguating two different readings of the noun alone or of the COC as a whole.

aspectual character. In other words, the default function of such LVCs is to provide syntactically complex terminative partners to non-terminative verbs. Thus the light verb itself is virtually meaningless, its function being to licence the object, and the object, *qua* object, is 'fake', its role being to provide lexical content in an aspectual mode (terminative) that the simple verb cannot: i.e. to 'give a grin' is just to 'grin terminatively', a notion that can only be expressed by exploiting the syntactic structure of VPs like *write a memo*, *wipe a table*, or indeed, of TCOCs like *dance a dance*. In this latter type, of course, the object DPs refer and the verbs themselves are non-terminative (cf. 14.1.1), while the light verbs and their non-referential objects combine semantically into 'verbal periphrases' with terminative aspectual character by default. Nonetheless, there is in both cases an object with the potential to be understood as having 'inherent limits', and this guarantees that both VP types have telic readings available, in the first when the patient is understood to be incrementally affected (the default reading of TCOCs we assume,[14] thus giving all English COs a primary aspectual function), in the second because the verbal periphrasis is by default terminative in character.

Note now the contrast in (12):

(12) a. ??*Kate was in the middle of smiling knowingly when her husband arrived.
b. Kate was in the middle of giving (him) a knowing smile when her husband arrived.

Obviously, one can only be in the middle of something with a beginning and an end: 'smiling' does not have such limits, but 'giving a smile' does. *A smile*, *a grin,* etc. cannot be 'given' indefinitely. We conclude, then, that the combination of deverbal event nouns with a light verb creates complex predicates with terminative aspectual character by default, in which verbal grammatical properties are carried by the verb but the main lexical content, including the lexical aspectual character, is carried by the non-referential object.

Note now that a COC such as *grin a grin* is identical in all relevant respects to *give a grin*, except that the light verb now includes the (in practice unique) means of 'giving' this event, i.e. the difference between *give a smile* and *smile a smile* is analogous to that between *get the table clean* and *wipe the table clean*. Thus *smile a smile* = '*give*-through-smiling [a smile-event]'. As expected, the

[14] Thus, without contextual evidence to suggest otherwise, *John danced a crazy dance* is most naturally understood to denote a single complete performance: contrast *John danced a crazy dance till he dropped.*

default aspectual character is again determined by that of the cognate event-noun, cf. (13), parallel to (12b):

(13) Kate was in the middle of smiling a knowing smile when her husband arrived.

Unlike in AG and Hebrew, therefore, the principal role of *all* event-noun periphrases (i.e. both LVCs and COCs) in English is apparently to effect a shift of aspectual character *vis-à-vis* the corresponding unergatives (cf. Tenny 1994; Levin and Rappaport Hovav 1995; Macfarland 1995).[15] The restriction to unergatives is best explained on the basis that unaccusatives, like *come/go*, *fall*, *faint*, etc., are typically already terminative, while the introduction of 'limits' with non-terminative transitive verbs is either a function of how their objects are viewed (thus allowing for the option of telic readings for VPs like *wash a car*) or a consequence of introducing 'resultative' adjectives (thereby enforcing telicity and simultaneously changing the meaning and aspectual character of the verbs involved, as in *wash a car clean* = '*get*-by-washing a car clean', see section 14.2).[16] Event-noun periphrases, including COCs, thus provide a way for the sole subset of VPs that could otherwise denote only atelic eventualities (i.e. those headed by non-terminative and non-complement taking unergatives) to receive a telic reading, viz by introducing 'objects' to play a role related to that of the true direct objects of non-terminative transitives. We assume that the resources for effecting telicity shifts (i.e. terminative LVCs of various kinds and the option of lexicalization with non-terminative verbs) are partly motivated by the need to express certain kinds of 'aspectual' information unambiguously in a language in which verb forms themselves cannot be marked for viewpoint aspect.[17]

But if these LVCs/COCs have the syntactic structure of VPs like *wash a car, dance a dance*, and if the latter have both telic and atelic readings, we might

[15] A similar point is also made by Mulder for Dutch (1992: ch 8, 201), who notes that while *dat de man de kar duwde* ('that the man the cart pushed') is ambiguous between a perfective and an imperfective reading, its paraphrase with a light verb construction ('give the cart a push') is interpreted as unambiguously 'perfective' (= 'terminative' in our scheme of things).

[16] Note that manner of movement unergatives can be 'unaccusativized' and given terminative aspectual character through the addition of goal PPs (cf. *walk to the station* = '*go*-by-walking to the station'). Nonetheless terminative LVCs like *have a walk* are also available. These are not, however, susceptible to manner lexicalization. *Walk a walk*, for example, corresponds to the meaning of *do a walk* in which *walk* denotes a manner of walking (cf. *do/walk a silly walk*). We are unclear why this should be so.

[17] We do not, however, claim (falsely) that the atelic/telic contrast corresponds to the imperfective/perfective contrast, only that both involve the expression of aspectual information involving limits or bounds. See section 14.2 for further discussion.

reasonably expect the same to be true of the former. This brings us immediately to the contrast between (14a) and (14b):

(14) a. ??*Kate gave (us) a cheeky smile until the boss arrived.
b. Kate smiled a cheeky smile until the boss arrived.

We take it that this difference reveals a secondary use of COCs in English, analogous to the primary use of COs in Hebrew. In general, the debate about the role of English COs has been conducted, as noted at the beginning of this chapter, in terms of whether they are objects (arguments) or adjuncts, and whether they have an aspectual or an adverbial role. We have argued that they are indeed objects, but without argument status. However, it is clear that secondarily, and normally only when the context forces it (e.g. in the presence of a durative adverbial), English COs with adjectival modification can also be interpreted as equivalent to manner adverbs, i.e. without changing aspectual character, as in (15) (cf. Jones 1988):

(15) Kate smiled a cheeky smile (all day long) = Kate smiled cheekily (all day long).

This reading is available, however, only for those COs that also allow the aspectual reading, and COs with aspectual readings are available only with unergatives, as noted: thus unlike in Hebrew, adverbial COs are not available with unaccusatives and transitives, cf. (16):

(16) a. *The new satellite orbited an unstable orbit for twenty years.
b. *Kate cleaned the house a thorough clean all morning.

It therefore seems clear that the adverbial function is parasitic on the aspectual one, as otherwise we would expect adverbial COs with all verb classes. In order to achieve compatibility with a durative adverb, however, a CO must be interpreted as an activity-denoting noun rather than as a noun denoting an event/result, i.e. one with *non-terminative* aspectual character, so that the COC in (15) = '*do*-by-smiling [a smiling-activity]', where *do* has been substituted for *give* to reflect the aspectual character of the cognate nominal (cf. *Kate did a cheesy grin all week*). Thus *smile a smile*, as a complex predicate denoting both terminative and non-terminative 'smiling', constitutes a VP with either a telic or an atelic reading, just like *wash a car*. The crucial difference is that inducing telicity (albeit in a special sense, see section 14.2) is the primary purpose of COCs, the atelic reading being an accidental by-product of the availability of non-terminative (activity) readings for nominals like *smile*.

14.1.4 *Interim summary*

In conclusion, the core roles of COs in Greek and Hebrew, as exemplified in (2) and (5), and the core role of COs in English, as exemplified in (7), are quite different. Greek has TCOs (and perhaps adverbial accusatives of extent/respect); Hebrew has activity/event-noun COs with adverbial function. Both occur with all verb classes and neither causes a change of aspectual character in co-occurring verbs. English COs, by contrast, have the primary role of effecting just such a shift, adverbial readings being secondary and contextually dependent: this 'aspectual' function is only relevant to unergatives, and COs do not therefore occur with other verb classes. Crucially, there is no evidence for any such aspectual function in AG or Hebrew. Thus examples like those in (17) are not attested in AG, and are simply ungrammatical in MG:

(17) a. *Xamo′jelase ′ena afoplisti′ko xa′mojelo.
s/he-smiled a disarming smile
b. *′Evikse ′enan ′asximo ′vixa.
s/he-coughed an ugly cough

We argue in 14.2 below that this is not an accidental state of affairs.[18]

14.2 Further ramifications

Just as Greek (like Hebrew) rejects the English type of COC, so too Greek (like Hebrew) fails to allow constructions of the following two types, which are highly characteristic of English:

(18) a. Kate wiped the table clean. resultative adjective: *wiped* = '*made* [the table clean] by wiping' (i.e. 'wiping' becomes a kind of 'making' in the causative sense)

[18] Greek is in fact very much more restrictive than English overall, disallowing not only the strict CO construction with verbs like *xamoje'lo* 'smile' but also cases which Levin (1993: 97–98) calls the Reaction Object (RO) Construction:

(i) a. She smiled her approval.
b. *Xamo′jelase tin ′engri′si tis.
smiled-pfve the approval of-her

This construction involves the same classes of unergative verbs that take a CO, but here they take 'non-subcategorized objects that express a reaction (an emotion or disposition). Most of the verbs that allow such reaction objects name activities that are associated with particular emotions, and the action they name is performed to express the associated emotion', Levin (1993: 98). It follows therefore that our analysis predicts that examples like (ia) and (ib) will also be impossible in Greek, just like result-state and result-location readings for predicate adjectives and PPs (see below).

Contrast:
Kate wiped the table for hours. = activity
Kate wiped the table clean in five seconds. = accomplishment

b. Kate walked to London. resultative PP: *walked* = '*came/went* [to London] by walking'
(i.e. 'walking' becomes a way of 'coming/going')

Contrast:
Kate walked in the park for hours. = activity
Kate walked to London in two hours. = accomplishment

Thus relevant examples are not attested in AG,[19] and are simply ungrammatical in MG:

(19) a. *I E′leni ′skupise to tra′pezi katha′ro.
the Eleni wiped the table clean

b. *I E′leni per′patise stin A′thina.
(*on a goal reading, as opposed to locative 'in-the Athens')
the Eleni walked to-the Athens

Both types in (18) involve lexicalization of a terminative LVC with a non-terminative verb, with a consequential shift of lexical meaning and aspectual character in the product. This in turn entails a telic reading (i.e. accomplishment status) for the relevant VPs, as indicated. In other words, once *wipe* is understood to mean '*make*-by-wiping', and *walk* to mean '*come/go*-by-walking', end-points (viz a result state or location) are presupposed. It is the addition of such 'resultative phrases' that triggers these shifts, just as the addition of event-noun COs induces the related shift in examples like (7),

[19] Apparent counter-examples in AG, analogous to (18b), like:

(i) es Himéra:n prô:ton pleúsantes (Thucydides VII, 1)
(in)to Himera first sailing

are probably of a different type. We suggest that the meaning here is 'sail as-far-as (the interior of) X (in some time)', where the PP does not denote a true goal but rather puts an arbitrary bound on a homogeneous activity that is compatible with linear movement. As such it does not effect a shift of aspectual character (cf. Horrocks and Stavrou 2007). We assume provisionally that examples in Hebrew of manner-of-motion verbs with 'goal' PPs and time-within-which adverbials are similar.

where *smile* means '*give*-by-smiling', etc. The main difference is that COs, unlike resultative phrases, do not *force* the change but invite a terminative interpretation by default (rather like the referential objects of non-terminative transitives are capable of being understood to have natural 'limits'). We assume that all these shifts are handled by lexical rules specifying the syntactic contexts in which they occur and the meaning changes involved. Thus for the core type of COCs (involving a shift of aspectual character) we would have:

(20) non-terminative V_{unerg}: [. . . .] 'perform-activity-X'
—>
terminative V_{trans} : $[_{indef\ DP} \ldots [_{N}$Event-X]]
'*LV*-by-performing-activity-X [Event-X]'

Though there is a similar transition from non-terminative to terminative for the verbs involved in all three cases, it is not in fact clear that VPs containing COs denote truly telic eventualities (cf. **She slept a dreamless sleep in eight hours*, **She smiled an enigmatic smile in a few seconds*). Strict telicity involves the incremental transition of an affected entity to an inherent culmination (e.g. Krifka 1998; Rothstein 2000, 2001, among others). COCs, however, involve non-incremental progression through an inherently limited event: one sleeps one's way homogeneously through a sleep, for example, rather than sleeping more and more of a sleep until it is fully slept (*pace* Massam 1990; Macfarland 1995). The crucial thing, however, is that in all three constructions there is a contextually driven change of lexical meaning involving the imposition of *some* natural limit on an otherwise open-ended activity, and that this has consequences for the interpretation of the VPs in question. For convenience, therefore, we continue to characterize all three types of VP as 'telic'.

Beck and Snyder 2001a, 2001b have analysed a large number of languages and note that those which disallow the resultative construction (verb + resultative adjective) also disallow the conversion of an activity into an accomplishment by means of a goal-PP, and *vice-versa*. Horrocks and Stavrou 2003, 2007 show that languages with a grammaticalized opposition of viewpoint aspect marked in distinct verb-stems (i.e. perfective vs. imperfective) do not allow changes of lexical aspectual character of the kind described above, and so also disallow the relevant telicity shifts. In Table 14.1, borrowed from Beck and Snyder 2001a: 118 but expanded to include Greek and a few other languages, the distribution of the relevant constructions is surveyed. The table is split horizontally: the upper part includes languages which have the constructions under consideration, the lower part languages that reject them:

TABLE 14.1

Language	Resultative Adj	Goal PP + temporal *in* PP
English	+	+
German	+	+
Hungarian	+	+
Japanese	(+)	+
Khmer	+	+
Korean	+	+
Mandarin	+	+
Italian	−	−
Spanish	−	−
French	−	−
Greek	−	−
Hebrew	−	−[20]
Arabic	−	−
Russian	−	−
Hindi/Urdu	−	−

It cannot be accidental that the languages in the upper block do not mark the perfective/imperfective opposition through distinct verb stems, while languages in the second block do (though in some cases, e.g. Romance, only in verb-forms referring to past-time, cf. Italian *compra-i* vs. *comprav-o*, *correvo* vs. *corsi*, etc.). We predict therefore, pending future research, that 'aspectual' COs pattern cross-linguistically with 'resultative' constructions, i.e. with positive results for the upper block (assuming the construction is available in principle) and negative results for the lower.

The key issue now, therefore, is to explain why languages which grammaticalize viewpoint aspect in this way systematically block the characteristic shifts of lexical meaning and aspectual character (effected via the use of non-terminative verbs to lexicalize terminative LVCs) that languages without such morphological properties permit.

14.3 A solution

The first point to emphasize is that choice of (grammaticalized) viewpoint aspect is independent of lexical aspectual character: thus, verbs of either aspectual character may be marked perfective or imperfective, as the following examples show (AG above and MG below in each case):

[20] See footnote 19.

(21) a. ê:lthen eis tà:s Athé:na:s terminative + perfective (the activity *per se* has a natural goal, and the goal is marked as actually attained).
ʹPije s-tin Aʹthina
'S/he-went to the Athens.'

b. é:rxeto eis tà:s Athé:na:s terminative + imperfective (the activity *per se* has a natural goal, but the goal is still prospective).
ʹPijene s-tin Aʹthina
'S/he-was-going to the Athens.'

c. ebádisen en tê: i pólei non-terminative + perfective (the activity *per se* is open ended, but marked as having stopped at an arbitrary point).
perʹpatise s-tin Kʹentro
'S/he-walked in the city center.' (= 'had a walk').

d. Ebádizden en tê: i pólei non-terminative + imperfective (the activity *per se* is open ended, and is marked as continuing).
perpaʹtuse s-to kʹentro
'S/he-was-walking in the city center.'

The essential differences may be summed up as in (22):

(22)

Asp. character		*Morph. asp.*	
a. terminative	+	perfective	= the lexically inherent terminus is attained
b. terminative	+	imperfective	= the lexically inherent terminus is not yet reached
c. non-terminative	+	perfective	= the open-ended activity has simply stopped
d. non-terminative	+	imperfective	= the open-ended activity is continuing

Thus the overall meaning of aspectually marked verb forms depends in part on the lexical aspectual character of the verb in question, and though the meanings of the aspects are constant (perfective denoting a 'bounded' action conceived as a single complete whole, imperfective an 'unbounded' activity with an internal temporal contour of continuation/progression without beginning or end), these combine with aspectual

character to give different overall readings for verb forms of the two lexical types.

Note now that irregularity and suppletion in aspect stems are routine across languages with a perfective/imperfective opposition, as in AG and MG (the data in (23) are from AG):[21]

(23) a. suppletion:

impfve	*pfve*	
blep-	id-	'see'
leg-	eip-	'say'
esthi-	fag-	'eat

b. irregular/unpredictable allomorphy:

impfve	*pfve*	
lamban-	lab-	'take'
ekbain-	ekba-	'go out'
ball-	bal-	'throw'

c. partly regular patterns, but with frequent exceptions:

(i)

impfve	*pfve*	
agorazd-	agoras-	'trade'
elpizd-	elpis-	'hope'

But:

impfve	*pfve*	
harpazd-	harpaks-	'snatch'
ste:rizd-	ste:riks-	'prop/support'

(ii)

impfve	*pfve*	
agapa-	agape:s-	'love'
tima-	time:s-	'honour'

But:

impfve	*pfve*	
gela-	gelas-	'laugh'
khala-	khalas-	'slacken'

The two stems therefore simply have to be learned in many cases, given the absence of verbal 'roots' from which both can be built by predictable processes. Furthermore, given the prevalence and unpredictability of irregularity, even 'regular' verbs are conventionally listed in lexica as sets of aspect stems (though one could of course use redundancy rules to 'generate' perfective from imperfective stems in these cases).

[21] In practice the situation is even more complex, in that the perfective passive may have a distinct stem of its own, but we ignore this further complication here.

Thus the lexical entry for a Greek verb comprises a list of aspect stems without any common root, and to know the lexical meaning of a verb is to know the shared component of meaning that is modulated by the choice of perfective or imperfective aspect. But every actually occurring verb form is either perfective or imperfective, and no form is aspect-free.[22] Thus access to the lexical meaning is necessarily mediated through the two aspect stems. But the contribution of perfectivity/imperfectivity in each case interacts with the lexical aspectual character of a lexeme, as we have seen. Thus a lexical aspectual character has to be fixed for each verb if the overall meanings, including crucially the shared lexical meaning, of the aspect stems is to be defined. It follows, therefore, that a fixed aspectual character is a pre-determined lexical property of every verb in a language like Greek, ancient or modern.[23] Hebrew and Arabic are essentially of the same kind, despite the assignment of temporal values, at different times and in different degrees, to the once purely aspectual meanings of the relevant pairs of contrasting verb stems (see Arnold and Choi 2003; Glinert 1991; Holes 1995).

Given that aspectual character is lexically fixed in languages in which viewpoint aspect is encoded in distinct verb stems, it follows that nothing can then change this pre-assigned property, as would be required if an 'aspectual' CO, or indeed a 'resultative' adjective or (true) 'goal-marking' prepositional phrase, were added to a VP. For example, the perfective stem of a non-terminative verb such as AG *gelas-* means 'perform the activity of laughing and stop (at some arbitrary point)', so a past perfective indicative such as 3sg AG *egélase* means 's/he performed the activity of laughing and stopped (at some arbitrary point)'. This cannot then be combined with a CO in the English fashion (e.g. **egélase gélasma* 'laughed (a) laugh') because this could only mean something inherently anomalous, namely *'performed the activity of laughing and stopped—a laugh'. To be meaningful this could only have the English-type sense '*gave*-by-laughing (a) laugh-event' (terminative), but to interpret *egélase* this way would be to change its aspectual character from non-terminative to terminative, which is impossible in that its aspectual character is fixed as non-terminative in order to provide a dictionary meaning

[22] This point was made very explicitly already by Mirambel 1959/78, who claims that every verb form in the language carries a value of viewpoint aspect. The bearer is actually the stem and all the other categories (mood, voice, tense, etc). endorse the value of a particular stem, which exists independently of these categories, while these categories cannot exist outside the two aspectual stems.

[23] Again, according to Mirambel 1959/78, in Greek the two aspect values are rivals, not just different. They are at the heart of the verb system and so can never change their meaning when they combine with another expression.

for its lexically listed aspect stems (= its lexical entry). It follows that Greek COs, whatever else they may do, cannot change aspectual character.

Similar remarks apply, *mutatis mutandis*, to constructions involving resultative adjectives and goal-marking PPs. As we have seen, their presence forces a similar shift in the lexical meaning and aspectual character of the affected verbs, giving VPs with telic readings, so languages like Greek also reject resultative adjectives and goal-marking PPs (cf. Horrocks and Stavrou 2003, 2007). English and languages like it are different in that (monolectic) verb forms are not marked for viewpoint aspect and the aspectual character of a verbal root is therefore not fixed once and for all in the lexicon. Instead there is a 'default' reading, which can be overridden by changes of syntactic context, e.g. the addition of an aspectual CO, a resultative adjective, or a goal-marking PP.

14.4 Conclusions

We have established that COs in Greek (other than accidentally cognate objects of transitive verbs) are normally fully referential transitivizing objects with argument status. We have also suggested that at least some AG 'COs' are analysable as adverbial adjuncts, namely accusatives of 'respect/extent', leaving open the question of whether this is a necessary move in specific cases. In AG, TCOCs occur with subsets of verbs of all classes, though the inventory of verbs affected has been greatly reduced in MG. These verbs all denote activities that presuppose a 'latent' patient argument that can optionally be made explicit, as 'dancing' necessarily involves the performance of a 'dance' etc.

Hebrew COs, however, denote non-referring and non-argument activities (non-terminative) and events (terminative), and their primary role is to facilitate adjectival modification as a means of replicating manner adverbials in a language with very few lexical adverbs. Arabic is very similar. These activity/event-noun COs may occur freely with verbs of all classes, as expected given their function.

Both these types were analysed as involving lexicalized LVCs, albeit of two different kinds, though neither type entails any difference of aspectual character between the simple verb and its lexicalized LVC (i.e. COC) equivalent.

Leaving aside English TCOCs, which are syntactically like those in Greek but realize the 'internal' object specifically to form VPs capable of sustaining a telic reading in the default case, the remaining COs of English are non-referring non-arguments as in Hebrew, but denote only terminative events in their default function, specifically to provide terminative 'periphrastic'

equivalents to non-terminative unergatives: VPs comprising such COCs again denote telic eventualities, as opposed to those headed by the corresponding simple verbs, which denote atelic ones. (Non-terminative activity readings are also available, but as a secondary function in supportive contexts, and these are like the Hebrew cases.) An appropriate lexicalized LVC analysis is again adopted, and the restriction to unergatives for both types of CO follows from the fact that most unaccusatives are already terminative, while VPs headed by normally transitive verbs allow for 'telic' readings in other ways.

We have tried to show that these differences are not accidental. Greek and, in varying degrees, Semitic languages have a grammaticalized opposition of perfective/imperfective aspect carried by contrasting verb stems. In the absence of 'bare roots' and/or regular procedures for deriving aspect stems, languages with such an opposition typically have to list verbs in the lexicon as partly unpredictable sets of stems. But since any definition of the lexical meaning shared by these stems requires a lexical aspectual character to be fixed once and for all, the latter cannot subsequently be modified in syntactic contexts that might in principle have such an effect. Greek etc. therefore have no 'aspectual' COs of the English kind (or resultative adjectives and 'true' goal-marking PPs). By contrast, languages like English, without such an opposition, allow verbs to be listed with a default aspectual character, which, in the absence of distinct perfective/imperfective stems, can be adjusted in particular syntactic contexts, e.g. by 'aspectual' COs (and resultative adjectives or goal PPs).

15

Locales

HAGIT BORER

Locale, n.: A place, especially with reference to a particular event

15.0.1 *Post-verbal subjects: the accepted paradigm*

As is well known, some languages which normally display an S–V–O order allow a V–S(–XP) order, with certain well-established restrictions, in some contexts. The existence of utterances such as those in (1), in Italian, has been extensively discussed by Perlmutter (1978); Burzio (1981); Belletti and Rizzi (1981); and Belletti (1988), among others. Similar cases in Hebrew are discussed in Borer (1980) and are illustrated in (2).

(1) Sono arrivati '(molti)' studenti
are arrived (many) students (Italian)

(2) a. parca mehuma (ha.boqer)
erupted.f.sg riot.f.Sg (this morning)

b. hitxilu harbe hap̲ganot
started many demonstrations

c. hop̲iaγ qcat γašan la̲ban ba.šamayim
appeared little smoke white in-the.sky

Both Borer (1980) and Belletti (1988) note that unless the subject is clearly extraposed and is in the right periphery (cf. (3)), external arguments are excluded, and the post-verbal subject must be weak. The relevant restrictions are illustrated, in Hebrew, by (4)–(5). We note before proceeding that the Hebrew correlates of (3) are at best marginal.[1]

[1] Pinto (1997) notes that (3) and similar cases only have a presentational reading, namely, they are only possible for an incoming phone call, and not for an exiting one. Similar effects hold in Hebrew, to the extent that (3) and similar cases are licit. Pinto (op. cit.) further discusses the role of locatives in licensing such cases, thereby potentially linking them to the paradigms to be discussed here. We set this matter aside for reasons of space.

(3) Ha telefonato Gianni
has telephoned Gianni

(4) *No definites, no strong quantifiers*
a. *parac kol 'vikuax (ha.boqer)
erupted.m.sg every argument.m.sg (this.morning)
b. *hitxilu kol ha.hapganot (ha.boqer)
started.m.pl all the.demonstrations (this.morning)
c. *hopiaγ ha.γašan ha.laban ba.šamayim (ha.boqer)
appeared the.smoke the.white in-the.sky (this.morning)

(5) *No unergatives*
a. *γabad ganan
worked.m.sg gardener.m.sg
b. *caxaqa yalda
laughed.f.sg 'girl
c. *nazlu mayim
dripped.m.pl water.m.pl

15.0.2 *Beyond the accepted paradigm*

Moving beyond the well-established paradigm above, we note that, at least in Hebrew, not all unaccusatives (or passives) allow V–S(–XP) word order, as ((6)a–f) illustrate:[2]

[2] Care must be taken to ensure that the cardinal readings associated with expressions such as *šloša tapuxim* 'three apples' are not interpreted as either specific or partitives ('three of the apples'). The matter is, as usual, tricky in positive contexts. Clearer effects emerge in negative contexts, where non-specific readings are clearly excluded:

(i) a. *lo hibšilu 'asarot tapuxim (γal ha.γec)
no ripened tens apples (on the.tree)
'dozens of apples didn't ripen on the tree' (*non-specific)
b. *lo nirqab qcat basar (ba.meqarer)
no rotted a little meat (in-the.fridge)
'a little bit of meat didn't rot in the fridge' (*non-specific)
c. *lo putru šlošim γobdim (ha.šana)
no fired.pass thirty workers (this.year)
'thirty workers were not fired here this morning' (*non-specific)

(6) a. *hibšilu (γasarot) tapuxim (γal ha.γec)
ripened (tens)' apples (on the.tree)

b. *nirqab (qcat) basar (ba.meqarer)
rotted (a little) meat (in-the.fridge)

c. *qap'u (yoter midai) mayim (ba.layla še-γabar)
froze (too much) water (last night)

d. *putru (šlošim) γobdim (ha.boqer)
fired.pass (thirty) workers (this.morning)

e. *culma ('eyze) zebra γal-yedey pil (ha.boqer)
photographed.pass (some) zebra by elephant (this.morning)

While syntactic models of the 1980s could account for the unergative/unaccusative asymmetry in a straightforward way, this is no longer the case given present-day structural assumptions. Such earlier accounts crucially appealed to the claim that external arguments merge above the verb's final landing site, whereas internal, unaccusative subjects merge as complements of the verb. V–S word orders for unaccusatives could thus emerge directly from the failure of the deep object to move, and were impossible for external arguments without postposing.[3] In present-day structures, however, the subject never merges at its final landing site and the verb, likewise merging low, almost always moves to some functional head above the initial merger site of external arguments. If V–S orders were to emerge simply from the failure of the subject to move to the highest specifier, all clause types would uniformly allow (or disallow) V–S word order, for unaccusative as well as for unergative (and transitive) subjects without any need for postposing. How, then, is the asymmetry between unaccusative subjects, on the one hand, and unergative and transitive subjects, on the other hand, to be characterized?

15.0.3 *A double puzzle and something on achievements*

Yet a further puzzle is associated specifically with the paradigm in (1)–(2). The cases in (1)–(2) are unambiguously telic. In fact, they appear to have an achievement interpretation. And yet, in (1)–(2) the subject need not be a quantity expression. What, then, licenses the telic reading? The availability of bare mass and plural noun subjects in such constructions together with a telic reading is illustrated in (7)–(9), in conjunction with a number of telicity tests. Specifically, and following Kamp (1979) and Partee (1984) (and see also

[3] Or, alternatively, through the movement of VP over the external argument.

Reinhart (1996), telic events, when coordinated, give rise to a sequential, rather than simultaneous reading. It follows that the order of coordination affects interpretation for such events, and indeed, the truth conditions for (7)a–(8)a are different from those which hold for (7)b–(8)b. A second test, following Verkuyl (1989), shows that the V–S events under discussion cannot be interpreted as continuous in the presence of a modifier, such as *on Sunday and on Monday*, but rather, (9) must be interpreted as involving two separate events:[4]

(7) a. hitparca lava ve-nidleqa /hitparca ve-nidleqa lava
erupted lava and-ignited /erupted and-ignited lava
'lava erupted (first) and (next) ignited'

b. nidleqa lava ve-hitparca /nidleqa ve-hitparca lava
ignited lava and-erupted /ignited and-erupted lava
'Lava ignited (first) and (next) erupted'

(8) a. hitgalu gazim dliqim ve-hitlaqxu
discovered.pass gases flammable and-'fired'

a'. hitgalu ve-hitlaqxu gazim dliqim
discovered.pass and-'fired' flammable gases
'flammable gases were discovered (first) and (next) burst up in flames'

b. hitlaqxu gazim dliqim ve-hitgalu
'fired' gases flammable and-discovered.pass

b'. hitlaqxu ve-hitgalu gazim dliqim
'fired' and-discovered.pass gases flammable
'flammable gases burst up in flames (first) and were discovered (next)'

(9) a. parcu mehumot be-yom rišon ve-be-yom šeni
erupted riots on-Sunday and-on-Monday
(two occasions of riot eruption)

[4] And compare:

(i) a. 'etmol rac dan ve-šar
yesterday ran Dan and-sang (simultaneous reading possible)

b. le-'orex ha.derek zaxal naxaš be-yom rišon ve-be-yom šeni
along the road crawled snake on-Sunday and-on-Monday
(continuous crawling possible)

b. hopiaγ γašan be-yom rišon ve-be-yom šeni
appeared smoke on-Sunday and-on-Monday
(two occasions of smoke appearance)

In turn, the absence of a quantity DP in achievements may not be that surprising. Mittwoch (1991) notes independently that transitive achievements may be licensed in the absence of a quantity object. Mittwoch's conclusions are based on cases such as (10)–(11) (relevant telicity tests added). Similar cases in Hebrew are in (12):

(10) a. the prospectors discovered gold and found rare coins
b. the prospectors found rare coins and discovered gold

(11) a. Robin found oil on Monday and on Tuesday (requires two diggings)
b. The prospectors struck oil on Saturday and on Sunday
c. The bulldozer hit bedrock on Saturday and on Sunday
d. Mary noticed ink on her sleeve on Saturday and on Sunday
e. John spotted wildfowl on Saturday and on Sunday
(based on Mittwoch (1991))

(12) a. Rina gilta zahab ve-mac'a matbeγot yeqarim
Rina discovered gold and-found coins precious
b. Rina mac'a matbeγot yeqarim ve-gilta zahab
Rina found coins precious and-discovered gold
c. Nurit hitxila proyektim xadašim ve-mac'a šeqet napši
Nurit started projects new and-found peace soul
'Nurit started new projects and then (possibly as a result) found peace of mind'
d. Nurit mac'a šeqet napši ve-hitxila proyektim xadašim
Nurit found peace soul and-started projects new
'Nurit found peace of mind and then (possibly as a result) started new projects'

Intransitive achievements now present us with a double puzzle. First, these events, but no other telic ones, are licensed without a quantity DP. Secondly, these events, but no others, telic or atelic, allow a V–S–(XP) word order. Are these properties related, and if so, how?

15.0.4 *Not all achievements*

Lest it is tempting to assume that the phenomena can be described by appealing to the properties of achievements as such, note that not all

achievements share the above diagnostics. Some achievements clearly do not permit a V–S_{WEAK} word order, let alone a V–$S_{-QUANTITY}$ one:

(13) a. *nipsequ gšamim (sop-sop)
stopped.pl rains (finally)
b. *nigmeru sukaryot (b-a.bayit)
finished.pl candies (at home)
c. *neγecru diyunim (ba.memšala)
halted.pl discussions (in-the.government)
d. *histaymu bxinot (ba.universita)
ended.pl tests (in-the.university)

(14) a. *ha.memšala hipsiqa diyunim (γim ha.mapginim)
the.government stopped negotiations (with the.demonstrators)
b. *Rani gamar sukaryhot/xalab (ha.boqer)
Rani finished candies/milk (this.morning)
c. *qicucey ha.taqcib γacru qidma/proyektim[5]
cuts the.budget stopped progress/projects
d. *ha.talmid siyem bxinot (ha.boqer)
the.student ended tests (this.morning)

Summarizing our puzzle thus far, we note that in present day models, a straightforward account is no longer available for the paradigm in (1)–(2). Furthermore, a more careful inspection reveals that the occurrence of V–S with the relevant restrictions is limited, at least in Hebrew, to a subset of achievements, and that these achievements are precisely those which otherwise allow a telic interpretation without a quantity (deep) object. In the next few pages, I will propose that a unified account for all these factors is possible if we assume that V–S word orders are always licensed by a covert *locale*, a locative which can function as an existential binder for the event argument. Achievements which license V–S word order are *presentational* ones, in the classical sense of presentational—they contain a covert *locale* specifically associated with the location of the event. That *locale*, in turn, has existential force which allows it to bind and existentially close the event argument. That very same *locale* may also bind, and existentially close, ASP_Q, the node, by assumption, responsible for the emergence of telic, quantity reading.

[5] But note:

(i) *ha.šoter γacar tnuγa /mekoniot*
the.policeman stopped traffic /cars

In the absence of a covert *locale*, these effects are not attested, regardless of whether the events under consideration are telic or atelic, achievements or accomplishments. However, as we shall show, an *overt locale*, when provided, has the very same effects, when present, as a covert one. It licenses weak, post-verbal subjects in V–S contexts, and it licenses telicity in the absence of quantity objects.

The properties of overt *locales* are the subject matter of section 15.1, where I show them to license V-S_{WEAK} configurations in all event types. General theoretical considerations relevant to the syntax of event structure and the syntactic licensing of the event arguments are outlined in section 15.2. In section 15.3, I return to *locales*, showing them to have existential force, and putting forth a specific analysis of V-S_{WEAK} configurations in the context of both overt and covert *locales*. I further discuss some empirical predictions of the account. Finally, in section 15.4 I turn to the licensing of telic readings in presentational achievements, arguing that it, too, is licensed by *locales*, as evidenced, yet again, by the emergence of identical effects in otherwise atelic contexts in the presence of overt *locales*.

15.1 Licensing V1 with *locales*

We observed already that in unergative structures, typically intransitive activities or intransitive states, V–S(–XP) word orders are barred. As it turns out, however, such intransitive activities or states can occur entirely felicitously in V–S configurations if a locative pronominal—a *locale*—is added, meaning *here*, *there*, or *chez+agreement*, as illustrated in (15) (activities) and (16) (statives). Furthermore, in the presence of a *locale* the utterance requires its subject to be weak, very much on a par with what has already been demonstrated for V–S presentational achievements:[6]

(15) a. ('amarti še-) γabad *(šam/kan/ecli) ganan (ha.yom)
(I said that) worked here/there/chez.me gardener (today)

b. *('amarti še-) γabad (šam/kan/ecli) Ran/ha.ganan (ha.yom)
(I said that) worked here/there/chez.me Ran/the.gardener (today)

[6] The V–S order in (15)–(16) should and could be distinguished from other instances of V–S orders attested in Hebrew in a variety of context, such as *narrative inversion* or XP–V–S inversion cases, in which no definite restriction applies to the post-verbal subject. See fn. 9 below for some additional relevant comments.

c. ('amarti še-) γabdu *(šam/kan/ecli) (kama, šloša) gananim
(I said that) worked here/there/chez.me (several, three) gardeners
(ha.yom)
(today)

(16) a. ('amarti še-) gar *(šam/kan/ecli) bo'eš (ha.qayic)
(I said that) resided here/there/chez.me skunk (this.summer)

b. *('amarti še-) gar (šam/kan/ecli) ha.bo'eš (ha.qayic)
(I said that) resided here/there/chez.me the.skunk (this.summer)

c. ('amarti še-) garu *(šam/kan/ecli) (kama, šloša) bo'ašim
(I said that) resided here/there/chez.me (several, three) skunks
(ha.qayic)
(this.summer)

The effects produced by *locales* in (15)–(16) are not produced by temporal weak pronouns, or by other weak pronouns, such as the reflexive dative in (19)a or the directional (source) one in (19)b:[7]

(17) a. ('amarti še-) *γabad 'az ganan (ba.gan)
(I said that) worked then gardener (in-the.garden)

b. ('amarti še-) *gar 'az bo'eš (mi-taxat l-a.bayit)
(I said that) resided then skunk (from-under to-the.house)

(18) a. ('amarti še-) *γobed γata/γakšav ganan (ba.gan)
(I said that) works now/now gardener (in-the.garden)

b. ('amarti še-) *gar γata/γakšav bo'eš (mi-taxat la.bayit)
(I said that) resided now/now skunk (from-under to-the.house)

(19) a. ('amarti še-) *gar lo bo'eš (mi-taxat la.bayit)
(I said that) resided to.him skunk (from-under to-the.house)
'I said that a skunk was residing (leisurely) under the house'

[7] Similar effects, however, *are* produced by possessive datives, as in (i) a matter which I do not pursue here. For some discussion of possessive datives see Borer and Grodzinsky (1986) and Landau (1999):

(i) a. rac *(li) keleb ba.xacer
ran to.me dog in-the.yard
'a dog ran in my yard'

b. gar *(li) bo'eš mitaxat la.bayit
resided to.me skunk under to-the.house
'a skunk lived under my house'

b. ('amarti še-) *rac mi-šam yeled (ha.boqer)
(I said that) ran from-there boy (this.morning)
'I said that a boy ran from there (this morning)'

The effects are further restricted to weak pronouns. (20) illustrates the distribution of phrasal (stressed) locative pronouns in Hebrew. The distribution of weak locatives is in (21), showing that they must be adjacent to the verb, must be unstressed, and may not be coordinated. That *locales* license V–S order in unergatives, whether activities or statives, only when they are weak pronouns is illustrated in (22)–(23):

(20) *Phrasal locative pronouns (stressed):*
a. kol ha.yeladim 'aklu 'aruxat γereb 'eclénu/kán
all the.boys ate supper chez.us/here
Constrastive only:
(continue the rest on a new line)
b. kol ha.yeladim 'aklu 'eclénu/kán 'aruxat γereb
all the.children ate chez.us/here supper
c. ha.yeladim qiblu mamtaqim kán ve-šám
the.boys received candies here and-there
d. ha.yeladim qiblu kán ve-šám mamtaqim
the.boys received here and-there candies

(21) *Unstressed locative pronouns*:
a. *ha.yeladim qiblu mamtaqim kan
the.boys received candies here
b. *ha.yeladim qiblu mamtaqim kan ve-šam
the.boys received candies here and-there
c. *ha.yeladim qiblu kan ve-šam mamtaqim
the.boys received here and-there candies
Unstressed locative, weak pronouns
d. ha.yeladim qiblu kan mamtaqim
the.boys received here candies

(22) a. *γabad kán ve-šám ganan (ha.yom)
worked here and-there gardener (today)
b. *gar bo'eš kán ve-šám (ba.qayic ha.axaron)
resided skunk here and-there (in-the.summer the.last)
c. *γabdu kán (kama, šloša) gananim (ha.yom)
worked here(several, three) gardeners (today)

d. *xayu kama/ šloša bo'ašim 'eclénu/kán/šám (ba.qayic ha'a-xaron)
lived several/three skunks chez.us/here/there (in-the.summer -the last)

(23) a. *('amarti še-) γabad (ha.)ganan ba.gan/'ecli/ecel Ran
(I said that) worked (the)gardener in-the garden/chez.me/chez Ran

b. *('amarti še-) šakan (ha.)bo'eš ba.gan/ecli/ecel Ran/šam
(I said that) dwelled the.skunk in-the garden/chez.me/chez Ran/there

c. *('amarti še-) γabdu (kol ha.)gananim ba.gan/ecli/ecel Ran/šam
(I said that) worked (all the.)gardeners in-the garden/chez.me/chez Ran/there

d. *('amarti še-) hitgoreru (kol ha).bo'ašim ba.gan/ecli/ecel Ran/šam
(I said that) resided (all the).skunks in-the garden/chez.me/chez Ran/there[8]

A paradigm very much like (15)–(16) is discussed by Torrego (1989) and Rigau (1997) in Catalan. Consider the sentences in (24). They illustrate the distribution of post verbal subjects in activity events, presumably unergative. An initial *locale* is necessary to license a weak post-verbal subject, as in (24)a–b. Although V–S *is* possible without a *locale*, the subject, in that case, must be specific.[9]

(24) a. Hi canten molts nens
there sing many boys

b. Hi dormen molts nens
there sleep many boys

c. Canten molten nens
sang many boys
'many of the boys sang' (specific reading only)

[8] Hebrew verbs *šakan*, *gar*, *higorer* and *xai* all translate, roughly, as 'reside, dwell, live'.

[9] Torrego (1989) reports a *locale*-like effect in LOC–V–S configurations in Spanish with phrasal PPs. The detection of similar effects in Hebrew, however, is confounded by the existence of a general XP–V–S configuration in which the subject need not be weak. An anonymous reviewer notes, interestingly, that phrasal locatives *can* license a weak post-verbal subjects in the cases in (i) (and contrast with (iia-b)):

(i) oklot/'aklu b-a.misγada ha.zot dugmaniot
eat/ate in-the.restaurant the.this models
'models (existential) eat/ate in that restaurant' (*generic; existential)

Very much like Italian *ne*, Catalan *en* is a partitive clitic typically allowing cliticization from object, but not from subject position, a restriction traditionally attributed to c-command effects. As it turns out, *en* cliticization from the subject in V–S activities is possible, but only when a *locale* is present, as illustrated by (25)a–b. In V–S activities without a *locale*, *en* cliticization is blocked. In turn, the co-occurrence of *locales and en* cliticization forces the subject to be weak, thereby contrasting with V–S activities without a *locale*, where the subject is specific:

(25) a. *En canten molts
of-them sing many

b. *En dormen molts
of them sleep many

(26) a. N'hi canten molts
of-them-there sing many

b. N'hi dormen molts
of-them- sleep many (Catalan, Torrego (1989); Rigau (1997))
there

Torrego analyses such constructions as undergoing a shift from unergativity to unaccusativity. Specifically, if the subject of *locale* activities merges as low as the subject of unaccusatives, the cliticization of *en* as well as the occurrence of V–S order could be subsumed under the properties of unaccusative V–S configurations. However, at least in Hebrew, constituent tests relevant to the unergative/unaccusative distinction show that the subject in *locale* configurations continues to be 'high' in the relevant sense. Reflexive dative pronouns, which can only co-occur with external arguments (in all event types) may co-occur with the post verbal subject in *locale* configurations. Possessive clitics, which exclude external arguments, but which may modify all lower DPs within the clause, including within adjuncts, continue to be impossible with

(ii) a. *oklot / aklu (et ha.) aparseqim dugmaniot
eat/ate (OM the) peaches models.
'models ate (the) peaches' (*generic; *existential)

b. * aklu be-šaγa 'arba dugmaniot
ate at-hour four models
'models (ext/generic) ate at four o'clock (*generic; *existential)

The paradigm in (i–ii) clearly confirms the role of locatives in licensing post-verbal weak subjects. It also suggests that the structural environments in which such licensing may occur might be more complex than those discussed in this chapter.

the *locale* subject (the licit reading of (27)c involves an ethical dative; see Borer and Grodzinsky (1986) for some discussion):

(27) a. γabad lo kan ('eyze) ganan (kol ha.boqer)
worked to-him$_2$ here(some) gardener$_2$ all the.morning

b. γabad šam {le-rani} ('eyze) ganan {le-rani} (kol ha.boqer)
worked there{to-rani} (some) gardener$_2$ {to-rani} all the.morning
'*A gardener of Rani's worked there all morning'

c. γabad lanu kan 'eyze ganan (kol ha.boqer)
worked to-us here some gardener all the.morning
'*A gardener of ours worked here all morning'
'A gardener worked "on us" here all morning'

Rigau (1997), discussing the paradigm in (25)–(26), proposes that *locales* affect a change in event type, and that *locale* V–S configurations are always stative. We note, however, that in Hebrew activity events with *locales* stay such, thereby allowing, for instance, manner adverbs which are barred with statives with or without *locales*:

(28) *Activities*:
a. hitrocecu šam/kan/ecli kama/šloša yeladim be-hitlahabut šaγa/*be-šaγa
ran. around here/there/chez.me several/three boys enthusiastically hour/*in-hour
'Three/several boys ran around there enthusiastically for an hour/*in an hour'

b. γabad šam/kan/ecli ganan be-mehirut šaγa/*be-šaγa
worked here/there/chez.me gardener quickly hour/*in-hour

Nor are the effects restricted to activities. Accomplishments, of the type excluded without *locales* in V–S configurations (cf. (6)), are licit with *locales* without a resulting change in event type or syntactic structure:[10]

(29) *Accomplishments*
a. nirqab 'eclekem yoter midai basar be-yomayim
rotted chez.you too much meat in-two days

b. putru šam alpey γobdim be-γeser daqot
fired.pass there thousands workers in-ten minutes

[10] An activity reading is licit for (29)a–e, providing a durational adverb is provided.

c. qap'u šam mayim ve-hipširu be-xameš daqot ≠
froze there water and-thawed in-5 minutes ≠
≠ hipširu šam mayim ve-qap'u be-xameš daqot
≠ thawed there water and-froze in 5 minutes

d. hibšilu lanu/*lahem$_2$ po γasarot tapuxim$_2$ be-xamiša šabuγot
ripened to-us/*to-them$_2$ here tens apples$_2$ in-five weeks
*poss. dat/*refl. dat*
'our apples ripened in five weeks'

We therefore conclude that the effects of *locales* cannot be related to event type. Rather, as we shall see, *locales* play a crucial role in licensing events in general, a conclusion this account does share with Rigau (1997) (and see Borer (2005b) for a fuller review).

15.2 What do *locales* license?

15.2.1 *Event predication*

At the end of the day, I will argue, *locales* existentially bind the event argument. In order to show that this is, indeed, the case, however, a brief introduction is necessary to the assumptions that I will make as concerning the representation of event structure.

Taking as a starting point a Neo-Davidsonian representation of events, consider the representations in (30). While they certainly do capture the predication relations between the verb and the event, as well as the argumental relations between the event participants and the event, it is easy to see that the representation is altogether too coarse:

(30) a. ∃e [run (e) & argument (Kim, e)]
Kim ran

b. ∃e [arrive (e) & argument (Kim, e)]
Kim arrived

c. ∃e [build (e) & argument (Kim, e) & argument (the house, e)]
Kim built the house

d. ∃e [push (e) & argument (Kim, e) & argument (the cart, e)]
Kim pushed the cart

What is missing in (30) is more detailed information on the participants of the event, so as to correlate their interpretation with their syntactic position. Arguably this is not crucial for (30)a and (30)b, where we may assume that the single argument is contextually interpreted, given the predication relations

between the event argument and the verb. However, this is crucial when more than one participant is involved. In the broadest terms, the representations in (30)c and (30)d fail to capture the fact that subject participants c-command object participants.

A more articulate representation would be as in (31). (31) presupposes the existence of telic and atelic *syntax* (*quantity* and *non-quantity* event syntax, in the terminology of Borer (2005b)), such that it gives rise to the correlation between the syntactic position of participants and their interpretation:

(31) a. Quantity (telic) Intransitive (unaccusative syntax):
∃e [subject-of-quantity (Kim, e) & arrive (e)]
b. Non-quantity (atelic) Intransitive (unergative syntax)
∃e [originator (Kim, e) & run (e)]
c. Quantity (telic) Transitive:
∃e [originator (cat, e) & subject-of-quantity (the tree, e) & (climb, e)]
d. Quantity (atelic) Transitive:
∃e [originator (cat, e) & default-participant (the tree, e) & (climb, e)]

Note now that although the event in e.g. (31)c must be *quantity* and have *quantity* syntax, as it gives rise to a *subject-of-quantity* interpretation, the interpretation of such an event as *quantity* is indirect and is accomplished through the interpretation of the argument, and not through the direct predication of the event itself of *quantity*. This, in turn, represents a fairly common practice within linguistics. Accounts which utilize thematic roles, or alternatively, notions such as *causer* or *agent*, effectively amount to characterizing the event indirectly through the roles assigned to its arguments. It is easy, however, to show that this could not be the right way to go. (32)a–b are clearly *quantity* events, telic, and yet a direct internal argument is not present. (33)a is an activity, while (33)b a state, and yet these, too, cannot be characterized through roles assigned to arguments, because no referential arguments are present nor are any roles assigned:[11]

[11] It is not helpful, note, to assume that in (32) and similar cases the *quantity* reading is induced by a silent or elided argument. First, the meaning of *the army took over* (=the army became the dominant power) is distinct from that of *the army took over the city* (=occupied the city). Second, silent arguments typically do not license a telic interpretation where they *can* be shown to be plausibly present, e.g. following verbs such as *eat* or *drink*. Assuming that the expletives in (33)a–b are quasi-arguments isn't helpful either. Certainly, even if quasi-argumental, *it* in (33)a is not an *agent* or a *causer*, thereby rendering its quasi-argumental status semantically non-informative as concerning the type of event of which it is a participant.

(32) a. The army took over. (quantity)
b. He moved in on my girlfriend

(33) a. It rained (activity)
b. It was cold (stative)

It thus appears that if an event such as (32)a is to be characterized as *quantity*, such characterization must be direct—*quantity* must be directly predicated of the event, giving rise to the event properties in (34):

(34) a. ∃e [quantity (e) & take-over (e) & originator (the army,e)]
b. ∃e [rain (e)][12]
c. ∃e [state (e) & cold (e)]

Now insofar as the existence of a syntactic quantity structure is necessary for the emergence of the correct syntactic placement of arguments, and insofar as we have now established that quantity events require the predication of such quantity structure on the event argument, it now emerges, ipso facto, that the event argument itself must be syntactically projected. In turn, if events are predicated not only of the lexical item (*take-over; rain; cold*) but also of a syntactic structure determining their type, it would be parsimonious to assume that the interpretation of arguments, to the extent that they exist, is dependent on the event type, rather than the other way around. We will thus assume that a referential DP in the (structural) subject position will be interpreted as an *originator* if it is not already assigned another role. As the subjects of weather verbs are not referential, they are not thus interpreted, although, by assumption, they occupy the same position as other subjects.

Schematically, the picture that emerges is as in (35), and we note that insofar as syntactic realization is unambiguous, the representations allow some argument roles to remain underspecified (see Borer (op. cit.) for discussion):

(35) a. Quantity (telic) Intransitive (unaccusative syntax)
∃e [quantity (e) & subject-of-quantity (Kim, e) & arrive (e)]
b. Non quantity (atelic) Intransitive (unergative syntax)
∃e [originator (Kim, e) & run (e)]

[12] In Borer (2005) I argue that *activity* is not a predicate of events, but rather an interpretation assigned to events which are not otherwise specified as either quantity or state. This matter is largely orthogonal to our discussion of *locales*.

c. Quantity (telic) Transitive:
∃e [quantity (e) & originator (cat, e) & subject-of-quantity (the tree, e) & climb (e)]
d. Non-quantity (atelic) Transitive:
∃e [originator (cat, e) & default-participant (the tree, e) & climb (e)]

Once we assume events are directly interpreted through predication, and not through the projection of arguments, we must address the question of what, if any, are the syntactic manifestations of such events and event predication. How, in other words, is the event argument syntactically licensed? We must address an additional question as well. We concluded, largely on the basis of the properties of weather predicates, that event typing is not dependent on argumental projection. We did not, however, address the obligatory presence, at least in English, of an expletive in such contexts. In what follows, I will suggest that the second question is one of the answers to the first. *It* is obligatory because it licenses the event syntactically. Event argument licensing, I will suggest, can be accomplished by expletives, by referential DPs in the relevant structural position, and most saliently for our purposes, by *locales*.

15.2.2 *Licensing the event argument*

We concluded that syntactically, the event argument may be predicated either of an (aspectual) node corresponding to *quantity* for telic events (ASP_{Q}) or of a stative structure for stative events, whatever that may turn out to be (henceforth SP). What, however, is the syntactic nature of the event argument itself, and how is it licensed? Higginbotham (1985) and much subsequent work suggest that the event argument must be existentially bound by tense. Higginbotham (op. cit.) further suggests that the event argument, like other arguments, is associated with the lexical head of the predicate, although, note, unlike other arguments licensed by lexical heads, the event argument, in Higginbotham's system, does not merge syntactically.

As it turns out, however, associating the event argument with *lexical* predicate heads as well as binding it by tense are rather problematic. If the event argument is associated with a *lexical* predicate head as such, then by assumption, the lexical heads *damaged, drinkable* and *colossal* must have an event argument to assign, thereby giving rise to the (stative) events in (36)a–c. However, the very same lexical heads, when used attributively, cannot be associated with an event argument, for such an event argument would be

unbound and ungrammaticality would be predicted for (37)a–c contrary to fact:[13]

(36) a. The window is damaged
b. The liquid is drinkable
c. The state of confusion is colossal

(37) a. a damaged window
b. a drinkable liquid
c. a colossal (state of) confusion

Turning to licensing by tense, we note that the event nominals in (38) are licit, although the event argument is clearly not bound by tense:[14]

(38) a. The instructor's (intentional) examination of the student (for seven days)
b. The frequent monitoring of wild flowers (by students) to document their disappearance
c. The destruction of Rome in a day

If the event argument is neither assigned by a particular lexical head-of-predicate, nor licensed by tense, how is it represented structurally, and how is it licensed? In Borer (2005b) I suggest that the event argument is associated with its own node, E(vent)P. Relevant structures are in (39), with EP headed by a null position, a variable, which must be bound to be licit:[15]

(39) a. Stative: $[_{EP}\ \mathbf{e}_{E}\ ([_{TP})\ [_{SP}\ [_{VP/AP}\ ]]]]$
b. Eventive, non-quantity: $[_{EP}\ \mathbf{e}_{E}\ldots\ ([_{TP})\ [_{VP}\ ]]]]$
c. Eventive, quantity: $[_{EP}\ e_{E}\ldots\ ([_{TP})\ [_{ASP\text{-}QP}\ [_{VP}\ ]]]]$

By assumption, the event arguments in (40)–(42) are somehow licensed. If we assume, in turn, that the licensing of the event argument entails existentially binding it, then it must also follow that these structures contain a binder for the event argument:

[13] The problem generalizes to all accounts which assume that argument roles of any kind are associated with lexical heads, in that, e.g. *the confusion is complete* shows no instantiations of the putative arguments of *confuse*, including the event argument.

[14] The assumption that the derived nominals in (38) contain an event argument is following the compelling argumentation in Grimshaw (1990). Note that the view of grammar put forth here and in Borer (2005), forthcoming, perforce must cast this result in different structural terms from the lexicalist ones put forth by Grimshaw (op. cit.).

[15] See reference on the rationale for EP above TP.

(40) a. Mary is tired
b. John broke the computer
c. Jane ran in the park

(41) a. It rained
b. It was cold

(42) a. There was a boy in the garden
b. There arrived from China a crate with a red knob

Considering first the pair in (42)a,b we observe that the claim that expletive *there* may function as an existential binder is hardly a novel one. Suppose now that it binds e_E, thus effectively providing existential closure for the event argument. Extending this rationale to the referential DP subjects in (40) and to expletive *it* in (41)a,b suppose they, too, bind e_E, thereby existentially closing the event argument, and that they may do so providing they c-command e_E, thus forcing them, effectively, into the [Spec,EP] position. For referential DPs, the existential force, I assume, comes from the fact that they are independently existentially closed and hence may bind the event argument (and see below for further discussion). As for pronominal expletives such as *it*, I will assume that they are inherently existentially closed, possibly a carryover from their pronominal properties. The relevant syntactic structures are in (43) (irrelevant portions omitted):

(43) a. $[_{EP}$ John-*nom* e_E ($[_{TP}$ ~~John~~-*nom*) $[_{ASP\text{-}QP}$ the computer $[_{VP}$ broke]]]]
b. $[_{EP}$ it-*nom* e_E ($[_{TP}$ ~~it~~-*nom*) $[_{VP}$ rain]]]]
c. $[_{EP}$ there-*nom* e_E ($[_{TP}$ ~~there~~-*nom*) $[_{SP}$ a boy$[_{PP}$ in the yard]]]]

The effect here is clearly reminiscent of the EPP, in that the system mandates, effectively, a subject of some sort for events, insofar as such subjects license the event argument. In turn, if EPP effects emerge from the need to existentially close the event argument, and if any (existentially closed) constituent in [Spec,EP] may existentially close the event argument, we predict existential closure of the event argument by elements which are neither expletives nor argument DPs, but which have existential force. Furthermore, and in contrast with the EPP as typically understood, if the event argument can be bound by an element which is not in [Spec, EP], neither an expletive nor an argumental DP are required to bind the event, and we would then expect the possibility of an EP headed by e_E, but missing a specifier altogether.

15.3 Back to *locales*

15.3.1 Locales *and existential closure*

It remains an open question, for this author, as to why it is specifically locatives which have existential force over events, as opposed to, e.g. temporal expressions, as is more frequently assumed. That locative expressions *do*, however, have existential force, and that this function tends to go hand in hand with licensing post-verbal subjects, is well established. An extraordinarily detailed study of the correlation between locatives, existentials, and the placement of the subject is found in Freeze (1992). Freeze summarizes his empirical findings for numerous languages in the table replicated as Table 15.1 (with minor expository adjustments).

Freeze concludes compellingly that locatives are systematically implicated in the derivation of existential meaning, and that such an existential meaning is available whenever the locative is either in the subject position, or in a head position which he associates with I. The latter is instantiated in languages such as Catalan, Palauan, Palestinian Arabic, or Italian in the presence of a locative proform attached to the verb or to the copula. In all these cases the subject follows the copula. Freeze concludes that full locative expressions in existentials are in the canonical subject position, and that locative clitics correspond to a null *pro* in the subject position (and see also Bresnan and Kanerva (1989)). He further concludes that predicate locatives and existentials are but two facets of the same coin, and that their complementary distribution derives from the fact that they are derived from a single source. Our claim that locatives in Hebrew, Spanish and Catalan have an existential function, and that they are either in [Spec,EP] (Spanish) or in E (Hebrew, Catalan), with the (logical) subject in some specifier

TABLE 15.1

	AS IN	*PREDICATE LOCATIVE*	*EXISTENTIAL*
SVO	Russian	R COP L	L COP R
	Finnish	R COP L	L COP R
	Catalan	R COP L	Ø P-COP R
VOS	Chamorro	COP L R	COP R L
	Palauan	COP L R	COP-P R L
VSO	Tagalog	COP L R	COP R L
	Palest. Arabic	R_2 COP L ~~R_2~~ (topicalized)	COP-P R L
SOV	Hindi	R L COP	L R COP

R=subject role; L=locative, COP=copula, P=locative prepositional clitic
Source: from Freeze (1992), table 3, p. 564.

lower than E (and hence post-verbal) is fully consistent with this picture. We note, as an extension of Freeze's picture, that while locatives are certainly required for the configuration in question to emerge, they need not be arguments. More crucially, the existence of a *theme* is not necessary, and the verbal element need not be restricted to a copula. The constructions we discussed in Hebrew, Catalan and Spanish all exhibit existential force in configurations which involve a 'high' locative, and an agreeing subject, *theme* or otherwise, following the highest verbal element, be it a copula or the verb. While we must continue to ponder the issue of why this is licensed in the presence of high locatives, that it *is* indeed so appears beyond dispute.[16]

We must now ask what it is that *locales* in actuality license. Usually, it is assumed that the existential force of locative expressions is applicable to the post-verbal subject. It is because of that that it must be weak, and that the propositions under considerations have an existential-type interpretation. I would like to suggest, however, that *locales* do not existentially close the subject, but rather, the event argument, through the syntactic binding of e_E. In turn their syntactic position, pre-verbal or in an I-like node, follows precisely from that function. Given the fact that e_E is the highest functional head in a proposition, and that *locales* must c-command it in order to bind it, they must be either in the subject position, or alternatively, adjoined to e_E itself.

Consider now the properties of a DP subject. I suggested that subjects which are themselves existentially closed, either because they are inherently strong (e.g. strong quantifiers, specific DPs) or because they are discourse anaphors (e.g. definite descriptions, proper names) may bind e_E, thereby existentially closing the event. Weak subjects, on the other hand, by assumption cannot perform such a task. We therefore predict directly the ungrammaticality of the paradigms in (5)–(6), repeated here as in (44)–(45) in which e_E is not bound, the event not closed, and the subjects themselves not closed either, for that matter:

(44) a. *γabad ganan
worked.m.sg gardener.m.sg
b. *caxaqa yalda
laughed.f.sg girl
c. *nazlu mayim
dripped.m.pl water.m.pl

[16] That English *there,* or Italian *ci* have lost their locative meaning in the context of existential sentences is neither necessary nor sufficient for the emergence of an existential meaning. Ultimately, I concur with Freeze (1992) and with Tortora (1997) that the origin of the existential meaning resides with the locative function. See Borer (2005b) for some more on *there.*

(45) a. *hibšilu šloša tapuxim (γal ha.γec)
ripened three apples (on the.tree)

b. *hitmotetu qirot (be-šabat)
collapsed walls (on-Saturday)

c. *nirqab qcat basar (ba.meqarer)
rotted a little meat (in-the.fridge)

d. *qap'u mayim (ba.layla še-γabar)
froze water (last night)

e. *putru šloša γobdim (ha.boqer)
fired.pass three workers (this.morning)

f. *culma 'eyze zebra γal yedey pil (ha.boqer)
photographed.pass some zebra by an elephant (this.morning)

I will now assume without further discussion that when a *locale* existentially closes the event argument in e_E, e_E may itself existentially bind its argument, thereby forcing it to be weak. Such a *locale* can be either a full phrase occurring in [Spec,EP], or adjoined to e_E (or more accurately, to the verb raised to e_E). The subject, weak, is in [Spec,TP]:[17]

(46) a. $[_{EP}\ [_{SPEC}\ \exists_{LOCALE}\ ]\ \ e_E\ [_{TP}\ DP_{WEAK}\ldots\ldots\ ]$

b. $[_{EP}\ \exists_{LOCALE}\ e_E\ [_{TP}\ DP_{WEAK}\ \ldots\ldots\ ]$

[17] A question emerges here concerning the possibility of the structure in (i):

(i) $[_{EP}\ [_{SPEC}\ DP_{WEAK}\ ]\ _{LOCALE}\ e_E\ [_{TP}\ ]]$

In (i), the pre-verbal subject is existentially closed by e_E, itself existentially closed by a *locale*. If licit, the configuration in (i) would predict the emergence, in Hebrew, of weak pre-verbal subjects otherwise barred, with *locales*. See Borer (2005b) for some relevant discussion. As we shall see in section 15.4, Spec-head configuration *is* a licit one in the context of an ASP_Q. existentially closed by a *locale*.

A model-internal question involves the assignment of an *originator* role to the subject in [Spec,TP] in (46). See reference for discussion.

As is well known English, but not many other languages, does allow weak pre-verbal subjects in a position where, by assumption, they cannot existentially close e_E. The matter is set aside here for reasons of space, but the reader is referred to Borer (2005a), where it is discussed at some length, and where it is proposed, following Dobrovie-Sorin and Laca (1996), that weak pre-verbal subjects in English are licensed precisely when they can be assumed to have a locative force, the latter, effectively, functioning as an existential binder. Insofar as that analysis is on the right track, it lends independent support to the claim that locative expressions are existential binders.

The configuration in (46)a is that discussed in Spanish by Torrego (1989), and noted in fn. 9. We further noted that although the configuration may be attested in Hebrew, its effects are quite possibly obscured for independent reasons. The configuration in (46)b, on the other hand, now emerges as the account for the primary puzzle discussed in this chapter thus far: the Hebrew paradigm in (15)–(16) (activities and states) and in (29) (accomplishments), and the Catalan paradigm in (24) and (26), all cases in which post-verbal weak subjects are licensed in the presence of *locales*. In these cases, I submit, the e_E cannot be bound by its own argument, as the argument is weak. Once it is bound by a *locale*, however, it may bind its own argument, thereby creating a licit structure. In fact, paradoxically, the problematic cases now emerge as those associated with the classical accepted paradigm. Within the approach developed here it is no longer obvious what, if anything, binds e_E and existentially closes the event argument in (1)–(2), a matter to which I turn now.

15.3.2 *Presentational achievements and covert* locales

Consider again our starting point, the well known paradigm in (1)–(2), repeated here as (47)–(48):

(47) Sono arrivati (molti) studenti
are arrived (many) students (Italian)

(48) a. parca mehuma (ha.boqer)
erupted.f.sg riot.f.Sg (this.morning)
b. hitxilu harbe hap̲ganot
started many demonstrations
c. hop̲iaγ qcat γašan la̲ban b-a.šamayim
appeared little smoke white in-the.sky (Hebrew)

As noted, evidence from Hebrew suggests that the occurrence of post verbal subjects—without *locales*—is in actuality quite limited, and is only attested with presentational achievements. We now note that in all such achievements, the subject, so to speak, comes to exist *at the location* of the event as a result of the event. The 'riot' in (48)a exists by virtue of the event that created it, the 'students' in (47) exist by virtue of having entered the world of discourse by arriving, and so on. It is thus eminently plausible to assume, precisely in such cases, the presence of a covert, abstract *locale* which functions exactly on a par with an overt one: it binds e_E, thereby existentially closing it, and by doing so,

forces the post verbal subject, agreeing with such e_E and hence bound by it, to be weak, as well as to come to exist in the location of the event itself.

For completeness sake we note that the existential binding of e_E by a covert *locale* must be assumed optional, as indeed is the appearance and the binding by an overt one, so as to derive the grammaticality of the cases in which a pre-verbal, strong subject binds the event argument and a *locale* is presumably excluded in its binding instantiation or vacuous quantification would emerge:

(49) Molti studenti sono arrivati
many students are arrived

(50) a. ha.mehuma parca ha.boqer
the.riot.f.Sg erupted.f.sg this.morning
b. Harbe hapganot hitxilu ha.yom
many demonstrations started today
c. ha.γašan ha.laban hopiaγ ba.šamayim
the.smoke the.white appeared in-the.sky

We are now in a position to distinguish between those achievements which are presentational, as in (47)–(48) and those which are not, to wit, those involving an event coming to a close as in (15), repeated in (51). In the achievements in (51), we note, not only doesn't the subject come to exist, so to speak, as a result of the event, but quite the contrary. The subject is clearly pre-supposed, thereby predicting its impossibility as a weak DP and accounting for the ungrammaticality of (51). We note by way of additional confirmation that in these cases, the addition of a *locale* does not improve matters. The problem with (52a–d) does not involve the failure of e_E to be licensed (although that, too, is the case) but rather, the incompatibility of weak subjects with the required interpretation:[18]

(51) a. *nipsequ (kan) gšamim (sop-sop)
stopped.pl (here) rains (finally)
b. *nigmeru (eclenu) sukaryot (ba.bayit)
finished.pl (chez.us) candies (at home)

[18] Unsurprisingly, V–S word orders are possible for such achievements with a strong subject. Significantly, such strong subjects display the diagnostics of post-posed subjects, in following adjuncts, where present:

(i) a. nipsequ (sop-sop) ha.gšamim (*sop-sop)
stopped.pl (finally) rains (*finally)

c. *neγecru (šam) diyunim (ha.boqer)
halted.pl (there) discussions (this.morning)

d. *histaymu (kan) bxinot ('etmol)
ended.pl (here) tests (yesterday)

15.3.3 *Hebrew transitive expletives*

In a departure from the specific typology put forth by Freeze (op. cit.), the existential closure by *locales* put forth here should be insensitive to any aspects of the structure which are below E, and hence, at least in principle, should be licit for any and all subject roles as well as for all event types, including transitive ones. We thereby predict, rather surprisingly, the existence, in Hebrew, of transitive expletive constructions, when licensed by *locales*: cases in which the subject is, in some sense, demoted and weak, but the structure is that of a transitive event structure nevertheless. This prediction is borne out. As the paradigm in (52)–(54) illustrates, V–S–O word orders are clearly excluded in Hebrew, regardless of whether the subject is strong or weak. The presence of temporal expressions, pronominal or otherwise does not improve matters:

(52) a. *hipcic ('az/ha.šabuγa) (kol/ha.)matos 'et ha.γir
bombed (then/this.week) (every/the.)plane OM the.town

b. *tiqen ('az/'etmol) ('ezye/ha)poγel 'et ha.midraka
fixed (then/yesterday) (some/the.)worker OM the.sidewalk

c. *xatku ('az/'etmol) (kol/ha.)mapginim 'et ha.gader
cut (then/yesterday) (all/the)demonstrators OM the.fence

Consider however the same configurations in the presence of a *locale*. We find, as exactly predicted, that V–S–O word orders *are* licit, and that the subject is per force weak, in other words, precisely the diagnostics predicted by the system developed here, thereby providing striking evidence for its veracity:

(53) a. hipcic šam ('eyze) matos 'et ha.γir (ha.boqer)
bombed there (some) plane OM the.town (this morning)

b. nigmeru (ba.xanut) kol ha.sukaryot (ba.xanut)
finished.pl (in-the.store) all the.candies (in-the.store)

Under the assumption that postposing diagnostics, however analysed, are associated with the subject occupying a pre-verbal specifier at *some* point of the derivation, the behaviour of the subjects in (i) is entirely consistent with the assumption that they, themselves, existentially close the event when in [Spec,EP]. I thank I. Landau (p.c.) for first drawing my attention to the cases in (i).

b. tiqen kan ('eyze) poγel 'et ha.midraka (ha.boqer)
fixed here (some) worker OM the.sidewalk (this morning)

c. xatku šam (kama) mapginim 'et ha.gader (ha.sabuγa)
cut there (several) demonstrators OM the.fence (this.week)
(existential; *generic)

(54) a. *hipcicu šam kol/šlošet ha.metosim 'et ha.γir (ha.sabuγa)
bombed there all/three the.planes OM the.town (this.week)

b. *tiqen kan ha.poγel 'et ha.midraka (ha.boqer)
fixed here the.worker OM the.sidewalk (this morning)

c. *xatku šam kol ha.mapginim 'et ha.gader (ha.boqer)
cut there all the.demonstrators OM the.fence (this.morning)

15.4 Licensing telicity with *locales*

At the beginning of this chapter I noted that two puzzles, rather than one, are associated with presentational achievements. Not only are they the only cases in which post-verbal weak subjects are licit without an overt licensor of some kind, they are also exceptional in allowing a telic reading without a quantity internal argument. This last observation, we noted, is true both for the intransitive achievements in (47)–(48) above as well as for transitive achievements, as in (10)–(12) repeated here, in essence, as (55)–(56):

(55) a. the prospectors discovered gold
b. Alisha found oil
c. The workers struck oil
d. The bulldozer hit bedrock
e. Mary noticed ink on her sleeve
f. John spotted wildfowl (based on Mittwoch (1991))

(56) a. Rina gilta zahab
Rina discovered gold

b. Rina mac'a matbeγot yeqarim
Rina found coins precious

c. Nurit hitxila proyektim xadašim
Nurit started projects new
'Nurit started new projects'

We attributed the possibility of post-verbal subjects without an overt licensor in presentational intransitive achievements to the presence of a covert *locale*. It is,

of course, possible that the emergence of telicity in presentational achievements, transitive and intransitive, is unrelated to this factor and that a different account must be sought for these distinct effects. Suppose, however, that the accounts *are* related, and that it is precisely the covert *locale* present in presentational achievements that makes not only existential closure of e_E possible, but also the emergence of a telic reading without a quantity argument. Effectively, the claim would then be that in both post-verbal intransitive cases with a non-quantity subject and in telic cases with a non-quantity (deep) object it is the covert *locale* that licenses ASP_Q, the node, by assumption, responsible for the emergence of telic reading (see section 15.2).

If true, now, we expect the same effects to be attested for overt *locales*. In other words, we expect cases which do not allow for a telic reading in the absence of a quantity internal argument, to allow such a reading when a *locale* is present. The prediction here, we note, is uni-directional. In a given language, in a given configuration, any given locative expression may license, effectively bind, e_E alone, it may license, effectively bind, ASP_Q alone, it may license, effectively bind, both, or it may license neither, in this latter case being an existentially inert locative expression, not a *locale* altogether, by our terminology.

While the Hebrew facts which bear on the matter are subtle, for a significant number of speakers the expected effects *are* present, as illustrated by the contrast between the obligatorily atelic cases in (57),(59) and the possibly telic ones in (58), (60):[19]

(57) a. Michal katba širim (be-mešek šloša šabuγot/*be-šloša šabuγot)
Michal wrote poems (during-three weeks/*in-three weeks)

b. Rina šatla vradim (be-mešek šloša šabuγot/*be-šloša šabuγot)
Rina planted roses (during-three weeks/*in-three weeks/
*gradually)

c. Ran limed šira γibrit (be-mešek šloša yamim/*be-šloša
yamim)
Ran taught poetry Hebrew (during-three days/*in-three days)

[19] Although the contrasts reported here between (57),(59) on the one hand and (58),(60) on the other hand have been confirmed by numerous native speakers, they are clearly subtle, and do not hold for all speakers. For some, all utterances in (57)–(60) are interpreted as atelic, and the *locales* in them purely as locatives. In turn, the failure, in the functional lexicon of some speakers, to classify *locales* as potential binders for ASP_Q is neutral, relative to the availability of such an option in UG. The universal pervasiveness of telicity marking by means of locative particles is well attested (e.g. the locative source of Slavic perfective prefixes, the licensing of telicity by locative particles in Hungarian, and even in English, the telic function of particles such as *up* and *down* in *eat up*, *climb down*), thus at the very least establishing the general plausibility of the judgments reported by the relevant subset of speakers.

(58) a. Michal katba kan širim (be-mešek šloša šabuγot/be- šloša šabuγot)
Michal wrote there poems (during-three weeks/in-three weeks)
b. Rina šatla eclenu vradim (be-mešek šaloš šaγot/be-šaloš šaγot)
Rina planted chez.us roses (during-three hours/in-three hours)
c. Ran limed šam šira γibrit (be-mešek šloša yamim/be-šloša yamim)
Ran taught there poetry Hebrew (during-three days/in-three days

(59) a. Michal katba širim (*be-hadraga)
Michal wrote poems (*gradually)
b. Ran limed šira γibrit (*be-hadraga)
Ran taught poetry Hebrew (*gradually)

(60) a. Michal katba kan širim (be-hadraga)
Michal wrote here poems (gradually)
b. Ran limed šam šira γibrit (be-hadraga)
Ran taught there poetry Hebrew (gradually)

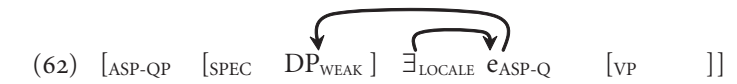
I suggested that *locales* license post verbal weak subjects by binding e_E, thereby existentially closing the event. An existentially closed event, in turn, can bind its argument, thereby closing it existentially and effectively forcing it to be weak. Suppose we consider now a parallel situation for ASP_Q, proposing, specifically, that $e_{ASP\text{-}Q}$ must be existentially closed, on a par with e_E. In the normal course of events, we note, both e_E and $e_{ASP\text{-}Q}$ are existentially closed by their own, presumably otherwise licensed argument:

(61) a. $[_{EP} \; [_{SPEC} \; DP_{\exists\text{-CLOSED}} \;] \; e_E \; [_{TP} \;]]$

b. $[_{ASP\text{-}QP} \; [_{SPEC} \; DP_{\exists\text{-CLOSED}} \;] \; e_{ASP\text{-}Q} \; [_{VP} \;]]$

If, however, the argument is structurally prevented from existentially closing e a *locale* may, if present, bind it. A thus-bound e, in turn, binds its own

argument, forcing it to be weak. For ASP_{Q}, such a state of affairs translates to the structure in (62):[20]



In the system developed in Borer (2005b), a telic, quantity reading, emerges whenever ASP_{Q} is projected and licensed. Specifically, ASP_{Q} in that system is taken to be an event modifier of sorts, or in structural terms, a modifier of E, specifically turning E into a quantity E, that is, an event with quantifiable divisions. In turn, $e_{\text{ASP-Q}}$, by assumption the head of ASP_{Q}, is, like all heads of functional nodes, subject to licensing conditions. If the our conclusions on the properties of *locales* are on the right track, they point to the existence of parallel licensing conditions which hold for heads of functional projections involved in the syntactic representation of events. It stands to reason that such syntactic parallelism is semantically grounded. The full articulation of such semantic grounding, however, must await future research.

15.5 Conclusion

Our starting paradigms presented us with a clustering of properties: a V–S order in a language that otherwise does not allow it; a weak subject in such configurations; a possibility of licensing, that very same order, with a locative expression; and finally, the attestation, in that very same paradigm, of telicity effects in contexts which normally bar them syntactically.

As it turned out, the account, using the distribution and the properties of *locales*, both overt and covert, as its anchoring point, emerged as capable of creating the almost conspiratorial confluence of these different properties. An event argument in need of existential closure in the absence of an (otherwise existentially closed) DP in its specifier had turned out to avail itself of such an

[20] At least in Hebrew, *locales* may not license ASP_{Q} without a DP in [Spec,ASP_{Q}P] altogether, to wit, no telic reading is available for the paradigms in (15)–(16). As such, licensing ASP_{Q} through *locales* is different from classical cases such as *run to the store* where telicity is induced without a DP, or from cases of perfective, telic readings in Slavic without a direct object (and see also (32)a). Binding of e_{E}, on the other hand, was possible in the absence of an argument. This state of affairs raises the possibility that *locales* do not bind $e_{\text{ASP-Q}}$ directly, but rather, bind the argument in [Spec, ASP_{Q}P], which, in turn, binds $e_{\text{ASP-Q}}$. Either way, note, the licensing of telicity by *locales* requires not just existential closure, as in the case of e_{E}, but also the introduction of quantifiable divisions, as existential binding, alone, does not suffice to induce telicity (see Borer (2005b) for argumentation). In turn, the introduction of quantifiable divisions into a predicate by means of a locative expression is independently plausible. We set these matters aside for reasons of space.

existential closure through a *locale*. The cost, however, given the binding relations between e_E and its argument, was a necessarily weak subject. The extension of the system to the second event node, ASP_Q, turned out to yield a subset of the relevant properties: in the presence of a *locale* binder, telicity could emerge without a quantity object. The cost, however, was a weak (deep) object, bound in a Spec-Head configuration.

A number of matters were left for future study, primary among them the best way of characterizing the set of nodes which are subject to existential closure, and the semantic commonality between them. The study did establish, to our view conclusively, that, to the extent that the event argument must be existentially bound, such biding is accomplished through locative expressions, *locales*, and not through temporal ones, thereby establishing the prima facie necessity for a propositional *locative* syntax, to take its rightful place, under future investigation, alongside that of the temporal one.

16

Modal and Temporal Aspects of Habituality

NORA BONEH AND EDIT DORON

In this chapter, we explore the modal characteristics of habituality, and the relation of habituality to imperfectivity. We have already argued in previous work (Boneh and Doron 2008) for the existence of a habituality modal operator Hab which is independent of imperfective aspect. Here we defend this analysis further, in particular in the face of reductionist views such as Ferreira (2005), who treats Hab as reducible to imperfectivity of plural events, and Hacquard (2006), who treats imperfective aspect as reducible to modal operators such as Hab/Prog. The reductionist views of Ferreira and Hacquard seem natural for languages with *imparfait*-type morphology expressing both continuity and habituality, such as the Romance languages. For us, the existence of this type of morphology shows that it is indeed natural to present habituals as ongoing. Yet we do not believe in the reduction of Hab to imperfectivity, or vice-versa. Rather, we assume that the output of the modal operator Hab is the input to aspectual operators, normally the imperfective aspect, since Hab is stative, but not exclusively. We show that Hab can be the input to the perfective aspect as well. Thus, it is possible to separate habituality from imperfectivity.

The chapter mainly discusses languages such as Hebrew, English, Polish, which lack perfective/imperfective viewpoint morphology, though they may encode verbal lexical aspect morphology (Polish), or other viewpoint aspectual morphology such as the progressive (English). In these languages, the output of Hab does not show a perfective/imperfective contrast, yet it is

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normally imperfective, just like the *imparfait* in the Romance languages, since the default viewpoint for states is the imperfective. Importantly, in these languages, a different viewpoint aspect is found, which we call *retrospective,* morphologically marked by past-tense auxiliaries such as *haya* in Hebrew, *used to* and *would* in English, and *zvykł* in Polish. We will show that retrospective habituals are aspectually complex in that they characterize an interval which is disjoint from a perspective time; as such they instantiate actualized habits, while nonetheless being modal, like the other habituals. This will lead us to the conclusion that habituality is primarily a modal category, which can only indirectly be characterized in aspectual terms.

The chapter is organized as follows. The next section serves as a basis to the sections following it in presenting the perfective and imperfective aspectual operators and the tests used throughout the chapter to distinguish between these aspects. Section 16.2 compares the Romance languages with Hebrew, English, and Polish. In the former languages, habituality is indeed imperfective by default, but it is not restricted semantically and morphologically to the imperfective aspect. In the latter languages too, we find an unmarked habitual form which is typically imperfective, but can also be interpreted perfectively. But these languages also feature a *retrospective* habitual, which conveys the termination of the habit, yet is exclusively imperfective. Section 16.3 presents the aspectual properties of the retrospective habitual, and argues that it involves a complex aspect, assimilating it to the perfect tenses. Section 16.4 deals with the modal nature of habituality, showing that irrespective of aspect, all habitual forms are modal. We show that the fact that retrospective habituals are actualized does not contradict their modality. Section 16.5 proposes an analysis of habituals, showing how the parameters of modality and aspect interact to derive the various types of habituals presented in the previous sections. Section 16.6.1 supports our analysis by giving arguments for dissociating habituality from imperfective aspect and its subcomponents: progressive and plurality, as proposed by Ferreira (2005). Section 16.6.2 lends support to the modal part of the analysis by assimilating habituality to disposition. Section 16.7 is the conclusion.

16.1 Background: the perfective/imperfective aspectual operators

In discussing viewpoint aspect, we adopt the definition of the perfective/imperfective aspectual operators in Kratzer (1998):

(1) $\text{Imp} \rightsquigarrow \lambda Q\, \lambda i\, \lambda w\, \exists e\, [Q(e,w)\ \&\ i \subseteq \tau(e)]$

(2) $\text{Pfv} \rightsquigarrow \lambda Q\, \lambda i\, \lambda w\, \exists e\, [Q(e,w)\ \&\ \tau(e) \subseteq i]$

According to this definition, viewpoint aspect is a mapping from properties Q of an event e (either a dynamic event or a state) to those intervals i *(reference time)* which stand in particular inclusion relations to the *event time* τ(e), the time of e. In the imperfective aspect, reference time is included in event time, whereas the perfective viewpoint aspect specifies the reverse relation. For the simple aspects such as the ones defined in (1) and (2), the reference time is related directly to the speech time by tense. For complex aspects such as the perfect or the retrospective habitual we will define below, the reference time is related to an additional interval called *perspective time*, and it is the perspective time which is related to speech time by tense.

Various tests have been developed in the literature (Mittwoch 1988; Smith 1991; Bonomi 1995; Lenci and Bertinetto 2000, among others) for the distinction between the perfective and imperfective aspects. Frame adverbials, such as *that year* or *in 1998*, which denote the reference time, are understood as included in the event time in the case of the imperfective aspect, but as including the time of the event in the case of the perfective aspect. Frame adverbials thus serve as a test which distinguishes these two viewpoint aspects; we will use this test below, e.g. in (3). A second test involves the adverbs *still* and *already*, which are acceptable with the imperfective but not with the perfective, since they imply that the event either started before the reference time, in the case of *still*, or continues beyond the reference time, in the case of *already*; we make use of this test e.g. in (4) below. A third test is based on modification by punctual *when*-clauses: the reference time of the main clause follows the *when*-clause, and therefore its event time overlaps the *when*-clause, in the case of the imperfective aspect, whereas it follows it in the case of the perfective aspect; we will use this test in section 16.2.2 below, for example in (14). A fourth test which distinguishes perfective from imperfective aspect is co-occurrence with measure phrases, such as durational adverbials (e.g. *for*-adverbials) and iterative adverbials (e.g. *twice*), which are only possible with perfectives, not with imperfectives; this test too is used in section 16.2.2, in example (16).

16.2 Habituality and aspect

16.2.1 *Perfective habituals in the Romance languages*

In the Romance languages, habituality strongly correlates with imperfectivity. Perfective verb forms have been claimed not to allow a habitual reading (Lenci 1995; Lenci and Bertinetto 2000, for Italian). Here we review the arguments for this position and show that there are also perfective habituals in the Romance languages.

The interpretation of the perfective verb in (3a) is one where the events of going to the cinema with Maria occurred in 1998, i.e. the events are confined to the frame of the temporal adverb. This correlates with the natural interpretation of (3a) as involving a particular sequence of events rather than a habit. With the imperfective verb in (3b), it is completely open whether the events also occurred before and/or after the year 1998, and this naturally gives rise to an interpretation of habituality.

(3) a. Nel 1998, Gianni è andato spesso al cinema con Maria.
In 1998, Gianni often went-PFV to the cinema with Maria

b. Nel 1998, Gianni andava spesso al cinema con Maria.
In 1998, Gianni often went-IMP to the cinema with Maria

(Lenci and Bertinetto 2000: 16)

Accordingly, (4a) with the adverb *already* is anomalous because it implies that events confined to the year 1998 continued past that year. This adverb is not problematic with the imperfective verb in (4b) which allows these events to continue past the year 1998:

(4) a. *Nel 1998, Gianni è già andato spesso al cinema con Maria.
In 1998, John already often went-PFV to the cinema with Mary

b. Nel 1998, Gianni andava già spesso al cinema con Maria.
In 1998, John already often went-IMP to the cinema with Mary

(Lenci and Bertinetto 2000: 17)

A similar contrast has been observed in (5). The perfective verb form in (5a) is anomalous, since it may only express recurring events within the interval denoted by the temporal adverbial, yet a one-year interval cannot contain ten-year recurrences. (5b) shows that the imperfective is not restricted to the temporal interval denoted by the adverbial.

(5) a. *?Nel 1998, gli abitanti di Pisa sono andati al mare una volta ogni dieci anni.
In 1998, the inhabitants of Pisa went-PFV to the beach once every ten years

b. Nel 1998, gli abitanti di Pisa andavano al mare una volta ogni dieci anni.
In 1998, the inhabitants of Pisa went-IMP to the beach once every ten years

(Lenci and Bertinetto 2000: 22)

We claim that these arguments do not prove that perfective forms cannot be habitual, but rather that they can have both episodic and habitual readings,

with the episodic being often more salient. (5a) is ungrammatical under both readings. The ungrammaticality of the habitual reading follows from the contradiction between the characterization of the habit as extending over a period longer than ten years, and the claim that this habit is contained in a one-year interval. In the episodic reading, the same contradiction holds between the ten-year gap separating the events in the sequence, and the claim that this gap was measured within a one-year interval.

A similar problem undermines the contrast provided by Lenci (1995):

(6) Gianni fumava le Marlboro, ma quell' estate ha fumato
Gianni smoke-IMP Marlboro, but that summer he smoke-PFV
le Chesterfield.
Chesterfield
'Gianni used to smoke Marlboro, but that summer he smoked Chesterfield.'

(Lenci 1995: 156 n. 4)

According to Lenci, the imperfective verb in (6) predicates a characteristic property of Gianni, that of being a Marlboro smoker, while 'The second clause (with a perfective tense) refers to a sequence of events of smoking Chesterfields which is however felt as closed and as a sort of exception to the standard habit of smoking Marlboros.' (Lenci 1995: 156 n. 4). But this interpretation is problematic. The perfective verb does not seem to predicate an accidental property, but rather a (temporary) habit. This can be seen by that fact that it supports counterfactuals (Dahl 1975): that summer, an event of Gianni smoking a cigarette was normally an event of him smoking a Chesterfield.

In the literature on French, there is disagreement about whether it is possible to find habituals in the perfective aspect (see Kleiber 1987; Boneh and Doron 2008a, for discussion). Yet there are natural examples, when the perfective verb is independently assumed to be habitual, e.g. by reference to professions:

(7) Paul a travaillé chez Renault (pendant cinq ans).
Paul worked-PFV at Renault (for five years)

(Kleiber 1987: 215 (41))

Another way to derive a habitual independently of the imperfective is through an adverbial denoting a long interval which is also inherently durational, such as an adverbial with *pendant* 'for'/ 'during':[1]

[1] In French, imperfective morphology does not force habituality, or iteration, even with an interval which is long relative to the length of the event (cf. Labelle 2002):

(i) L'année dernière, Jean se mariait.
Last year, Jean married-IMP (Kleiber 1987: 168, citing Ducrot 1979: 18–19)

(8) Paul est allé à la messe le dimanche pendant trente ans.
Paul went-PFV to church on Sunday for thirty years
(Kleiber 1987: 216 (45))

Note that the perfective habituals in (7) and (8) pass Dahl's counterfactuality test, e.g. any occasion of Paul working would have normally been at *Renault*.

The existence of perfective habituals is also demonstrated by Filip and Carlson (1997). Accordingly, we will say that the output of the habitual operator can be the input both to imperfective and perfective aspect, though perfective aspect is often more naturally interpreted as episodic, i.e. simply as iterative. Habituals in the perfective aspect differ from imperfective habituals in that the habit is limited within the boundaries of a given time span.

16.2.2 *Retrospective habituals: English, Hebrew, and Polish*

For languages such as English, Hebrew, and Polish, it is even more problematic to assume that habituality is a subtype of imperfectivity. These languages do not mark perfective/imperfective viewpoint morphology, though they might encode lexical aspectual morphology (Polish), or other aspectual contrasts, such as progressive (English).

In English, imperfectivity is not marked as such, but it is expressed in the language in various ways: the progressive form has temporal properties that can be associated with imperfectivity, and the simple form is by default imperfective with stative VPs (which are not in general compatible with the progressive form). Stative VPs in the simple form can also be interpreted as perfective, on their non-default reading (cf. Smith 1991). Although progressive forms are aspectually imperfective, they are not the preferred form to express habituality. The simple form, on the other hand, is readily associated with habituality. Since habituals are stative, habitual simple forms are imperfective by default, but can also be perfective, on the non-default reading.

In Modern Hebrew, verbs are not inflected by aspectual affixes. In particular, there is no marking of the perfective/imperfective distinction. We assume a default viewpoint aspect, which depends on lexical aspect, at least in the basic cases. Default aspect is perfective in the case of dynamic events, and imperfective in the case of states (cf. Boneh and Doron 2008). Thus, states pattern alike in Hebrew and in English, in that they are imperfective by

default, yet they can be interpreted perfectively, on their non-default reading. This is true in particular for habitual states.

Polish is different in this respect. In Polish (as in other Slavic languages) states are not expressed with the perfective form, in accordance with the view that the Polish perfective is really lexical aspect and not viewpoint aspect as in the Romance languages. Perfective aspect thus cannot be used with habituals in Polish.

Regardless of the aspectual makeup of their verbal systems, the languages under discussion have more than one formal means to express habituality, a simple form in (9a–b), and a periphrastic form with a special auxiliary in (10a–b):

(9) a. *Simple form* (episodic/habitual)
ya'el **'avd-a** ba-gina — Hebrew
Yael work.PAST-3SF in.the-garden
'Yael **worked** in the garden.' — English

b. Daniel **pracował** w ogrodzie — Polish
Daniel work. IMPF.PAST.3SM in garden
'Daniel **worked** in the garden.'

(10) a. *Periphrastic form* (retrospective habitual)
ya'el **hayt-a** **'oved-et** ba-gina — Hebrew
Yael BE.PAST-3SF work-SF in.the-garden
'Yael **used to / would work** in the garden.' — English

b. Daniel **zwykł** **pracować** w ogrodzie — Polish
Daniel use to.PFV.PAST.3SM work.IMPF.INF in garden
'Daniel **used to / would work** in the garden.'

The periphrastic form in Hebrew is composed of the auxiliary verb *hyy* 'be' inflected for past tense, together with a participial form. In the Polish periphrastic forms, the auxiliary is the inflecting verb *zvykł* in the perfective, followed by the imperfective stem of the infinitive.

The most striking contrast between the simple and periphrastic forms in all the languages has to do with whether the habituality expressed is understood to hold at speech time or not. Unlike the simple form, the periphrastic one gives a retrospective view on the denoted state, with an effect of a habitual which is felt to be cut off from speech time. This has been noted e.g. by Tagliamonte and Lawrence (2000) for English, and is shown here with the following attested example from Hebrew. The speaker, while reminiscing on past issues, comments on the impropriety of the

periphrastic form on the grounds that it is not appropriate with a habit that is still current:

(11) at zoxeret še-'ax-i **haya** **mefarmet**
you remember-SF that-brother-my BE.PAST-3SM format-SM
li et ha-maxšev? ma ani
to-me ACC the-computer? what I
omeret? ma pit'om 'haya' – hu 'adayin!
say-SF why *haya* – he still
'Do you remember that my brother used to format my computer? What am I saying? Not *used to*—he still does!'

The retrospective view is typical of the periphrastic forms in general, whether they denote a habit, as in (11) above, or other states, as in (12).

(12) a. horey-ha **gar-u** bi-yrušalayim, ve-hem
parents-her live.PAST-3P in-Jerusalem and-they
'adayin garim šam
still live there
'Her parents lived in Jerusalem, and they still live there.'

b. horey-ha **hay-u** **gar-im** bi-yrušalayim,
parents-her BE.PAST-3P live-PM in-Jerusalem
#ve-hem 'adayin garim šam
and-they still live there
'Her parents used to live in Jerusalem, #and they still live there.'

In (12a) the described state may or may not hold at speech time. But as the infelicity created by the addition of the second clause indicates, (12b) suggests that her parents no longer live in Jerusalem.

Typically, states described in the past tense, such as in (12a), do not exclude the state holding at speech time. This is so since, as mentioned above, the simple form is by default imperfective with stative VPs. As mentioned in section 16.1 past tense marks the precedence of the reference time (R) relative to the speech time (S), while the state itself overlaps R, but may still extend to overlap S as well. The question is why this overlap with S is not possible for the state described in (12b).

The question is all the more puzzling given that although the periphrastic form views the habit in retrospect, it does not reduce it to the perfective aspect, which is neutralized for states both in English and in Hebrew, as discussed above. The following example shows that both the periphrastic form and the simple one are imperfective in that both are

compatible with a frame adverb that does not contain the habit, but is contained in it, unlike the corresponding perfective Italian example in (5) above:

(13) a. be-1998, tošavey modi'in **halx-u** la-yam pa'am be-šaloš šanim
in-1998, inhabitants Modi'in go.PAST-3P to-sea once in-three years
'In 1998, the inhabitants of Modi'in went to the beach once every three years.'

b. be-1998, tošavey modi'in **hay-u** **holx-im** la-yam pa'am be-šaloš šanim
in-1998, inhabitants Modi'in BE.PAST-3P go-PM to-sea once in-three years
'In 1998, the inhabitants of Modi'in would/used to go to the beach once every three years.'

Furthermore, the two forms are typically imperfective in their aspectual properties when modified by punctual *when*-clauses; the habit in either case overlaps the time of the *when*-clause, rather than following the time of the *when*-clause.

(14) a. kše-hikar-ti ota, ya'el **yašn-a** ba-yom ve-'**avd-a** ba-layla
when-meet.PAST-1S her, Yael sleep.PAST-3SF in.the-day and-work.PAST-3SF in.the-night
'When I met her, Yael slept during the day and worked at night.'

b. kše-hikar-ti ota, ya'el **hayt-a** **yešen-a** ba-yom ve-'**oved-et** ba-layla
when-meet.PAST-1S her, Yael HYY.PAST-3SF sleep-SF in.the-day and-work-SF in.the-night
'When I met her, Yael would sleep during the day and work at night.'

In fact, additional examples show that the periphrastic habitual is actually 'more' imperfective than the simple habitual. Unlike the periphrastic habitual, which like the progressive can only receive an imperfective reading, the simple habitual is imperfective by default, but this default can be overridden. First, the periphrastic habitual, like the progressive, can only be interpreted as imperfective by the frame-adverbial test: event time has to contain the time of the adverbial, and in particular it has to fill the interval denoted by the adverbial. The simple form, on the other hand, may also be interpreted perfectively, where the event time is a proper subpart of the adverbial time:

(15) a. In the 80's, John was writing a book/living in the dormitories.
b. In the 80's, John used to go to work by bus.
c. In the 80's, John went to work by bus.

(15a) is not appropriate if John had finished his book in, say, 1984, and (15b) is likewise inappropriate if the habit of going to work by bus ended in 1984. But in (15c), going to work by bus could have ended in 1984.[2]

Similarly, the periphrastic habitual, like the progressive, does not allow modification by durational adverbials (16a–b), whereas the simple form in (16c) does (the same contrast holds for Hebrew):[3]

(16) a. (Last year) #I was living in Mary's house for three months.
(Mittwoch 1988: 108)
b. (In the 80s) #I used to work in the garden for three years.
(Boneh and Doron 2008: 24b)
c. (In the 80s,) I worked in the garden for three years.
(Boneh and Doron 2008: 22b)

Durational adverbs are perfectivizing devices (cf. Horrocks and Stavrou, this volume). Their infelicity in (16a–b) demonstrates that the latter can only be interpreted imperfectively. On the other hand, (16c) is felicitous since it can be interpreted perfectively (on the non-default reading).

We have shown that the periphrastic habitual, like the progressive, is imperfective, whereas the simple habitual can be interpreted perfectively (though this is not its default interpretation).

16.3 The nature of retrospective habituals

In the last section we showed that the retrospectivity of the periphrastic form, i.e. the disjointness of the habit from the speech time S, is

[2] Some fuzziness of the boundaries is allowed both for the progressive and the periphrastic habitual. Though event time must contain the interval denoted by the adverbials, the boundaries can be excluded. Thus Mittwoch (1988) notices that the sentence 'Last year/When I was in Boston, John was writing a book' can be continued by 'He finished it in November/a month before I left.' The same is true of the periphrastic habitual: 'In the 80's, John used to go to work by bus. In 1989, when he bought a car, he stopped going by bus.'

[3] Though a durational adverbial cannot measure the length of the habit, it can measure the length of each episode. The latter reading is salient with *for three hours:*

(i) In the 80s, I used to work in the garden for three hours.
(Boneh and Doron 2008a: 24a)

compatible with its imperfectivity. This is an unexpected result, since disjointness from S is usually taken to be a characteristic of perfectivity (Comrie 1976; Smith 1991, among others). The question we face is how to account for the compatibility of these two seemingly contradictory properties. How can we explain the fact that the periphrastic habitual is perfective-like in the sense of being disjoint from speech time, while at the same time being clearly imperfective.

We claim that the disjointness of the periphrastic habitual from S is actually not part of the semantics of this form, but arises as a conversational implicature. This is also the view of Comrie (1976) and Binnick (2005). Indeed, this implicature can be cancelled:

(17) a. be-1990 le-ruti haya oto, aval kvar az
in-1990 to-Ruti BE.PAST-3SM car, but already then
hi **hayt-a** **nosaˈa-t** la-ˈavoda ba-otobus
she BE.PAST-3SF go-SF to-work by-bus
'Ruti had a car in 1990, but already back then she used to/would go to work by bus.'

b. horey-ha **hay-u** **gar-im** bi-yrušalayim,
parents-her BE.PAST-3P live-PM in-Jerusalem,
ve-ani lo yodeˈa im hem ˈadayin gar-im šam
and-I not know.SM if they still live-P there
'Her parents used to live in Jerusalem, and I don't know whether they still live there.'

The examples in (17) are compatible with the same (habitual) state holding at S, and thus demonstrate that the disjointness implicature can be cancelled.

Specifically, we claim that the disjointness implicature arises from the competition between the periphrastic habitual and a stronger form which entails that the habit continues until S. This stronger form is the present perfect in English, and the simple present form in Hebrew:

(18) meˈaz ota tqufa ruti **nosaʹa-t** la-ˈavoda ba-otobus
since that period Ruti go-SF to-work by-bus
'Since that period, Ruti has gone to work by bus.'

The periphrastic habitual is weaker in that R, the time it refers to, is disjoint from S. The stronger form, the universal present perfect, is based on a reference time R which includes S. The stronger form thus entails

the weaker form. Accordingly, the periphrastic habitual and the universal present perfect form an information scale. Asserting the weaker element of the scale gives rise to a scalar implicature (Horn 1989), according to which the stronger element is not true. Thus the competition between two habitual forms gives rise to the implicature that the habit does not continue until speech time.[4]

The contrast between the two forms is illustrated in (19), where R is explicitly claimed to stretch until S. In that case, the periphrastic habitual is strictly ruled out, as shown in (19b):

(19) ruti maxra et ha-oto šela be-1990.
Ruti sold ACC the-car hers in-1990.
'Ruti sold her car in 1990.'

a. meˈaz ve–ˈad hayom, hi **nosaˈa-t** la-ˈavoda ba-otobus
from-then and-till today, she go-SF to-work by-bus
'Since then, she has been going to work by bus.'

b. *meˈaz ve-ˈad hayom, hi **hayt-a** **nosaˈa-t**
from-then and-till today, she BE.PAST-3F go-SF
la-ˈavoda ba-otobus
to-work by-bus
'*Since then, she used to go to work by bus.'

The fact that the retrospective habitual and the universal present perfect can be viewed as scalar alternatives to each other indicates that the periphrastic habitual denotes a complex aspect, similarly to the perfect. Unlike simple aspects, which can be viewed as denoting a relation between a temporal interval and an event, complex aspects denote a relation between two temporal intervals and an event. An additional temporal interval for the interpretation of the perfect has been proposed by McCoard (1978); Kamp and Reyle (1993); Iatridou *et al.* (2001); Pancheva (2003); Pancheva and von Stechow (2004); Mittwoch (2008). This additional interval has been called P (Perspective time) by Kamp and Reyle (1993). In the unmarked case, P is identified with the speech time S, as we have done in our discussion so far, but in other cases, P may be disjoint from speech time.

[4] The same argument does not show that the simple past and the simple present form a scale as well, since they are not based on temporal intervals included in one another. R of the simple past is disjoint from R of the present tense, i.e. from S.

Abstracting away from whether or not P overlaps S, the universal perfect is characterized by R including P, whereas in the retrospective habitual, R precedes P:

(20) a. Universal Perfect

---------- (R---------- (P---))-----

b. Retrospective Habitual

---------- (R----------)---------- (P---)------

A diagnostic for the precedence relation between R and P in the retrospective aspect is its incompatibility with the adverb *now*. Kamp and Reyle argue that the presence of *now* in a clause implies that the clause describes a state holding at P (*ibid.*: 596). Accordingly, it should not be possible to use *now* with the periphrastic past, where R must precede P. In the simple past, on the other hand, it is possible to associate P with the time of some past propositional attitude, overlapping R. The following examples show that this is indeed the case:

(21) a. Mary was very happy. She now went to work by bus.
b. Mary was very happy. *She now used to go to work by bus.[5]

Furthermore, the two habitual forms interact differently with respect to the sequence of tense (SOT) phenomenon in English, whereby stative past tense clauses embedded under the past tense have what has been called a 'simultaneous reading' (cf. e.g. Abusch 1988; Ogihara 1989). If we view SOT as stemming from the fact that, as suggested in Abusch (1997), the past tense

[5] Here there is actually a split in English between *used to* and *would*-habituals. Since *now* is attested with *would*-habituals, it appears that these are not retrospective, but rather express an overlap between R and P (there might actually also be some non-retrospective uses of the Hebrew periphrastic form):

(i) Any plan for the future depended on the term of the girl's life **now** ending, and neither could speak of that. Sometimes, though, the boy **would now** talk of the past. (Internet)

Similarly in a narrative (iia) is possible, since the periphrastic form with *used to* requires that R precede P, the time of writing the diary. But for the periphrastic form with *would*, R overlaps P, and therefore the second sentence in (iib) is contradictory:

(ii) a. Endill started to keep a diary. He used to write with a pencil, but now he wrote with a pen.
b. Endill started to keep a diary. #He would write with a pencil, but now he wrote with a pen.

morphology of the embedded clause may express the pastness of the embedded R with respect to S, while it overlaps P, we predict that only the simple form, but not the periphrastic form, gives rise to SOT:

(22) a. John assured us that Mary played tennis twice a week.
(SOT habitual reading)
b. John assured us that Mary used to play tennis twice a week.
(not SOT)

According to our analysis, the past morphology of the periphrastic form expresses a relation between R and P which is independent of S, i.e. it does not actually express tense but aspect. What determines tense is the relation between P and S. But since the past form of the periphrastic form is morphologically a tense morpheme, we cannot reapply tense morphology to it, and so the periphrastic form cannot be inflected for tense. We suggest that this explains the fact mentioned in Boneh and Doron (2008) whereby periphrastic habitual forms in Hebrew (and English) are limited to past form, and do not occur in the present and the future forms.[6]

The parallelism between the retrospective habitual and the universal present perfect has provided us with an account for the disjointness implicature. Another common characteristic of these two aspects is that in both forms, R is an extended interval, which is not an instant. Together with the imperfective interpretation of the periphrastic habitual, the extended nature of R gives rise to the effect of the periphrastic form as 'characterizing' a period of time, an effect which has been mentioned in literature (e.g. Comrie 1976).

To sum up so far, we have seen that both languages which mark the perfective/imperfective contrast, like the Romance languages, and languages which do not mark this contrast, use the imperfective aspect as a default view of habituals, while allowing the perfective aspect in some circumstances. Languages which do not mark the perfective/imperfective contrast mark a special aspect, the retrospective habitual, which is similar in complexity to the perfect aspect.[7]

[6] Binnick (2005), (2006) views the periphrastic habitual as a *present* tense, parallel to the *present* perfect, but in the following attested example, P (the interval modified by *now*) is actually most naturally interpreted as preceding speech time.

(i) She said that she now understands an awful lot of things. She always **used to ask** my opinions of things and that now a lot of my answers made sense.

[7] Portuguese is an interesting case to examine in light of the correlation which we try to establish here concerning the availability of a retrospective habitual in languages which lack a perfective/imperfective contrast. Portuguese, featuring the perfective/imperfective contrast, seems to have a

16.4 The modal nature of habituality

16.4.1 *Modality of simple and periphrastic forms*

After having shown in section 16.2 that habituality cannot be characterized aspectually in a uniform manner, we propose to characterize it as modal. The modal nature of habituality has been noted repeatedly, starting with Carlson (1977); Dahl (1975); Comrie (1985: 40); and as recently as Bittner (2008); Landman (2008), and others, and serves to distinguish habituality from accidental event plurality. We adopt the view that habituality is inherently modal, and thus cannot be characterized by a purely temporal notion of event recurrence (such as Van Geenhoven 2001, 2004; Scheiner 2002; Rimell 2005). We now show that this is the case for both simple and periphrastic forms.

First, both simple and periphrastic forms support counterfactuals. Both sentences below have a reading where they entail that whatever class might have taken place, the students would have typically worn a tie for it.

(23) a. be-1952 ha-studentim be-utrext **lavš-u**
in-1952, the students in Utrecht wear.PAST-3P
'aniva ba-ši'urim
tie in class
'In 1952, the students in Utrecht wore a tie in class.'

b. be-1952 ha-studentim be-utrext **hay-u** **lovš-im**
in-1952 the students in Utrecht BE.PAST-3P wear-PM

periphrastic habitual form, but it is not retrospective, rather it behaves like a (restricted) version of a universal present perfect form (Giorgi and Pianesi 1997; Schmitt 2001; Cabredo-Hofherr, Laca, and Carvalho 2008):

(i) Você tem feito seus deveres de casa?
you have.PR.SG do.PP your homework
'Have you done/been doing your homework regularly?'
(Cabredo-Hofherr, Laca, and Carvalho 2008: 6a)

This form is not retrospective, since in the present perfect P is not disjoint from R. Indeed, it can co-occur with *now,* unlike the English periphrastic habitual we saw above in (21b):

(ii) Agora já tem comido o suficiente.
Now I have-present eating enough
'Now I took the habit of eating enough.' (Giorgi and Pianesi 1997: 48 (21))

'aniva ba-ši'urim
tie in class
'In 1952, the students in Utrecht would/used to wear a tie in class.'
(translated from Delfitto 2000: 2a)

Second, since habitual sentences are modal, the generalizations they denote only hold systematically in idealized versions of reality, and allow exceptions in actuality, very similarly to the generic interpretation of noun phrases. This tolerance towards exceptions is true both for the simple and the periphrastic forms; thus there is no difference in this respect between (24a) on its habitual reading, and (24b):

(24) a. dina **'išn-a** 'axarey 'aruxat-ha-'erev
Dina smoke.PAST-3SF after dinner
'Dina smoked after dinner.'

b. dina **hayt-a** **me'ašen-et** 'axarey 'aruxat-ha-'erev
Dina BE.PAST-3SF smoke-SF after dinner
'Dina would/used to smoke after dinner.'

Third, the periphrastic form with the auxiliaries *would* and *haya* is the one used in other modal environments, such as modal subordination in (25). Moreover, habituals themselves trigger modal subordination, e.g. *baked/used to bake* in (26), parallel to the modal auxiliary *might* in (25):

(25) 'alul lehikanes lekan ganav
might to.enter to.here thief
hu **haya** **loke'ax** qodem kol et ha-maxšev
he BE.PAST.3SM take.SM first of all ACC the-computer
'A thief might enter. He would take the computer first.'

(26) safta šeli **aft-a** / **hayt-a** **of-a**
grandmother-my bake.PAST-3SF / BE.PAST-3SF bake-SF
'ugot mešag'ot, hi **hayt-a** **yoc-et**
cakes amazing she BE.PAST-3SF go.out-SF
la-gina ve-**qotefet** tapuxim,
to.the-garden and-pick-SF apples
axar kax hi **hayt-a** **xozer-et** la-mitbax u-**megarešet** et kulam…
then she BE.PAST-3SF return-SF to.the-kitchen and-shoo-SF ACC everybody…
'My grandmother baked/used to bake amazing cakes. She would go out to the garden and pick apples. Then she would return to the kitchen and shoo everybody out . . . '
(translated from Carlson and Spejewski 1997: 102 (1))

The auxiliaries *would* and *haya* are also used in counterfactuals. The correspondence of counterfactuality and habituality has been observed for many languages (e.g. Palmer 1986; Iatridou 2000; Cristofaro 2004).[8]

16.4.2 *Retrospectivity and actualization*

One of the arguments for the modality of habitual sentences given by Krifka *et al.* (1995) involves examples were habituality holds without a single instantiation:

(27) meri **tipl-a** b-a-do'ar me-'antarqtiqa.
Mary handle.PAST-3SF at-the-mail from-Antarctica
#mikevan še-lo haya do'ar kaze, haya l-a
because that-not HYY.PAST.3SM mail such, HYY.PAST-3SM to-her
harbe zman panuy
lots time free
'Mary handled the mail from Antarctica. #Since there was no such mail, she had a lot of free time.'

We noted in Boneh and Doron (2008) that periphrastic habituals, on the other hand, are judged to be false if uninstantiated:

(28) meri **hayt-a** **metapel-et** b-a-do'ar me-'antarqtiqa
Mary HYY.PAST-3SF handle-SF at-the-mail from-Antarctica
#mikevan še-lo haya do'ar kaze, haya l-a
because that-not HYY.PAST.3SM mail such, HYY.PAST.3SM to-her
harbe zman panuy
lots time free
'Mary used to handle the mail from Antarctica. #Since there was no such mail, she had a lot of free time.'

The two sentences of (28) are contradictory, since the first sentence conveys the actualization of episodes described by the verb phrase, and hence the existence of mail from Antarctica, which the second sentence denies.

Since the modal character of periphrastic habituals has been established in the previous section, we conclude that the requirement for actualization does not signal lack of modality.[9] There are actualization requirements for other

[8] In Serbo-Croatian too, according to Thomas (1998), one way of expressing habituals is in the conditional. This way mainly presents the habit 'as belonging to a distant past, terminated, cut off from the moment of speech' (Thomas 1998: 241).

[9] In Boneh and Doron (2008), we assumed that the requirement for actualization does signal lack of modality of the periphrastic form. We are grateful to Yael Greenberg and to Christopher Piñón for pointing out to us that actualization requirements are not incompatible with modality.

modal operators as well, as has been demonstrated for several languages (Bhatt 1999; Hacquard 2006).

We also note that the requirement for actualization can only be satisfied by an iteration of episodes, not by a single episode. In the following example, where a single episode is actualized, the simple form is acceptable while the periphrastic one is not:

(29) **Context**: Ruti started a new job. She decided to go there by bus. She only went there once, and shortly after that she died.

a. ruti **nas'a** la-'avoda ba-otobus
Ruti went.PAST.3SF to-work by-bus
'Ruti went to work by bus.'

b. #ruti **hay-ta** **nosa'a-t** la-a'voda ba-otobus
Ruti BE.PAST-3SF go-SF to-work by-bus
'Ruti would / used to go to work by bus.'

(29a) can be understood habitually, assuming Ruti had been disposed to continue going to work by bus, but (29b) is infelicitous even under this assumption.[10] The simple form is possible on the basis of a potential sequence of events that continue uninterruptedly in alternative worlds where Ruti remains alive, while the periphrastic form is false, since it requires a sequence of events (more than one), all of which are in the actual world.

To conclude this section, habituality, whether expressed by the periphrastic or the simple form, was shown to have a modal component. The two forms differ as to whether a sequence of events realizing the habit must necessarily take place in the actual world or not. The periphrastic form requires actualization. We would like to relate this fact to the conclusion of the previous section, whereby the periphrastic form serves to characterize an interval of time. It seems to us that only properties which are actualized can serve to characterize a temporal interval, and not unactualized dispositions.

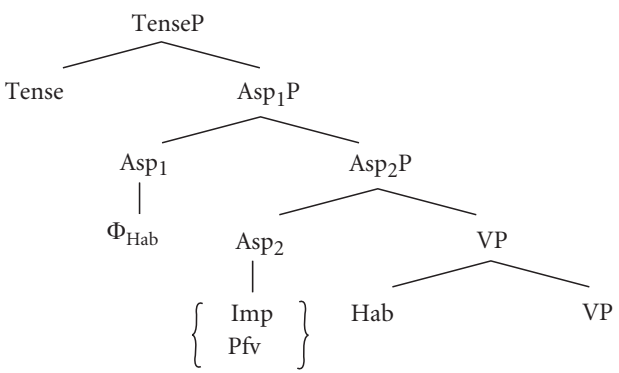
16.5 The structure of habituality

We have concluded that the perfective/imperfective contrast is not the distinguishing factor between simple and periphrastic expressions of habituality, since both may be imperfective. Neither is modality the distinguishing factor

[10] (29a) may also be understood episodically, of course.

between them, since we have found habituality to be modal in both forms. Rather we have shown that the periphrastic form is distinguished by its complex aspectuality: it offers a viewpoint on a preceding period of time which is both retrospective and imperfective. These findings can be integrated into the general framework we proposed in Boneh and Doron (2008). We continue to assume a habituality operator, Hab, which is a modal VP adjunct. Hab being an adjunct, it does not affect the morphology of the verb. The modified VP is input to aspectual operators. In simple expressions of habituality, Hab is the input to the Pfv/Imp operators. In the periphrastic expression of habituality, which involves a complex aspect, a higher aspectual operator Φ_{Hab} is found, which is realized as an auxiliary yielding the periphrastic habitual form, and only applies to imperfective predicates.

(30) Habitual sentence with simple/periphrastic forms



The concept at the basis of habituality is event iteration for an interval (e.g. Vlach 1993). We define iteration on the basis of Kratzer (2005), where e is a variable over events, w—over worlds and Q—over properties of plural events (where plurality includes singularity); σ is the sum operator of Link (1983), and $\subset$ is the proper subpart relation.

(31) ITER $\sim>$ $\lambda Q \lambda e \lambda w[Q(e, w)$ & $e=\sigma e'[Q(e', w)$ & $e' \subset e]]$

According to this definition, e is an ITER(Q) event in w iff e is the sum of all Q-events in w, where the sum has proper subparts, i.e. it consists of at least two Q-events. For example, e is an ITER(JOHN-SMOKE) event in w iff e is the sum of all JOHN-SMOKE events in w (assuming there are at least two).

Next, we define the interval i for which ITER(Q) holds in w. We assume that the running time of a sum of events is an interval, i.e. the interval that starts where the earliest event starts, and ends where the latest event ends.

(32) FOR $\sim>$ $\lambda Q \lambda i \lambda w \exists e[i = \tau(e)$ & ITER (Q,e,w)]

According to this definition, Q holds iteratively at i in world w iff i is the running time of the sum of Q-events in w. To exemplify: w is a world where JOHN-SMOKE holds iteratively at the one-year interval i iff the running time of the sum of all JOHN-SMOKE events in w is that one year interval i (assuming once again that there are at least two).

Before defining Hab as a modal operator on predicates Q of events, we note that though Hab does not require the actualization of Q, it does require some **initiating event**, an event which initiates the state s which is the disposition to Q:

(33) init(Q,s,w) iff $\exists e[\tau(e) < \tau(s)$ & e is an event initiating the disposition to Q in w]

We do not give an analysis of the notion of 'initiating-the-disposition', but we have in mind events which satisfy either Q or some other condition securing the disposition to Q, such as a contract, the manufacturing of an inanimate object with particular telic qualia, etc.

We now define Hab as a modal operator. Hab(Q) is stative, irrespective of Q, since it holds of instants as well as extended intervals. For a state s to count as satisfying the predicate Hab(Q), it must, first, be initiated, and second, be part of an interval i for which Q iterates, at least in worlds of the modal base $MB_{\tau(s),w}$:

(34) Hab$\sim>\lambda Q \lambda s \lambda w$[init(Q,s,w) & $\forall w' \in MB_{\tau(s),w} \exists i$ [$\tau(s) \subseteq i$ & FOR (Q,i,w')]

The modal base (as in Kratzer 1981, 1991) associates with an interval i and a world w, a set of accessible worlds $MB_{i,w}$ which is a set of nomic alternatives to world w at time i, ordered with respect to an ideal world where dispositions hold constantly once initiated. For example, Hab(JOHN-SMOKE) is a relation between states s and worlds w that holds iff s is properly initiated in w as a JOHN-SMOKE habit, and in every accessible world w', the sum of smoking events in that world has a running time including that of s, assuming that in w' there are at least two JOHN-SMOKE events.

According to (34), a habit can be predicated on the basis of event iteration in alternatives to the actual world, yet some initiating event is required in the actual world, which satisfies either Q or some other condition securing the disposition to Q. In the case of many habituals, the initiating event will itself simply satisfy Q. For example, the habit of smoking is initiated by an event of

smoking. The initiating event does not have to be plural, since one might suspect any singular event of being the first episode of a habit:

(35) When did you start to smoke? (said while you smoke for the first time)

The analysis thus claims that in order for John to have the habit of smoking in this world, there must be an initiating event in this world, typically at least one event of smoking. There need not be more smoking events in this world, but iteration *is* central to the notion of habituality: in the accessible worlds, which are the worlds in which nothing inhibits John from living according to his dispositions, the habit is instantiated by more than one event.

As for the aspectual operator Φ_{Hab}, it is realized as the aspectual auxiliary that gives rise to the periphrastic expression of habituality. The aspectuality it expresses is complex, in that it applies to the output of the imperfective operator, and in that it predicates both actualization and 'distancing' from the temporal perspective P. Its output are intervals of time which will eventually be ordered by the tense operator with respect to S. $\Phi_{\text{Hab}}(Q)$ maps properties of intervals i (the reference time R), to properties of intervals i^* (the perspective time P). The contribution of Φ_{Hab} is thus to require imperfectivity (second conjunct in the definition below), to require the extended interval nature of R, i.e. R is not an instant but a period of time (third conjunct in the definition), to require actualization (fourth conjunct) and proper precedence of R to P (last conjunct):[11]

(36) $\Phi_{\text{Hab}} \sim > \lambda Q\, \lambda i^* \lambda w\, \exists i\, \exists s\, [Q(i,w)\ \&\ i \subseteq \tau(s)\ \&\ \|i\| \neq o\ \&\ w \in MB_{\tau(s),w} \& i < i^*]$

16.6 Comparison with other analyses

16.6.1 *Dissociating habituality from plurality*

The analysis proposed in the previous section contrasts with a recent analysis of habituals proposed by Ferreira (2005). Ferreira, following Comrie (1976) (and similarly to Bonomi 1997, Cipria and Roberts 2000, among others), views habituality and progressivity as subtypes of imperfectivity, and proposes a unified analysis for both progressive and habitual readings of imperfective sentences, semantically and morphologically (the latter, for the Romance languages). According to him, the only difference between progressive and habitual readings concerns the number (singular or plural) of the events that are quantified over in the logical form of the

[11] Given n. 5, the last conjunct has to be modified for *would*, where it should say = rather than <.

sentences. The modality is the same, and involves the same ideal worlds in which an ongoing event of the kind described by the sentence is not interrupted by external factors (e.g. Dowty 1979; Landman 1992, 2008; Portner 1998). The difference between progressive and habitual readings reduces to the fact that the former applies to singular events and the latter to plural events.

We do not think that singular vs. plural number is actually the distinguishing factor between progressivity and habituality. We follow Krifka (1992), Landman (1996), Kratzer (2005), and others, in considering VP to denote plural events in general. Therefore, we view both progressives and habituals as potentially denoting plural events. Progressive and habitual predicates are very different from one another, but not necessarily in number. The progressive may apply to plural events:

(37) Sue is dialling a busy number.

This sentence most probably expresses a plurality of diallings, since the number is busy. Even when the sentence denotes a plural event, it does not necessarily express habituality.

Conversely, as we have already demonstrated above, in section 16.4.2, a plurality of events need not be actualized in order for a habitual sentence to be true. In cases where there is ambiguity between progressive and habitual, it can still be the case that neither requires an actual plurality of events:

(38) Johnny is crossing the street on his own.

Assume Johnny is a small child, crossing the street on his own for the very first time. Under this scenario, both readings are possible.

Similarly in French, Kleiber (1987) mentions the contrast in interpretation between (39), which he considers habitual, and (40), which he does not, despite the fact that both may involve a plurality of events:

(39) Paul allait à l'école à pied, l'année dernière.
Paul walked-IMP to school, last year (*ibid.*: 209 ex. 2)

(40) Paul allait à l'école à pied, la semaine dernière.
Paul walked-IMP to school, last week (*ibid.*: 208 ex. 24)

Thus we think that the progressive and the habitual do not necessarily differ in number. Rather, the progressive and habitual operators are different modal operators. Consider the difference between (41) and (42):

(41) This student writes good papers.

(42) This student is writing good papers.

The sentence in (41) describes a disposition of the student, expressed by iterations of good paper writing in all accessible worlds of the modal base. In (42) on the other hand, the good paper writing may very well be accidental, with the progressive only requiring the continuation of the particular sequence of good paper writing in those accessible worlds were these particular good papers are written.

The following pair of examples attests another difference in the modality of the progressive and the habitual simple forms.

(43) a. #They are issuing visas at the consulate, but they are closed this month.
b. They issue visas at the consulate, but they are closed this month.

The progressive seems to require an event of visa-issuing within every relevant subinterval of the habit-time. But (43a) states that this requirement is not met within the present month, and is thus contradictory. As we demonstrated in section 16.4.2 above, the habitual operator Hab does not require actualization, and (43b) is therefore not contradictory.

Finally, another argument can be based on Giannakidou (1995), who shows that habituality and progressivity differ in the licensing of negative polarity items in Greek. It therefore cannot be the case that both habituality and progressivity are expressions of one and the same operator. Giannakidou shows that *kanénas* indefinites are licensed in habitual but not in progressive sentences, though both share the same imperfective morphology:

(44) a. ótan thimótane, o jánis égrafe **kanéna gráma** ston patéra tou
Whenever he remembered-IMP, John wrote-IMP **any letter** to his father
(Giannakidou 1995: 30)
b. *ti stigmí pu o jánis milúse me **kanénan fílo tu** sto tiléfono, égine to atíxima
While John talked-IMP on the phone with **any friend of his**, the accident took place
(Giannakidou 1995: 32)

16.6.2 *Habituality and disposition*

A sentence such as (45a) below is not captured by Ferreira's account of the habitual, since it can clearly be true without a single, let alone plural, event of

actually selling vacuum-cleaners. Ferreira (2005) (also Scheiner 2002) does not consider such a sentence habitual, but rather as a verbal counterpart of (45b),

(45) a. John sells vacuum-cleaners.
b. John is a vacuum-cleaner seller.

not only in meaning but in morphology as well: similarly to the nominalizer suffix *-er* attaching to the stem *sell*, Ferreira proposes that English might have a zero-affix verbal counterpart taking eventive predicates as its argument and returning stative predicates with the same interpretation as that of the *-er* noun.

In Krifka *et al.* (1995); Lenci and Bertinetto (2000); Mittwoch (2005), professional occupations are brought as cases attesting to the modal nature of habituals, where the actual world need not necessarily be included in the worlds where the occupation is realized as a sequence of episodes. In the analysis developed here, we have included professional occupations as satisfying the habitual operator Hab. What is central to the analysis is that the episodes in question are non-accidental in nature, whether they occur in the actual world or not.

Moreover, we reject the view (Lawler 1973; Dahl 1975; Schubert and Pelletier 1989; Green 2000; Menéndez-Benito 2005; Ferreira 2005) that sentences like (46) have two distinct readings: a dispositional reading and a habitual reading.

(46) a. This machine crushes/crushed oranges.
b. This car goes/went 250 km/h.

According to the ambiguity view, (46) means on the former reading that the machine or car has the capacity/ability of crushing oranges or going 250 km/h, on the latter reading, it means that it regularly/usually does.

This purported ambiguity is independent of the question of whether the car or the machine needs to perform the attributed activity even once for the sentence to be true. Menéndez-Benito (2005) shows that there are dispositional sentences which *cannot* be true if there are no instantiating episodes involved:

(47) Bob jumps 8.90. (Krifka *et al.* 1995: 55(97))

This sentence cannot qualify as true on a dispositional reading without a single actual event, which we would view as an initiating event in the sense of (33) above. Taking into consideration only Bob's physical state, talent and other external circumstances is not enough. As such it is not paraphrasable by *Bob can jump 8.90*, which may be true if no actual jumps to this height

occurred. Conversely, we have shown that habituality is not in general characterized by actualization. Thus non-actualization is not what distinguishes dispositions from habituality.

What is seen as two readings in (47) is actually two different circumstances which satisfy the sentence, depending on whether the habit is actualized beyond an initiating event or not. These are actually two types of circumstances, not two readings.[12] The contexts which favor the dispositionality interpretation are more restricted, and often disappear with locative modifiers, as in the following example from Hackl (1998: 65a). This example is only interpreted as a habit, though without the locative modifier, it is more naturally interpreted as a disposition:

(48) John speaks French in the car.

16.7 Conclusion

In this chapter we have argued for a broad modal conception of habituality, one which includes dispositionality. Dispositionality is not part of progressivity, hence we concluded that the progressive is built on a distinct modal operator.

We have shown that habitual sentences cannot be characterized uniformly in aspectual terms. Contrary to the common view, habituality is not exclusively associated with imperfectivity, both semantically and morphologically. We have shown, for the Romance languages, that perfective forms also give rise to habitual interpretation. In languages lacking the perfective/imperfective contrast such as Hebrew, English, and Polish, we have found that aspectuality is determined to a large extent on the basis of lexical aspect. Thus, habituals, like states in general, are interpreted imperfectively by default. In context, it is possible to coerce perfectivity, but not when the habitual form is used to characterize an interval in retrospect. We have pointed to an operator in these languages, expressed by periphrasis, which expresses exactly

[12] We disagree with Menéndez-Benito, who argues for the existential nature of dispositional sentences by pointing to the fact that they license negative polarity items,

(i) John eats anything.

similarly to possibility modals and unlike necessity modals, where only the former selects *any*:

(ii) a. John can eat anything.
b. *John must eat anything.

We are not convinced that the contrast in (ii) indeed holds in general, and it seems to us to be reversed for epistemic modality.

this retrospective habituality. Since it is used to characterize a period of time, this operator also predicates the actualization of the habit.

The natural association of stativity with imperfectivity underlies the pervasive belief that habituality is a subcase of imperfectivity. However, the picture that emerges from this chapter is that habituality is only indirectly related to aspect, and that, in the different languages, aspectual properties manifested by a given habitual form depend on the particular aspectual operators at work in that language.

References

Abeillé, Anne (1995) 'The flexibility of French idioms: A representation with lexicalised tree adjoining grammar', in M. Everaert, E.-J. van der Linden, A. Schenk, and R. Schroeder (eds.), *Idioms: Structural and Psychological Perspectives*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 15–52.

Abeillé, Anne and Yves Schabes (1989) 'Parsing idioms in lexicalized TAGs', in *Proceedings of the Fourth Conference of the European Chapter of the Association for Computational Linguistics*. Manchester, University of Manchester, Institute of Science and Technology, 1–9.

Abusch, Dorit (1988) 'Sequence of tense, intensionality, and scope'. *Proceedings of the West Coast Conference on Formal Linguistics* 7: 1–14.

—— (1997) 'Sequence of tense and temporal de re'. *Linguistics and Philosophy* 20(1): 1–50.

Afarli, Tor A. (1997) 'Dimensions of phrase structure: the representation of sentence adverbials', *Motskrift*. 2: Institutt for nordistikk og litteraturvitenskap, NTNU, 91–113.

Alexiadou, Artemis (2001) *Functional Structure in Nominals: Nominalization and Ergativity*. Amsterdam: John Benjamins.

——(2005) 'A note on non-canonical passives: the case of the get passive', in H. Broekhuis *et al.* (eds.) *Festschrift für Henk van Riemsdijk*. Berlin: Mouton de Gruyter.

Alexiadou, Artemis, M. Rathert, and Arnim von, Stechow (2003) 'Introduction: the modules of perfect construction', in Alexiadou, Rathert, and Stechow (eds.) *Perfect Explorations*. Berlin: Mouton de Gruyter.

Alexiadou, Artemis, and Elena Anagnostopoulou (2004) 'Voice morphology in the causative-inchoative alternation: evidence for a non unified structural analysis of unaccusatives', in A. Alexiadou, E. Anagnostopoulou, and M. Everaert (eds.) *The Unaccusativity Puzzle*. Oxford: Oxford University Press.

Alexiadou, Artemis, and Florian Schäfer (2006) 'Instrument subjects are agents or causers'. To appear in Proceedings of WCCFL 25.

Alexiadou, Artemis, Elena Anagnostopoulou, and Florian Schäfer (2006) 'The properties of anti-causatives cross-linguistically', in M. Frascarelli (ed.), *Phases of Interpretation*. Berlin: Mouton de Gruyter.

Alexiadou, Artemis, and Edit Doron (2007) 'The syntactic construction of two non-active voices: passive and middle', paper presented at the workshop on global selective comparison. GLOW XXX: Tromsö.

Alexiadou, Artemis, and Elena Anagnostopoulou (2009). 'Agent, causers and instruments PPs in Greek: implications for verbal structure'. MIT Working Papers in Linguistics 57: 1–16.

Al-Fityani, Kinda (2007) 'Arab sign languages: a lexical comparison', *Technical report. Center for Research in Language Newsletter*, 19(1).

Arad, Maya (2002) 'Universal features and language particular morpheme', in A. Alexiadou (ed.), *Theoretical Approaches to Universals*. Amsterdam: John Benjamins.

Arnold, Bill and John Choi (2003) *A Guide to Biblical Hebrew Syntax*. Cambridge: Cambridge University Press.

Aronoff, Mark (1983) 'Potential words, actual words, productivity and frequency', in S. Inoue and K. Hattori (eds.), *Proceedings of the XIII International Congress of Linguists*. Tokyo: Permanent International Committee on Linguistics, 163–71.

Aronoff, Mark, Irit Meir, Carol Padden, and Wendy Sandler (2004) 'Morphological universals and the sign language type', *Yearbook of Morphology*, 19–40.

Aronoff, Mark, Irit Meir, and Wendy Sandler (2005) 'The paradox of sign language morphology', *Language*, 81(2): 301–44.

Aronoff, Mark, Irit Meir, Carol A. Padden, and Wendy Sandler (2008) 'The roots of linguistic organization in a new language', *Interaction Studies: A Special issue on Holophrasis vs. Compositionality in the Emergence of Protolanguage* 9(1): 131–50.

Aske, Jon (1989) 'Path predicates in English and Spanish: a closer look', *Proceedings of Annual Conference of Berkeley Linguistics Society* 15: 1–14.

Bach, Emmon (1986) 'The algebra of events', *Linguistics and Philosophy* 9: 5–16.

Badawi, El Said, Mike Carter, and Adrian Gully (2004). *Modern Written Arabic: A Comprehensive Grammar*. London and New York: Routledge.

Baker, Mark (1988) *Incorporation: A Theory of Grammatical Function Changing*. Chicago: University of Chicago Press.

——(2003) *Lexical Categories: Verbs, Nouns and Adjectives*. Cambridge: Cambridge University Press.

Baltin, Mark (1989) 'Heads and projections', in M. Baltin and A. S. Kroch (eds.), *Alternative Conceptions of Phrase Structure*. Chicago and London: Chicago University Press, 1–16.

Beavers, John (2008) 'Scalar complexity and the structure of events', in J. Dölling and T. Heyde-Zybatow (eds.), *Event Structures in Linguistic Form and Interpretation*. Berlin: Mouton de Gruyter.

Beck, Sigrid and William Snyder (2001a) 'Complex predicates and goal PP's: evidence for semantic parameter', in H.-J. Do, L. Dominguez, and A. Johansen (eds.), *Proceedings of the 25th Annual Boston University Conference on Language Development,* Vol. 1. Somerville, MA: Cascadilla Press, 114–22.

—— ——(2001b) 'The resultative parameter and restitutive *again*', in C. Frey and W. Sternefeld (eds.), *Auditur vox sapientiae: a Festschrift for Arnim von Stechow*. Berlin: Akademie Verlag, 81–95.

Behrend, Douglas (1990) 'The development of verb concepts: children's use of verbs to label familiar and novel events', *Child Development* 61: 681–96.

Belletti, Adriana (1988) 'The case of unaccusatives', *Linguistic Inquiry* 19: 1–34.

Belletti, Adriana and Luigi Rizzi (1981). 'The syntax of *ne*: Some theoretical implications', *Linguistic Review* 1: 117–54.

Bende-Farkas, Ágnes (2001) *Verb–object Dependencies in Hungarian and English: A DRT-Based Account*. PhD dissertation. University of Stuttgart.

Bennett, Michael (1977) 'A guide to the logic of tense and aspect in English', *Logique et Analyse* 20: 491–517.

Bennett, Michael and Barbara Partee (1972) 'Towards the logic of tense and aspect in English', Report for the System Development Corporation, Santa Monica, CA. Reprinted in Partee, Barbara, 2004, *Compositionality in Formal Semantics*. Oxford: Blackwell, 59–109.

——— ———(1978) *Toward the Logic of Tense and Aspect in English*. Bloomington, Indiana: Indiana University Linguistics Club.

Bennis, Hans (2000) 'Adjectives and argument structure', in P. Coopmans, M. Everaert, and J. Grimshaw (eds.), *Lexical Specification and Insertion*, Amsterdam/Philadephia: John Benjamins, 27–69.

———(2004) 'Unergative adjectives and psych verbs', in A. Alexiadou, E. Anagnostopoulou, and M. Everaert (eds.), *The Unaccusativity Puzzle: Studies on the Syntax-Lexicon Interface*, Oxford: Oxford University Press, 84–114.

Bhatt, Rajesh (1999) *Covert Modality in Non-Finite Contexts*. PhD thesis. University of Pennsylvania.

Bhatt, Rajesh and David Embick (in preparation) 'Causative derivations in Hindi'. Ms., UMass and UPenn.

Binnick, Robert (2005) 'The markers of habitual aspect in English', *Journal of English Linguistics* 33: 339–69.

———(2006) '*Used to* and habitual aspect in English', *Style* 40 (1–2): 33–45.

Bittner, Maria (2008) 'Aspectual universals of temporal anaphora', in S. Rothstein (ed.), *Crosslinguistic and Theoretical Approaches to the Semantics of Aspect*, Amsterdam: John Benjamins.

Bliss, Heather (2007) 'Structuring information in Blackfoot: against an A′-agreement analysis of cross-clausal agreement', unpublished Ms. University of British Columbia.

Bloomfield, Leonard (1946) 'Algonquian', in Harry Hoijer (ed.), *Linguistic Structures of Native America*. New York: Viking Fund Publications in Anthropology, 6: 85–129.

Boas, Franz and Elba Deloria (1939) *Dakota Grammar*. Memoirs of the National Academy of Sciences Vol. 23, no. 2.

Bobrow, Samuel and Susan Bell (1973) 'On catching on to idiomatic expressions', *Memory and Cognition* 1: 343–6.

Bochenski, Innocenty Maria (1961 [1970]) *A History of Formal Logic*, translated and edited by I. Thomas. New York, New York: Chelsea Publishing Company.

Bohnemeyer, Jürgen (2007) 'Morpholexical Transparency and the Argument Structure of Verbs of Cutting and Breaking', *Cognitive Linguistics* 18: 153–77.

Boneh, Nora and Edit Doron (2008) 'Habituality and the habitual aspect', in S. Rothstein (ed.), *Crosslinguistic and Theoretical Approaches to the Semantics of Aspect*, Amsterdam: John Benjamins, 321–47.

——(2008a) 'Deux concepts d'habitualité'. *Recherches Linguistiques de Vincennes* 37. Saint-Denis, 113–38.

Bonomi, Andrea (1995) 'Aspect and quantification', in P. M. Bertinetto, V. Bianchi, J. Higginbotham, and M. Squartini (eds.), *Temporal Reference, Aspect and Actionality*. Torino: Rosenberg and Seiller, 93–110.

Borer, Hagit (1980) 'Empty subjects in Modern Hebrew and constraints on thematic relations', in *Proceedings from the X Annual Meeting of the North-Eastern Linguistic Society*.

——(1989) 'On the morphological parallelism between compounds and construct state nominals', in G. Booij and J. van Marle (eds.), *The Morphology Yearbook* 1. Dordrecht: Foris Publications.

——(1999) 'The forming, the formation and the form of nominals', Ms., USC.

——(2005a) *Structuring Sense, Volume I: In Name Only*. Oxford: Oxford University Press.

——(2005b) *Structuring Sense, Volume II: The Normal Course of Events*. Oxford: Oxford University Press.

——(forthcoming) *Structuring Sense, Volume. III: Taking Form*. Oxford: Oxford University Press.

Borer, Hagit and Yosef Grodzinsky (1986) 'Syntactic cliticization and lexical cliticization: the case of Hebrew dative clitics', in H. Borer (ed.), *The Syntax of Pronominal Clitics, Syntax and Semantics 19*. New York: Academic Press.

Bos, Heleen (1994) 'An auxiliary in sign language of the Netherlands', in I. Ahlgren, B. Bergman, and M. Brennan (eds.), *Perspectives on sign language structure: Papers from the fifth international symposium on sign language research*. University of Durham: International Sign Linguistics Association, 37–53.

Branigan, Phil and Marguerite MacKenzie (2000) 'How much syntax can you fit into a word? Late insertion and verbal agreement in Innu-aimûn', presented at WSCLA 5, University of Toronto.

—— ——(2002) 'Altruism, A´-movement, and object agreement in Innu-aimûn', *Linguistic Inquiry* 33: 385–408.

Bresnan, Joan (ed.) (1982) *The Mental Representation of Grammatical Relations*. Cambridge, MA: MIT Press.

Bresnan, Joan and Jonni Kanerva (1989) 'Locative inversion in Chichewa: a case study of factorization in grammar', *Linguistic Inquiry* 20: 1 1–50.

Bresnan, Joan and Lioba Moshi (1990) 'Object asymmetries in comparative Bantu syntax', *Linguistic Inquiry* 21: 147–85.

Brittain, Julie (2003) 'A distributed morphology account of the syntax of the Algonquian verb', in S. Somesfalean and S. Burrell (eds.), Proceedings of the 2003 Annual Conference of the Canadian Linguistic Association. Département de linguistique et de didactique des langues. Université du Québec à Montréal, 26–41.

Burger, Harald, Annelies Buhoffer, and Ambros Sialm (1982) *Handbuch der Phraseologie*. Berlin/The Hague: De Gruyter.

Burzio, Luigi (1986) *Italian Syntax: A Government-Binding Approach*. Dordrecht: Reidel.

Butt, Miriam (2003) 'The light verb jungle', *Harvard Working Papers in Linguistics*, Volume 9; 1–49.

Cabredo-Hofherr, Patricia, Brenda Laca, and Sandra de Carvalho (2008) 'When "perfect" means "plural": the present perfect in Northeastern Brazilian Portuguese', Ms. Université Paris 8 and CNRS UMR 7023.

Carlson, Gregory (1977) *Reference to Kinds in English*. PhD dissertation. University of Massachusetts, Amherst. Published 1980 by New York: Garland Press.

Carlson, Gregory and Beverly Spejewski (1997) 'Generic passages', *Natural Language Semantics* 5: 101–65.

Chierchia, Gennaro (1989) 'A semantics for unaccusatives and its syntactic consequences', in A. Alexiadou, E. Anagnostopoulou, and M. Everaert (eds.), *The Unaccusativity Puzzle. Explorations at the Syntax–Lexicon Interface*. Oxford: Oxford University Press.

—— (1998) 'Reference to kinds across languages,' in *Natural Language Semantics* 6: 339–405.

Cipria, Alicia and Craige Roberts (2000) 'Spanish imperfecto and preterito: truth conditions and aktionsart effects in a situation semantics', *Natural Language Semantics* 8: 297–347.

Chomsky, Noam (1965) *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

—— (1966) *Cartesian Linguistics*. New York: Harper and Row.

—— (1972) *Language and Mind*. New York: Harcourt Brace Jovanovich.

—— (1981) *Lectures on Government and Binding*. Dordrecht: Foris.

—— (1986) *Knowledge of Language: Its Nature. Origin and Use*. New York: Praeger.

—— (1995) *The Minimalist Program*. Cambridge, MA: MIT Press.

—— (2000) 'Minimalist inquiries: the framework', in R. Martin, D. Michaels, and J. Uriagereka (eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*. Cambridge, MA: MIT Press, 89–155.

Cinque, Guglielmo (1990) 'Ergative adjectives and the lexicalist hypothesis', *Natural Language and Linguistic Theory* 8, 1–40.

Clark, Eve and Herbert Clark (1979) 'When nouns surface as verbs', *Language* 55, 767–811.

Comrie, Bernard (1976) *Aspect*. Cambridge: Cambridge University Press.

—— (1985) *Tense*. Cambridge: Cambridge University Press.

Coopmans, Peter and Everaert, Martin (1988) 'The simplex structure of complex idioms: the morphological status of *laten*', in M. Everaert, A. Evers, M. A. C. Huybregts, and M. Trommelen (eds.), *Morphology and Modularity*. Dordrecht: Foris, 75–104.

Craig, Colette (1977) *The Structure of Jacaltec*. Austin, TX: University of Texas Press.

Cristofaro, Sonia (2004) 'Past habituals and irrealis', in *Irrealis and Irreality*, Y. A. Lander, V. A. Plungian, A. Yu. Urmanchieva (eds.). Moscow: Gnosis, 256–72.

Croft, William (1990) 'Possible verbs and event structure', in S. L. Tsohatzidis (ed.), *Meanings and Prototypes: Studies on Linguistic Categorization*. London: Routledge.

—— (1991) *Syntactic Categories and Grammatical Relations*. Chicago. IL: University of Chicago Press.

—— (2005) 'Aspectual and causal structure in event representations'. Ms. University of New Mexico.

Dahl, Östen (1975) 'On generics', in *Formal Semantics of Natural Language*, E. Keenan (ed.). London and New York: Cambridge University Press. 99–112.

Dahlstrom, Amy (1991) *Plains Cree Morphosyntax*. New York: Garland Press.

Davidson, Donald (1967) 'The logical form of action sentences', reprinted in Donald Davidson (1980), *Essays on Actions and Events*. Oxford: Clarendon Press.

Davis, Hayley (2000) 'Salish evidence on the causative-inchoative alternation', in W. Dressler *et al.* (eds.), *Morphological Analysis in Comparison*. Amsterdam: John Benjamins, 25–60.

Deal, Amy Rose (2008) 'The origin and content of expletives: evidence from "selection"', to appear in *Syntax*.

Declerck, Renaat (1979) 'Aspect and the bounded/unbounded (telic/atelic) distinction', *Linguistics* 17: 761–94.

Delfitto, Denis (2000) 'On the morphosyntactic roots of genericity', H. Bennis, M. Everaert, and E. Reuland (eds.), *Interface Strategies*. Amsterdam: Royal Nederlands Academy of Arts and Sciences. 71–94.

Demirdache, Hamida (2005) 'What do pieces of words name?' Handout. Talk presented at the University of Vienna.

den Dikken, Marcel (1995) *Particles: On the Syntax of Verb-Particle, Triadic and Causative Constructions*. Oxford: Oxford University Press.

Díaz Vera, Javier (2000) 'The development of causation in Old English and its interaction with lexical and diachronic processes'. CIF. XXVI, 17–38.

Di Sciullo, Anna-Maria and Edwin Williams (1987) *On the Definition of Word*. Cambridge, MA: MIT Press.

Dobrovie-Sorin, Carmen and Brenda Laca (1996) 'Generic bare NPs', Ms. Université Paris 7 and Université de Strasbourg.

Doron, Edit (2003) 'Agency and voice: the semantics of the Semitic templates', *Natural Language Semantics* 11(1): 1–67.

Dowty, David (1977) 'Toward a semantic analysis of verb aspect and the English "imperfective" progressive', *Linguistics and Philosophy* 1: 45–78.

—— (1979) *Word Meaning and Montague Grammar: The Semantics of Verbs and Times in Generative Semantics and in Montague's PTQ*. Dordrecht: Reidel.

—— (1989) 'On the semantic content of the notion "thematic role"', in G. Chierchia, B. Partee, and R. Turner (eds.), *Properties, Types and Meaning II*, Dordrecht: Kluwer, 69–129.

—— (1991) 'Thematic proto-roles and argument selection', *Language* 67, 547–619.

—— (2007) 'Compositionality as an empirical problem', in C. Barker and P. Jacobson, *Direct Compositionality*. Oxford: Oxford University Press, 23–101.

Dryer, Matthew S. (2005) 'Order of subject, object, and verb', in Haspelmath, M., M. S. Dryer, D. Gil, and B. Comrie (eds.), *The World Atlas of Language Structures*. Oxford: Oxford University Press, 330–4.

Dubinsky, Stan (1994) 'Predicate union and the syntax of Japanese causatives', *Journal of Linguistics* 30: 43–79.

Ducrot, Oswald (1979) 'L'imparfait en français', *Linguistische Berichte* 60: 1–23.

Dunham, Joel (2007) 'The "durative" in Blackfoot: understanding imperfectivity', presented at SULA 4, Universidade de São Paulo.

Embick, David (1997) *Voice and the Interfaces of Syntax*. PhD dissertation. University of Pennsylvania.

—— (1998) 'Voice systems and the syntax/morphology interface', *MIT Working Papers in Linguistics* 32: 41–72.

—— (2003) 'Locality, listedness and morphological identity', *Studia Linguistica* 57: 143–69.

—— (2004a) 'Unaccusative syntax and verbal alternations', in A. Alexiadou, E. Anagnostopoulou, and M. Everaert (eds.), *The Unaccusativity Puzzle*. Oxford: Oxford University Press.

—— (2004b) 'On the structure of resultative participles in English', *Linguistic Inquiry* 35, 355–92.

Embick, David and Alec Marantz (2006) 'Architecture and blocking', unpublished Ms. University of Pennsylvania and MIT.

Emonds, Joseph (2000) *Lexicon and Grammar: The English Syntacticon*. Berlin: Mouton de Gruyter.

Enfield, Nick (2002) 'Cultural logic and syntactic productivity: associated posture constructions in Lao', in N. Enfield (ed.), *Ethnosyntax*. Oxford: Oxford University Press, 231–58.

Erbach, Gregor (1992) 'Head-driven lexical representation of idioms in HPSG', in M. Everaert, E.-J. van der Linden, A. Schenk, and R. Schreuder (eds.) *Proceedings of Idioms (Volume 1). International Conference on idioms*. Tilburg: Institute for Language Technology and AI, 11–24.

Erteschik-Shir, Nomi (1987) 'Right node raising', in M. A. Browning, E. Czaykowski-Higgins, and E. Ritter (eds.), *MIT Working Papers in Linguistics*. 9, 105–13.

—— (2007) *Information Structure: The Syntax-Discourse Interface*. Oxford: Oxford University Press.

Erteschik-Shir, Nomi and Tova Rapoport (1997) 'A theory of verbal projection', in Gabriela Matos and Matilde Miguel (eds.), *Interfaces in Linguistic Theory*. Lisboa: APL/Ediçõnes Colibri, 129–48.

—— —— (2000) 'Aspectual focus'. *GLOW*. Bilbao.

—— —— (2004) 'Bare aspect: a theory of syntactic projection', in Jacqueline Guéron and Jacqueline Lecarme (eds.), *The Syntax of Tense*. Cambridge, MA: MIT Press, 217–34.

—— —— (2005) 'Path predicates', in Nomi Erteschik-Shir and Tova Rapoport (eds.), *The Syntax of Aspect*. Oxford: Oxford University Press.

—— —— (2007) 'Projecting argument structure: the grammar of hitting and breaking revisited', in Eric Reuland, Tanmoy Bhattacharya, and Giorgos Spathas (eds.), *Argument Structure*. Amsterdam: John Benjamins, 37–48.

—— —— (in preparation) 'The atoms of meaning: interpreting verb projections'. Ben Gurion University.

Espenson, Jane (1991) Unpublished ms-1991. 'The structure of the system of causation metaphors'. University of California, Berkeley.

Ethnologue website http://www.ethnologue.com/show_language.asp?code=bla 20 June 2008.

Everaert, Martin (1991) 'The lexical representation of idioms and the morphology–syntax interface', unpublished ms. Utrecht University.

—— (1993) 'Verbal idioms, subject idioms and theta theory', in L. S. Stvan, L. Smith, S. Ryberg, M. B. Olsen, T. Macfarland, L. DiDesidero, A. Bertram, and L. Adams. *FLSM III: Papers from the Third Annual Meeting of the Formal Linguistics Society of Midamerica*. Bloomington, Indiana University Linguistics Club, 43–59.

—— (1995) 'Auxiliary selection in idiomatic constructions', in L. Nash and G. Tsoulas (eds.), *Actes du premier colloque Langues et Grammaire*. Paris, University Paris-8, 103–17.

—— (1996) 'The encoding of the lexical semantic structure of verbs: the case of auxiliary selection in idioms', in E. Weigand and F. Hundsnurscher (eds.), *Proceedings of the International Conference on Lexicology and Lexical Semantics Münster, Volume 2*. Tübingen: Max Niemeyer Verlag, 27–37.

Fellbaum, Christiane (1986) *On the Middle Construction in English*. Bloomington, Indiana: Indiana University Linguistics Club.

Ferreira, Marcelo (2005) *Event Quantification and Plurality*. PhD dissertation. MIT.

Filip, Hana (1999) *Aspect, Eventuality Types and Nominal Reference*. New York: Garland.

—— (2000) 'The quantization puzzle', in C. Tenny and J. Pustejovsky (eds.), *Events as Grammatical Objects, from the Combined Perspectives of Lexical Semantics, Logical Semantics and Syntax*. Stanford: CSLI Press.

—— (2004) *The Telicity Parameter Revisited*, paper presented at the SALT XIV, Semantics and Linguistic Theory, Cornell University, Ithaca.

—— (2005) 'The telicity parameter revisited'. *Semantics and Linguistic Theory (SALT) XIV*, Ithaca. CLC Publications, Department of Linguistics, Cornell University, 92–109.

—— (2008) 'Events and maximalization: the case of telicity and perfectivity', in S. Rothstein (ed.), *Crosslinguistic and Theoretical Approaches to the Semantics of Aspect*. Amsterdam: John Benjamins, 217–56.

Filip, Hana and Gregory Carlson (1997) *Sui Generis* Genericity. *Penn Working Papers in Linguistics*, 4. University of Pennsylvania.

Filip, Hana and Susan Rothstein (2006) 'Telicity as a semantic parameter', in J. Lavine, S. Franks, M. Tasseva-Kurktchieva, and H. Filip (eds.), *Formal Approaches to Slavic*

Linguistics: The Princeton Meeting 2005. Ann Arbor, MI: Michigan Slavic Publications, University of Michigan, 139–56.

Fillmore, Charles (1968) 'The case for case', in E. Bach and R. Harms (eds.), *Universals in Linguistic Theory*. New York, Holt, Rinehart and Winston, 1–88.

—— (1970) 'The grammar of *hitting* and *breaking*', in R. A. Jacobs and P. S. Rosenbaum (eds.), *Readings in English Transformational Grammar*. Waltham, MA: Ginn and Company, 120–33.

—— (1975) 'An alternative to checklist theories of meaning', *Berkeley Linguistic Society Proceedings* 1: 123–31.

—— (1977a) 'The case for case reopened', in P. Cole (ed.), *Syntax and Semantics 8: Grammatical Relations*. New York: Academic Press, 59–81.

—— (1977b) 'Topics in lexical semantics', in R. Cole (ed.), *Current Issues in Linguistic Theory*. Bloomington: Indiana University Press, 76–138.

—— (1982a) 'Frame semantics', in *Linguistics in the Morning Calm*. Seoul: Hanshin, 111–38.

—— (1982b) 'Toward a descriptive framework of spatial deixis', in R. J. Jarvella and W. Klein (eds.), *Speech, Place and Action*. London: John Wiley.

—— (1985) 'Frames and the semantics of understanding', *Quaderni di Semantica* 6(2): 222–53.

Fillmore, Charles, Paul Kay, and Catherine O'Connor (1988) 'Regularity and idiomaticity in grammatical constructions: the case of *let alone*', *Language*, 64.3: 501–38.

Fischer, Susan D. (1996) 'The role of agreement and auxiliaries in sign language', *Lingua, 98*(1–3), 103–19.

Foley, William and Robert Van Valin, Jr (1984) *Functional Syntax and Universal Grammar*. Cambridge, UK: Cambridge University Press.

Folli, Raffealla (2002) *Constructing Telicity in English and Italian*. PhD dissertation. University of Oxford.

Folli, Rafaella and Heidi Harley (2005) 'Flavors of *v*: consuming results in Italian and English', in P. Kempchinsky and R. Slabakova (eds.), *Aspectual Inquiries*. Dordrecht: Springer. 95–120.

—— —— (2008) 'Teleology and animacy in external arguments', *Lingua* 118: 190–202.

Forbes, Graeme (2003) 'Verbs of creation and depiction: more events in the semantics of English'. Final draft, Sept. 2003. http://spot.colorado.edu/forbesg/pdf_files/vbs_of_C&D.pdf.

Frantz, Donald (1978) 'Copying from complements in Blackfoot', in E.-D. Cook and J. Kaye (eds.), *Linguistic Studies of Native Canada*. Vancouver: University of British Columbia Press, 89–110.

—— (1991) *Blackfoot Grammar*. Toronto: University of Toronto Press.

Frantz, Donald and Norma Jean Russell (1995) *Blackfoot Dictionary of Stems, Roots, and Affixes*. Toronto: University of Toronto Press.

Fraser, Bruce (1970) 'Idioms within a transformational grammar', *Foundations of Language* 6: 22–42.

Freeze, Ray (1992) 'Existentials and other locatives', *Language* 68: 553–95.

Fu, Jingki (1994) *On Deriving Chinese Derived Nominals: Evidence for Parallel Morphology*. PhD dissertation. Amherst, MA: University of Massachusetts.

Fu, Jingki, Thomas Roeper, and Hagit Borer (2001) 'The VP within process nominals: evidence from adverbs and the VP-anaphor *DO-SO*', *Natural Language and Linguistic Theory* 19, 549–82.

Fukuda, Shin (2006) 'On the control/raising ambiguity with aspectual verbs: a structural account', in Barbara Stiebels (ed.), *Studies in Complement Control*. ZAS Papers in Linguistics 47: 159–95.

Gawron, Jean Mark (2007) 'Paths and the language of change', unpublished ms., San Diego, CA. San Diego State University.

Gazdar, Gerald, Ewan Klein, Geoffrey Pullum, and Ivan Sag (1985) *Generalized Phrase Structure Grammar*. London: Basil Blackwell.

van Geenhoven, Veerle (2001) 'Frequency and habituality as distributed iterativity'. Handout of lecture delivered at the 17th meeting of IATL (Israel Association for Theoretical Linguistics).

—— (2004) '*For*-adverbials, frequentative aspect and pluractionality'. *Natural Language Semantics* 12: 135–90.

Gehweiler, Elke (2006) 'How do homonymic idioms arise?' Ms. Freie Universität Berlin and BBAW.

Gentner, Dedre (1978) 'On relational meaning: the acquisition of verb meaning', *Child Development* 49: 988–98.

Giannakidou, Aanastasia (1995) 'Subjunctive, habituality and negative polarity items', *SALT* 5, 94–111.

Giannakidou, Anastasia and Jason Merchant (1998) 'Why Giannis can't scrub his plate clean: on the absence of resultative secondary predication in Greek', *Greek Linguistics '97: Proceedings of the 3rd International Conference on Greek Linguistics*. Athens, Ekdosis Ellinika Grammata, 93–103.

Giorgi, Alessandra and Pianesi Fabio (1997) *Tense and Aspect*. Oxford: Oxford University Press.

Givón, Talmy (1971). 'Historical syntax and synchronic morphology: an archaeologist's field trip', *Chicago Linguistic Society* 7, 394–415.

—— (1976) 'Topic, pronoun and grammatical agreement', in C. N. Li (ed.), *Subject and Topic*. New York: Academic Press, 149–88.

—— (1979) 'From discourse to syntax: grammar as a processing strategy', in T. Givón (ed.), *Syntax and Semantics XII: Discourse and Syntax*. New York: Academic Press, (81–112).

Glasbey, Sheila (1996) 'The progressive: a Channel-theoretic analysis', *Journal of Semantics* 13: 331–61.

Glinert, Lewis (1991) *Modern Hebrew: An Essential Grammar*. New York and London: Routledge.

Glougie, Jennifer (2000) *Topics in the Syntax and Semantics of Blackfoot Quantifiers and Nominals*. Unpublished M.A. thesis. University of British Columbia.

Goddard, Ives (1990) 'Primary and secondary derivation in Algonquian', *International Journal of American Linguistics* 56: 449–83.

Goldberg, Adele (1991) 'It can't go up the chimney down: paths and the English resultative', *Proceedings of Annual Conference of Berkeley Linguistics Society* 17: 368–78.

—— (1992) 'The inherent semantics of argument structure: the case of the English ditransitive construction', *Cognitive Linguistics* 3(1): 37–74.

—— (1995) *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago, IL: University of Chicago Press.

—— (1998) 'Semantic principles of predication', in J-P. Koenig. (ed.), *Discourse and Cognition: Bridging the Gap*. CSLI Publications, Stanford, CA: Stanford University, 41–54.

—— (2001) 'Patient arguments of causative verbs can be omitted: the role of information structure in argument distribution', *Language Sciences* 23, 503–24.

—— (2005) 'Constructions, lexical Semantics and the correspondence principle: accounting for generalizations and subregularities in the realization of arguments', in N. Erteschik-Shir and T. Rapoport (eds.), *The Syntax of Aspect*. Oxford: Oxford University Press.

—— (2006) *Constructions at Work: The Nature of Generalization in Language*. Oxford: Oxford University Press.

Goldberg, Adele and Ray Jackendoff (2004) 'The resultative as a family of constructions', *Language* 80(3): 532–68.

Goldin-Meadow, Susan Wing Chee So, Asli Özyürek, and Carolyn Mylander (2008) 'The natural order of events: How speakers of different languages represent events nonverbally'. *PNAS*, *105(27)*, 9163–8.

Green, Georgia (1973) 'A syntactic syncretism in English and French', in B. Kachru, R. B. Lees, Y. Malkiel, A. Pietrangeli, and S. Saporta (eds.), *Issues in Linguistics*, Urbana, IL: University of Illinois Press, 257–78.

Green, Lisa (2000) 'Aspectual BE-type constructions and coercion in African American English', *Natural Language Semantics* 8: 1–25.

Grice, H. Paul (1975) 'Logic and conversation', in *The Logic of Grammar*, D. Davidson and G. Harman (eds.), Encino, CA: Dickenson, 64–75.

Grimshaw, Jane (1979) 'Complement selection and the lexicon', *Linguistic Inquiry* 10: 279–326.

—— (1982) 'On the lexical representation of romance reflexive clitics', in J. Bresnan (ed.), *The Mental Representation of Grammatical Relations*. Cambridge, MA: MIT Press, 87–148.

—— (1990) *Argument Structure*. Linguistic Inquiry Monographs 18. Cambridge, MA: MIT Press.

—— (2005) *Words and Structure*. Stanford. CA: CSLI Publications.

Grimshaw, Jane and Armin Mester (1988) 'Light verbs and theta-marking', *Linguistic Inquiry* 19.2: 205–32.

Grimshaw Jane and Sten Vikner (1993) 'Obligatory adjuncts and the structure of events', in E. Reuland and W. Abraham (eds.), *Knowledge of Language II: Lexical and Conceptual Structure*. Dordrecht: Kluwer, 143–55.

Groenendijk, Jeroen and Martin Stokhof (2005) 'Why compositionality?' in G. Carlson and J. Pelletier (eds.), *Reference and Quantification: The Partee Effect*. Stanford: CSLI Press, 83–106.

Gropen, Jess, Steven Pinker, Michelle Hollander, and Richard Goldberg (1991) 'Affectedness and direct objects: the role of lexical semantics in the acquisition of verb argument structure'. *Cognition* 41: 153–95.

Gruber, Jeffrey (1965) *Studies in Lexical Relation*. PhD dissertation. MIT.

——(1976) *Lexical Structures in Syntax and Semantics*. Amsterdam. North Holland Publishing Company.

Guerssel, Mohamed, Ken Hale, Mary Laughren, Beth Levin, and Josie White Eagle (1985) 'A cross-linguistic study of transitivity alternations', *Papers from the Parasession on Causatives and Agentivity,* Chicago Linguistic Society, 48–63.

Guilfoyle, Eithne (1997) 'The verbal noun in Irish nonfinite clauses', in V. Capková and A. Ahlqvist (eds.), *Dán do Oide, Essays in Memory of Conn Ó Cléirigh*. Dublin: Institiúid Teangeolaíochta Éireann, 187–200.

Hackl, Martin (1998) 'On the semantics of "ability attributions"', Ms. http://www.linguistics.pomona.edu/mhackl/AbilityAttributions.pdf

Hacquard, Valentine (2006) *Aspects of Modality*. PhD dissertation. MIT.

Hale, Kenneth and Samuel Jay Keyser (1993) 'On argument structure and the lexical expression of syntactic relations', in Ken Hale and Jay Keyser (eds.), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*. Cambridge, MA: MIT Press, 53–109.

—— ——(2002) 'On the double-object construction', *Prolegomenon to a Theory of Argument Structure*. Cambridge, MA: MIT Press, 159–88.

—— ——(2005) 'Aspect and the syntax of argument structure', in Nomi Erteschik-Shir and Tova Rapoport (eds.), *The Syntax of Aspect: Deriving Thematic and Aspectual Interpretation*. Oxford: Oxford University Press.

Halle, Morris (1973) 'Prolegomena to a theory of word-formation', *Linguistic Inquiry* 4: 451–64.

Halle, Morris and Alec Marantz (1993) 'Distributed morphology and the pieces of inflection', in K. Hale and S. J. Keyser (eds.), *The View From Building 20*. Cambridge, MA: MIT Press, 111–76.

—— ——(1994) 'Some key features of distributed morphology', in A. Carnie and H. Harley (eds.) *MIT Working Papers in Linguistics 21: Papers on Phonology and Morphology*, 275–88.

Hallman, Peter (2000) 'Passives in Arabic and English', Ms., UCLA.

Hara, Masahiro (1999) 'Causatives in Japanese', Ms. Truman State University.

Harley, Heidi (1995) *Subjects, Events and Licensing*. PhD thesis. MIT.

——(2005) 'On the causative construction', Ms. University of Arizona.

——(2005) 'How do verbs get their names? Denominal verbs, manner incorporation and the ontology of verb roots in English', in Nomi Erteschik-Shir and Tova Rapoport (eds.), *The Syntax of Aspect: Deriving Thematic and Aspectual Interpretation*. Oxford: Oxford University Press.

——(2006) 'On the causative construction', to appear in Shigeru Miyagawa and Mamoru Saito (eds.), *The Handbook of Japanese Linguistics*. Oxford: Oxford University Press.

Harley, Heidi and Rolf Noyer (2000) 'Formal vs. Encyclopedic properties of vocabulary: evidence from nominalization', in B. Peters (ed.), *The Lexicon–Encyclopedia Interface*. Elsevier Press.

Haspelmath, Martin (1993) 'More on the typology of inchoative/causative verb alternations', in B. Comrie and M. Polinsky (eds.), *Causatives and Transitivity*. Amsterdam: John Benjamins, 87–120.

Hay, Jenny, Chris Kennedy, and Beth Levin (1999) 'Scalar structure underlies telicity in degree achievements', *Proceedings from Semantics and Linguistic Theory IX*. Ithaca, NY: CLC Publications, Cornell University, 127–44.

Hazout, Ilan (1991) *Verbal Nouns: Theta Theoretic Studies in Hebrew and Arabic*. PhD dissertation. Amherst, MA: UMASS.

Heim, Irene (1982) *The Semantics of Definite and Indefinite Noun Phrases*. PhD dissertation. Amherst, MA: University of Massachusetts.

Higginbotham, James (1985) 'On semantics', *Linguistic Inquiry* 16: 547–93.

——(2000). 'On events in linguistic semantics', in J. Higginbotham, F. Pianesi, and A.C. Varzi (eds.), *Speaking of Events*. Oxford: Oxford University Press.

Higgins, Roger (1973) *The Pseudo-Cleft Construction in English*. PhD dissertation, MIT.

Hinrichs, Erhard W. (1985) *A Compositional Semantics for Aktionsarten and NP Reference in English*. PhD dissertation, Ohio State University.

Hockett, Charles (1956) 'Idiom formation', in M. Halle, H. Lunt, and H. McLean (eds.), *For Roman Jakobson: Essays on the Occasion of his Sixtieth Birthday, 11 October 1956*. The Hague: Mouton, 222–9.

Holes, Clive (1995) *Modern Arabic: Structures, Functions and Varieties*. London and New York: Longman/Pearson.

Horn, Laurence (1972). *On the Semantic Properties of Logical Operators in English*. Distributed by India University Linguistics Club 1976.

——(1989) *A Natural History of Negation*. Chicago: University of Chicago Press.

——(2002) 'Assertoric inertia and NPI licensing', *CLS 38: The Panels*, 55–82.

Horrocks, Geoffrey and Melita Stavrou (2003) 'Actions and their results in Greek and English: the complementarity of morphologically encoded (viewpoint) aspect and syntactic resultative predication', *Journal of Semantics* 20, 297–327.

—— ——(2007) 'Grammaticalized aspect and spatio-temporal culmination', *Lingua* 117, 605–44.

Horvath, Julia and Tal Siloni (2002) 'Against the little-*v* hypothesis', *Rivista di Grammatica Generativa* 27: 107–22.

—— ——(2008) 'Causatives across components'. Ms. Tel Aviv University.
van Hout, Angeliek (1998) *Event Semantics of Verb Frame Alternations: A Case Study of Dutch and its Acquisition*. New York: Routledge Outstanding Dissertations in Linguistics.
Hymes, Dell (1971) *Pidginization and Creolization of Languages*. Cambridge: Cambridge University Press.
Iatridou, Sabine (2000) 'The grammatical ingredients of counterfactuality', *Linguistic Inquiry* 31: 231–80.
Iatridou, Sabine, Elena Anagnostopoulou, and Roumyana Izvorski (2001) 'Observations about the form and meaning of the perfect', in M. J. Kenstowicz (ed.), *Ken Hale: A Life in Language*. Cambridge, MA.: MIT Press, 189–238.
Jackendoff, Ray (1972) *Semantic Interpretation in Generative Grammar*. Cambridge, MA: MIT Press.
——(1975) 'Morphological and semantic regularities in the lexicon', *Language* 51: 639–671.
——(1983) *Semantics and Cognition*. Cambridge, MA: MIT Press.
——(1985) 'Multiple subcategorization and the theta-criterion: the case of *Climb*', *Natural Language and Linguistic Theory* 3: 271–95.
——(1990) *Semantic Structures*. Cambridge, MA: MIT Press.
——(1995) 'The boundaries of the lexicon', in M. Everaert, E.J. Van der Linden, A. Schenk, and R. Schreuder (eds.), *Idioms: Structural and Psychological Perspectives*. New Jersey: Lawrence Erlbaum, 133–65.
——(1996) 'The proper treatment of measuring out, telicity, and perhaps even quantification in English', *Natural Language and Linguistic Theory* 14: 305–54.
Jacobsen, Jr, William (1980) 'Washo bipartite verb stems', in K. Klar, M. Langdon, and S. Silver (eds.), *American Indian and Indoeuropean Studies*. The Hague: Mouton, 85–99.
——(1985) 'Morphosyntactic transitivity and semantic markedness', *CLS* 21: 89–104.
Jayez, Jacques. (1999) 'Imperfectivity and progressivity: the French *imparfait*', in Matthews, T. and Strolovitch, D. (eds.), *Proceedings of Salt 9*. Ithaca: CLC Publications, 142–62.
Janis, Wynne (1992) *Morphosyntax of the ASL Verb Phrase*. PhD dissertation. SUNY Buffalo.
Janssen, Theo (1983) *Foundations and Applications of Montague Grammar*. Doctoral dissertation. Department of Mathematics, University of Amsterdam.
Jespersen, Otto (1942) *The Philosophy of Grammar*. London: Allen and Unwin.
Johansson, Sarah (2007) 'Sentience and stem agreement in Blackfoot', presented at 39th Algonquian Conference. Toronto: York University.
Jones, Michael (1988) 'Cognate objects and the case filter', *Journal of Linguistics* 24: 89–111.
Joseph, Brian D. (2000) 'Is there such a thing as "grammaticalization?"', *Language Sciences* 23(2–3): 163–86.

Kamp, Hans (1979) 'Events, instants, and temporal reference', in R. Bäuerle, U. Egli, and A. von Stechow (eds.), *Semantics from Different Points of View*. Berlin: Springer Verlag, 376–417.

Kamp, Hans and Uwe Reyle (1993) *From Discourse to Logic*. Dordrecht: Kluwer.

Kamp, Hans and Barbara Partee (1995) 'Prototype theory and compositionality', *Cognition* 57: 129–91.

Katz, Jerrold (1966). *The Philosophy of Language*. New York: Harper and Row.

Kaufmann, Ingrid (1995) 'What is an (im-)possible verb? Restrictions on semantic form and their consequences for argument structure', *Folia Linguistica* 24: 67–103.

Kayne, Richard (1984) *Connectedness and Binary Branching*. Dordrecht: Foris.

Kearns, Kate (1988) *Light Verbs in English*. Ms. Cambridge MA, MIT.

——(2003). 'Durative achievements and individual-level predicates on events', *Linguistics and Philosophy* 26: 595–635.

Kenesei, István (2007) 'Semiwords and affixoids: the territory between word and affix', *Acta Linguistica Hungarica* 54: 263–93.

Kennedy, Christopher (2001) 'Polar opposition and the ontology of "degrees"', *Linguistics and Philosophy* 24: 33–70.

Kennedy, Christopher and Louise McNally (2005) 'scale structure, degree modification, and the semantic typology of gradable predicates', *Language* 81: 345–81.

Kennedy, Christopher and Beth Levin (2008) 'Measure of change: the adjectival core of verbs of variable telicity', in L. McNally and C. Kennedy (eds.), *Adjectives and Adverbs in Semantics and Discourse*. Oxford, Oxford University Press, 156–82.

Kenny, Anthony (1963) *Action, Emotion, and Will*. London: Routledge and Kegan Paul.

Kiparsky, Paul (1997) 'Remarks on Denominal Verbs', in A. Alsina, J. Bresnan, and P. Sells (eds.), *Complex Predicates*. Stanford, CA: CSLI Publications, Stanford University, 473–99.

Kisch, Shifra (2000) 'Deaf discourse: the social construction of deafness in a Bedouin community', MA thesis, Tel-Aviv University, Israel (in Hebrew).

——(2004) 'Negotiating (genetic) deafness in a Bedouin community', in J. V. Van Cleve (ed.), *Genetics, Disability and Deafness*. Washington, DC: Gallaudet University Press, 148–73.

Kitagawa, Yoshihisa (1986) *Subjects in Japanese and English*. Doctoral dissertation. Amherst, University of Massachusetts.

Kleiber, Georges (1987) *Du côté de la référence verbale : Les phrases habituelles*. Berne: Peter Lang.

Klein, Wolfgang (1994) *Time in Language*. London/New York: Routledge.

Klima, Edward S. and Ursula Bellugi (1979) *The Signs of Language*. Cambridge, MA: Harvard University Press.

Koenig, Jean-Pierre and Muansuwan Nuttanart (2002) 'How to end without ever finishing: Thai semi-perfectivity', *Journal of Semantics* 17: 147–84.

Koenig, jean-Pierre, gail mauner, breton Bienvenue, and Katherine Conklin (2008) 'What with?: the anatomy of a (proto)-role', *Journal of Semantics* 25 (2): 175–220.

Komlósy, András (1994) 'Complements and adjuncts' in Kiefer Ferenc and É. Kiss Katalin (eds.), *The Syntactic Structure of Hungarian*. New York: Academic Press, 91–178.

——(2000) 'A műveltetés. ("causativization")', in Kiefer Ferenc (ed.), *Strukturális magyar nyelvtan* 3. Morfológia. Budapest: Akadémiai Kiadó, 215–92.

Koopman, Hilda and Dominique Sportiche (1991) 'The position of subjects', *Lingua* 85.1: 211–58.

Kratzer, Angelika (1981) 'The notional category of modality', in H Eikmeyer *et al.* (eds.) *Words, Worlds and Contexts – New Approaches to Word Semantics*. Berlin: Walter de Gruyter, 38–74.

——(1991) 'Modality', in A. van Stechow and D. Wunderlich (eds.). *Semantics: An International Handbook of Contemporary Research*. Berlin: Walter de Gruyter, 639–50.

——(1996) 'Severing the external argument from its verb', in J. Rooryck and L. Zaring (eds.), *Phrase Structure and the Lexicon*. Dordrecht: Kluwer.

——(1998) 'More structural analogies between pronouns and tenses', in D. Strolovich and A. Lawson (eds.), *Proceedings of SALT VIII*. Ithaca, NY: CLC Publications, Cornell University.

——(2004) 'Telicity and the meaning of objective case', in J. Gúeron and J. Lecarme (eds.), *The Syntax of Time*. Cambridge, MA: MIT Press, 389–423.

——(2004) 'The event argument'. Ms. University of Massachusetts. Available online at www.semanticsarchive.net.

——(2005) 'On the plurality of verbs', in J. Dölling and T. Heyde-Zybatow (eds.), *Event Structures in Linguistic Form and Interpretation*. Berlin: Mouton de Gruyter.

Krifka, Manfred (1989) 'Nominal reference, temporal constitution and quantification in event semantics,' in R. Bartsch, J. van Benthem, and P. van Emde Boas (eds.), *Semantics and Contextual Expression*. Dordrecht: Foris, 75–115.

——(1992) 'Thematic relations as links between nominal reference and temporal constitution', in I. A. Sag and A. Szabolcsi (eds.), *Lexical Matters*. Stanford, CA: CSLI Publications, Stanford University.

——(1995) 'Common nouns: a contrastive analysis of Chinese and English', in G. Carlson and F. J. Pelletier (eds.), *The Generic Book*. Chicago: Chicago University Press, 398–411.

——(1998) 'The origins of telicity', in S. Rothstein (ed.), *Events and Grammar*, Dordrecht: Kluwer Academic Publishers, 197–236.

——(2006). '*Three more than two, at least three:* What's the difference?' Handout downloadable from amor.rz.hu-berlin.de/h2816i3x.

——(2007) 'More on the difference between *more than two* and at *least three*', Handout downloadable from amor.rz.hu-berlin.de/h2816i3x.

Krifka, Manfred, F. Jeffry Pelletier, Gregory Carlson, Alice ter Meulen, Gennaro Chierchia, and Godehard Link (1995) 'Genericity: an introduction', in *The Generic Book*, G. Carlson and F. J. Pelletier (eds.). Chicago: University of Chicago Press, 1–124.

Kuiper, Koenraad (2007) 'Cathy Wilcox meets the phrasal lexicon. Creative deformation of phrasal lexical items for humorous effect', in J. Munat (ed.), *Lexical Creativity, Texts and Contexts*. Amsterdam/Philadelphia: John Benjamins, 93–112.

Kuiper, Koenraad and Martin Everaert (2000) 'Constraints on the phrase structural properties of English phrasal lexical items', in B. Rozwadowska (ed.), *PASE Papers in Language Studies. Proceedings of the 8th Annual Conference of the Polish Association for the Study of English*. Wroclaw: Aksel 151–70.

Kuno, Susumo (1973) *The Structure of the Japanese Language*. Cambridge, MA: MIT Press.

Kuroda, Shige-Yuki (2003) 'Complex predicates and predicate raising', in Naoki Fukui (ed.), *Formal Japanese Syntax and Universal Grammar: The Past 20 Years. Lingua* 4–6: 447–80.

Labelle, Marie (2002) 'Events, states and the French Imparfait', in A. M. Pérez-Leroux, and Y. Roberge (eds.), *Romance Linguistics: Theory and Acquisition*. Amsterdam: John Benjamins.

Labov, William (1994) *Principles of Linguistic Change. Volume I: Internal Factors*. Oxford: Blackwell.

—— (2001) *Principles of Linguistic Change. Volume II: Social Factors*. Oxford: Blackwell.

Lakoff, George (1987) *Women, Fire and Dangerous Things*. Chicago: University of Chicago Press.

Landau, Idan (1999) 'Possessive raising and the structure of VP', *Lingua* 107: 1–37.

Landman, Fred (1992) 'The Progressive', *Natural Language Semantics*, 1: 1–32.

—— (1996) 'Plurality', in S. Lappin (ed.), *The Handbook of Contemporary Semantic Theory*. Oxford: Blackwell, 425–57.

—— (2000) *Events and Plurality*. Dordrecht: Kluwer.

—— (2008) '1066: On the differences between the tense-perspective-aspect systems of English and Dutch', in S. Rothstein (ed.), *Theoretical and Cross-Linguistic Approaches to the Semantics of Aspect*. Amsterdam: John Benjamins.

Lane, Harlan L., Robert Hoffmeister, and Ben J. Bahan (1996) *A Journey into the Deaf-World*. San Diego, CA: Dawnsign Press.

Langacker, Ronald (1987) *Foundations of Cognitive Grammar, Volume I*. Stanford, CA: Stanford University Press.

Lawler, John (1973) *Studies in English Generics*. Doctoral dissertation. University of Michigan, Ann Arbor.

Lavidas, Nikolaos (2007) 'The diachrony of the Greek anticausative morphology', in A. Alexiadou (ed.), *The Morpho-Syntax of Modern Greek*. Cambridge Scholars Publishing.

Lekakou, Marika (2005) *In the Middle, Somewhat Elevated. The Semantics of Middles and its Crosslinguistic Realization*. PhD. University of London. Available at LINGBUZZ.

Lenci, Alessandro (1995) 'The semantic representation of non-quantificational habituals', in P. M. Bertinetto, V. Bianchi, J. Higginbotham, M. Squartini (eds.),

Temporal Reference, Aspect and Actionality, Vol. I, *Semantic and Syntactic Perspectives.* Torino: Rosenberg and Sellier, 143–58.

Lenci, Alessandro and Pier-Marco Bertinetto (2000) 'Aspect, adverbs, and events: habituality vs. perfectivity', in J. Higginbotham, F. Pianesi, and A. C. Varzi (eds.) *Speaking of Events.* Oxford/New York: Oxford University Press, 265–87.

Levin, Beth (1993) *English Verb Classes and Alternations: A Preliminary Investigation.* Chicago, IL: University of Chicago Press.

—— (2000) 'Aspect, lexical semantic representation, and argument expression', *Proceedings of the 26th Annual Meeting of the Berkeley Linguistics Society,* 413–29.

Levin, Beth and Malka Rappaport Hovav (1991) 'Wiping the slate clean: a lexical semantic exploration', *Cognition* 41: 123–51.

—— —— (1992) 'The lexical semantics of verbs of motion: the perspective from unaccusativity', in I. M. Roca (ed.), *Thematic Structure: Its Role in Grammar.* Berlin: Foris, 247–69.

—— —— (1995) *Unaccusativity: At the Syntax Lexical Semantics Interface.* Cambridge MA: MIT Press.

—— —— (1999) 'Two structures for compositionally derived events', *SALT* 9: 199–223.

—— —— (2005) *Argument Realization.* New York: Cambridge University Press.

—— —— (2006) 'Constraints on the complexity of verb meaning and VP structure', in H.-M. Gärtner, R. Eckardt, R. Musan, and B. Stiebels (eds.), *Between 40 and 60 Puzzles for Krifka.* http://www.zas.gwzberlin.de/40-60-puzzles-for-krifka/ to appear Snippets.

—— —— (2007) 'Reflections on the complementarity of manner and result', unpublished handout. Zentrum für Allgemeine Sprachwissenschaft, Humboldt University, Berlin, 22 November 2007.

Levinson, Stephen (2008) 'Landscape, seascape and the ontology of places on Rossel Island, Papua New Guinea', *Language Sciences*: 256–90.

Lewis, David (1969) *Convention: A Philosophical Study.* Cambridge, MA: Harvard University Press.

Lillo-Martin, Diane and Edward S. Klima (1990) 'Pointing out differences: ASL pronouns in syntactic theory', in S. D. Fischer and P. Siple (eds.), *Theoretical Issues in Sign Language Research, Volume 1: Linguistics.* Chicago: University of Chicago Press, 191–210.

Link, Godehard (1983) 'The logical analysis of plurals and mass terms: a lattice theoretical approach', in R. Bauerle, C. Schwarze, and A. von Stechow (eds.), *Meaning, Use and Interpretation of Language.* Berlin: Mouton de Gruyter. Reprinted in P. Portner and B. Partee (eds.) (2002) *Formal Semantics: The Essential Readings.* Oxford: Blackwell Publishing. 127–46.

—— (1987) 'Algebraic semantics for event structures', in J. Groenendijk, M. Stokhof, and F. Veltman (eds.), *Proceedings of the 6th Amsterdam Colloquium.* University of Amsterdam, 153–73.

Lu, John H.-T. (1973) 'The verb–verb construction with a directional complement in mandarin', *Journal of Chinese Linguistics* 1: 239–55.

Macfarland, Talke (1995) *Cognate Objects and the Argument/Adjunct Distinction in English*. PhD dissertation. Evanston, Illinois. Northwestern University.

Majid, Asifa, Melissa Bowerman, Miriam van Staden, and James Boster (2007) Special issue, 'Cutting and breaking events: a crosslinguistic perspective', *Cognitive Linguistics*: 18–20.

Marantz, Alec (1984) *On the Nature of Grammatical Relations*. Cambridge, MA: MIT Press.

—— (1993) 'Implications of asymmetries in double object constructions', in S. A. Mchombo (ed.), *Theoretical Aspects of Bantu Grammar*. CSLI Publications, 113–50.

—— (1997) 'No escape from syntax: don't try morphological analysis in the privacy of your own lexicon', in A. Dimitriadis, L. Siegel, C. Surek-Clark, and A. Williams (eds.), *Proceedings of the 21st Annual Penn Linguistics Colloquium*. Penn University Working Papers in Linguistics, Volume 4.2, 201–25.

—— (2005) 'Objects out of the lexicon: objects as event', handout. Talk presented at the University of Vienna.

Massam, Diane (1990) 'Cognate objects as thematic objects', *Canadian Journal of Linguistics,* 1990: 161–90.

Matsumoto, Yo (1998) 'A reexamination of the cross-linguistic parameterization of causative predicates: Japanese perspectives', *Proceedings of the LFG98 Conference*.

McCawley James (1968) 'Lexical insertion in a transformational grammar without deep structure', *Chicago Linguistics Society* 4. Chicago IL, 71–80.

McClure, William (1994) *Syntactic Projections of the Semantics of Aspect*. Doctoral dissertation. Ithaca, NY: Cornell University.

McCoard, Robert (1978) *The English Perfect: Tense-Choice and Pragmatic Inferences*. Amsterdam: North Holland.

Meier, Richard P. (1990) 'Person deixis in American sign language', in S. D. Fischer, and P. Siple (eds.), *Theoretical Issues in Sign Language Research*. Chicago: University of Chicago Press, 175–90.

Meir, Irit (1998) 'Syntactic–semantic interaction of Israeli sign language verbs: the case of backwards verbs', *Sign Language and Linguistics* 1(1): 3–37.

—— (2002) 'A cross-modality perspective on verb agreement', *Natural Language and Linguistic Theory* 20(2): 413–50.

Meir, Irit, Carol Padden, Mark Aronoff, and Wendy Sandler (2007). 'Body as subject', *Journal of Linguistics* 43: 531–63.

Meir, Irit, and Wendy Sandler (2008) *A Language in Space: The Story of Israeli Sign Language*. New York: Lawrence Erlbaum Associates.

Meir, Irit, Carol Padden, Mark Aronoff, and Wendy Sandler (2008) 'Re-thinking sign language verb classes: the body as subject', in R. M. de Quadros (ed.), *Sign Languages: Spinning and Unraveling the Past, Present and Future*. 9th Theoretical Issues in Sign Language Research Conference, Florianopolis, Brazil, December 2006.

Mel'čuk, Igor (1995) 'Phrasemes in language and phraseology in linguistics', in M. Everaert, E. J. Van der Linden, A. Schenk, and R. Schreuder (eds.), *Idioms: Structural and Psychological Perspectives*. New Jersey: Lawrence Erlbaum, 167–232.

Menéndez-Benito, Paula (2005) *The Grammar of Choice*. PhD dissertation. University of Massachusetts.

Mirambel, André (1978) *I Nea Elliniki Glossa: Perigrafi ke analisi*, translated by S. K. Karatzas. Thessaloniki: Institute of Modern Greek Studies (Foundation Manolis Triantafyllides).

Mittwoch, Anita (1971a) *Optional and Obligatory Verbal Complements in English*. PhD thesis. SOAS, London.

—— (1971b) 'Idioms and unspecified NP deletion', *Linguistic Inquiry* 2(2): 255–9.

—— (1982) 'On the difference between *eating* and *eating something*: activities versus accomplishments,' *Linguistic Inquiry* 13: 113–22.

—— (1988) 'Aspects of English aspect: on the interaction of perfect, progressive and durational phrases', *Linguistics and Philosophy* 11: 203–54.

—— (1991) 'In defense of Vendler's achievements', *Belgian Journal of Linguistics* 6: 71–84.

—— (1992) 'Syntactic idioms?' in M. Everaert, E.-J. van der Linden, A. Schenk, and R. Schreuder (eds.) *Proceedings of Idioms (Volume 1). International Conference on Idioms*. Tilburg: Institute for Language Technology and AI, 75–84.

—— (1998) 'Cognate objects as reflections of Davidsonian event arguments', in S. Rothstein (ed.), *Events and Grammar*. Dordrecht: Kluwer.

—— (2005) 'Unspecified arguments in episodic and habitual sentences', in N. Erteschik-Shir and T. Rapoport (eds.), *The Syntax of Aspect*. Oxford: Oxford University Press.

—— (2008) The English resultative perfect and its relationship to the experiential perfect and the simple past tense, *Linguistics and Philosophy* 32 (2).

—— (to appear) 'Numeral modifiers and temporal container adverbials', *Proceedings of the 35th Annual Meeting of the Berkeley Linguistic Society*.

Miyagawa, Shigeru (1984) 'Blocking and Japanese causatives', *Lingua* 64: 177–207.

Mohanan, T. and K. P. Mohanan (1999) 'On representations in grammatical semantics', in T. Mohanan and L. Wee (eds.), *Grammatical Semantics: Evidence for Structure in Meaning*. Stanford, CA: CSLI Publications, 23–75.

Mok, Eva and John Bryant (2006) 'A best-fit approach to productive omission of arguments', *The 32nd Annual Meeting of the Berkeley Linguistics Society*. Berkeley.

Moltmann, Friederike (1989) 'Nominal and clausal event predicates', *Papers from the 25th Annual Regional Meeting of the Chicago Linguistic Society*, 300–14.

Mulder, Rene (1992) *The Aspectual Nature of Syntactic Complementation*. PhD thesis. University of Leiden. Published in HIL.

Namir, Lila and Izchak Schlesinger (1978) 'The grammar of sign language', in Namir and Schlesinger (eds.), *Sign Language of the Deaf: Psychological, Linguistic, and Sociological Perspectives*. New York: Academic Press, 97–140.

Naumann, Ralf and Cristopher Piñón (1997) 'Decomposing the progressive', in P. Dekker, M. Stokhof, and Y. Venema, (eds.), *Proceedings of the 11th Amsterdam Colloquium*, University of Amsterdam, Amsterdam, 241–6.

Neidle, Carol, Judy Kegl, Dawn MacLaughlin, Benjamin Bahan, and Robert Lee (2000) *The Syntax of American Sign Language: Functional Categories and Hierarchical Structure*. Cambridge, MA: MIT Press.

Newmeyer Fredrick J. (2000a) 'On the reconstruction of "proto-world" word order', in C. Knight, M. Studdert-Kennedy, and J. R. Hurford (eds.), *The Evolutionary Emergence of Language*. New York: Cambridge University Press, 372–88.

—— (2000b) Deconstructing grammaticalization. *Language Sciences*, 23(2–3): 187–229.

Nunberg, Geoffrey (1978) *The Pragmatics of Reference*. Indiana University Linguistic Club.

Nunberg, Geoffrey, Ivan Sag, and Thomas Wasow (1994) 'Idioms', *Language* 70.3: 491–538.

Ogihara, Toshiyuki (1989) *Temporal Reference in English and Japanese*. PhD dissertation. University of Texas at Austin.

O'Grady, William (1998) 'The syntax of idioms', *Natural Language and Linguistic Theory* 16: 279–312.

Ostler, Nicholas (1979) *Case Linking: A Theory of Case and Verb Diathesis Applied to Classical Sanskrit*. PhD thesis. MIT.

Padden, Carol (1988) *Interaction of Morphology and Syntax in American Sign Language*. New York: Garland.

Padden, Carol, Irit Meir, Wendy Sandler, and Mark Aronoff (in press (a)) 'Against all expectations: encoding subjects and objects in a new languages', in D. Gerdts, J. Moore, and M. Polinsky (eds.), *Hypothesis A/Hypothesis B*. Cambridge, MA: MIT Press.

—— —— —— —— (in press (b)) 'The grammar of space in two new sign languages', in D. Brentari (ed.), *Sign Languages: A Cambridge Language Survey*. Cambridge: Cambridge University Press.

Palmer, Frank (1986) *Mood and Modality*. Cambridge: Cambridge University Press.

Pancheva, Roumyana (2003) 'The aspectual makeup of perfect participles and the interpretations of the perfect', in A. Alexiadou, *et al.* (eds.), *Perfect Explorations*. Berlin: Mouton de Gruyter, 277–306.

Pancheva, Roumyana and Arnim von Stechow (2004) 'On the present perfect puzzle', in K. Moulton and M. Wolf (eds.), *Proceedings of NELS 34*, Volume 2, 469–84.

Parsons, Terence (1990) *Events in the Semantics of English: A Study in Subatomic Semantics*. Cambridge, MA: MIT Press.

Partee, Barbara (1984) 'Compositionality', in F. Landman and F. Veltman (eds.), *Varieties of Formal Semantics: Proceedings of the 4th Amsterdam Colloquium, 1982*. Dordrecht: Foris Publications, 281–311.

—— (1984) 'Nominal and temporal anaphora', *Linguistics and Philosophy* 7: 243–86

Peacocke, Christopher (1987) 'Depiction', *The Philosophical Review* 96: 383–410.

Pereltsvaig, Asya (1999) 'Two classes of CO.', in K. Shahin *et al.* (eds.). Proceedings of WCCFL XVII Stanford: SCLI, 537–51.

—— (2002) 'Cognate objects in Modern and Biblical Hebrew', in J. Ouhalla and U. Shlonsky (eds.), *Themes in Arabic and Hebrew Syntax*, Dordrecht: Kluwer, 107–36.
Perlmutter, David (1978) 'Impersonal passives and the unaccusative hypothesis', in *Proceedings of the Fourth Annual Meeting of the Berkeley Linguistic Society*. Berkeley, University of California, 157–89.
Pesetsky, David (1995) *Zero Syntax: Experiencers and Cascades*. Cambridge, MA: MIT Press.
Petruck, Miriam (1996) 'Semantic Frames', in J. Verschueren, J. Ostman, J. Blommaert, and C. Bulcaen (eds.), *Handbook of Pragmatics*. Philadelphia: John Benjamins.
Piggott, Glynne (1989) 'Argument structure and the morphology of the Ojibwa Verb', in D. B. Gerdts and K. Michelson (eds.), *Theoretical Perspectives on Native American Languages*. Albany, NY: SUNY Press, 176–208.
Pinker, Steven (1989) *Learnability and Cognition: The Acquisition of Argument Structure*. Cambridge, MA: MIT Press.
—— (1995) *The Language Instinct*. New York: Harper Perennial.
Piñón, Christopher (1997) 'Achievements in event semantics', in A. Lawson and A. Cho (eds.), *Proceedings of SALT VII*. Ithaca, NY: CLC Publications, Cornell University, 276–93.
—— (2001). 'A finer look at the causative-inchoative alternation', in R. Hastings, B. Jackson, and Z. Zvolenszky (eds.), *Proceedings of Semantics and Linguistic Theory 11*, Ithaca, NY: CLC Publications, Cornell University.
—— (2006) 'Definiteness effect verbs', in Katalin É. Kiss (ed.), *Event Structure and the Left Periphery: Studies on Hungarian*. Springer.
—— (2007) 'Verbs of creation', in Johannes Dölling, Tatjana Heyde-Zybatow, and Martin Schäfer (eds.), *Event Structures in Linguistic Form and Interpretation*. Walter de Gruyter, 493–522.
Pinto, Manuela (1997) *Licensing and Interpretation of Inverted Subjects in Italian*. PhD dissertation. Utrecht University.
Portner, Paul (1998) 'The progressive in modal semantics', *Language* 74: 760–87.
Pustejovsky, James (1991a) 'The syntax of event structure', *Cognition* 41: 47–81.
—— (1991b) 'The generative lexicon', *Computational Linguistics* 17(4): 409–41.
—— (1995) *The Generative Lexicon*. MIT Press.
Pylkkänen, Liina (2002) *Introducing Arguments*. PhD dissertation. Department of Linguistics. Cambridge MA: MIT Press.
—— (2008) *Introducing Arguments*. Cambridge, MA: MIT Press.
Quadros, Ronice Müller de. (1999). '*Phrase Structure of Brazilian Sign Language*', PhD dissertation. Pontifícia Universidade Católica do Rio Grande do Sul.
Ramchand, Gillian (1997) *Aspect and Predication*. Oxford: Clarendon Press.
—— (2006a) *First Phase Syntax*. Ms. University of Tromsoe.
—— (2006b) 'Direct and indirect causation in Hindi', Paper presented at the workshop on clitics, intonation and causatives. University of Konstanz.
—— (2007) *First Phase Syntax*. Cambridge: Cambridge University Press.

—— (2008) *Verb Meaning and the Lexicon: A First Phase Syntax*. Cambridge: Cambridge University Press.

Rapoport, Tova R. (1999) 'Structure, aspect, and the predicate', *Language* 75 (4), 653–77.

Rappaport Hovav, Malka (2006) Unpublished manuscript. 'Lexicalized meaning and the internal temporal structure of events'. Hebrew University.

—— (2008) 'Lexicalized meaning and the internal temporal structure of events', in S. Rothstein (ed.), *Crosslinguistic and Theoretical Approaches to the Semantics of Aspect*. Amsterdam: John Benjamins, 13–42.

Rappaport Hovav, Malka, Mary Laughren, and Beth Levin (1987) 'Levels of lexical representation', *Lexicon Project Working Papers* 20 Cambridge, MA.: Center for Cognitive Science, MIT.

Rappaport Hovav, Malka and Beth Levin (1998) 'Building verb meanings', in M. Butt and W. Geuder (eds.), *The Projection of Arguments: Lexical and Compositional Factors*. Stanford: CSLI Publications, 97–134.

—— —— (1999) 'Two types of compositionally derived events', unpublished Ms. Bar Ilan University and Northwestern University, Ramat Gan, Israel and Evanston, IL.

—— —— (2005) 'Change of state verbs: implications for theories of argument projection', in N. Erteschik-Shir and T. Rapoport (eds.), *The Syntax of Aspect*. Oxford, Oxford University Press, 274–86.

—— —— (2007) 'Reflections on the complementarity of manner and result', handout, Zentrum für Allgemeine Sprachwissenschaft. Berlin: Humboldt University.

Reichenbach, Hans (1947) *Elements of Symbolic Logic*. New York: Macmillan.

Reinhart, Tanya (1991) *Lexical Properties of Ergativity*. Lecture presented at the conference on lexical structure, Utrecht. http://www.let.uu.nl/~tanya.reinhart/personal.

—— (1996) 'Syntactic effects on lexical operations: reflexives and unaccusatives', Utrecht University, Utrecht: UiL OTS working papers.

—— (2000) *The Theta System: Syntactic Realization of Verbal Concepts*, OTS working papers, 00.0/TL (available also at http://www.let.uu.nl/~tanya.reinhart).

—— (2006) 'Causativization and decausativization', paper presented at the workshop in honor of Anita Mittwoch. Jerusalem, July 2006.

—— (2002) 'The theta system–an overview', *Theoretical Linguistics* 28: 229–90.

Reinhart, Tanya and Eric Reuland (1993) 'Reflexivity'. *Linguistic Inquiry* 24: 657–720.

Reinhart, Tanya and Tal Siloni (2005) 'The lexicon-syntax parameter: reflexivization and other arity operations', *Linguistic Inquiry* 36: 389–436.

Rigau, German (1997) 'Locative sentences and related constructions in Catalan: *Ésser/haver* alternations', in A. Mendikoetxea and M. Uribe-Etxebarria (eds.), *Theoretical Issues at the Morphology-Syntax Interface*. Supplement of the *International Journal of Basque Linguistics and Philology*: 395–421.

Rimell, Laura (2005) 'Habitual sentences and generic quantification', in V. Chand, A. Kelleher, A. J. Rodríguez, and B. Schmeiser (eds.), *Proceedings of the 23rd West Coast Conference on Formal Linguistics*. Somerville: Cascadilla Press, 663–76.

Ritter, Elizabeth and Sara Thomas Rosen (2001) 'The interpretive value of object agreement', *Language Sciences* 23: 425–51.

—— —— (2005) 'Agreement without A-positions: a closer look at Algonquian', *Linguistic Inquiry* 36: 648–60.

Ritter, Elizabeth and Martina Wiltschko (2004) 'The lack of tense as a syntactic category: evidence from Blackfoot and Halkomelem,' presented at the 39th International Conference on Salish and Neighbouring Languages, North Vancouver and Canadian Linguistics Association. University of Manitoba: Winnipeg.

—— —— (2006) 'Relating verb stems in Blackfoot: The contribution of argument structure to stem agreement', presented at the 38th Annual Algonquian Conference, University of British Columbia.

Roeper, Thomas (1987) 'Implicit arguments and the head–complement relation', *Linguistic Inquiry* 18: 267–310.

Rosch, E. (1975) 'Cognitive representations of semantic categories', *Journal of Experimental Psychology: General* 104: 192–233.

Rothstein, Susan (2000) 'The semantics of secondary predication: depictives and resultatives', Proceedings of the 16th Annual Meeting of the Israel Association for Theoretical Linguistics.

—— (2001) 'What are incremental themes?' *ZAS Working Papers in Linguistics* 2, Berlin: 139–57.

—— (2004) *Structuring Events: A Study in the Semantics of Aspect.* Oxford: Blackwell.

—— (2008) 'Telicity, atomicity, and the Vendler classification of verbs', in S. Rothstein (ed.), *Theoretical and Cross-linguistic Approaches to the Semantics of Aspect.* Amsterdam: Benjamins.

Rotstein, Carmen and Yoad Winter (2004) 'Total adjectives vs. partial adjectives: scale structure and higher order modifiers', *Natural Language Semantics* 12, 259–88.

Ruhl, Charles (1975) '*Kick the bucket* is not an idiom', *Interfaces: Linguistics and Psychoanalysis* 4: 2–4.

Safir, Ken (1987) 'The syntactic projection of lexical thematic structure', *Natural Language and Linguistic Theory* 5: 561–601.

Sandler, Wendy and Diane Lillo-Martin (2006) *Sign Language and Linguistic Universals.* Cambridge: Cambridge University Press.

Sandler, Wendy, Irit Meir, Carol Padden, and Mark Aronoff (2005) 'The emergence of grammar: systematic structure in a new language', *PNAS,* 102(7): 2661–5.

Schäfer, Florian (2006) 'A mute voice for the middle', in Proceedings of NELS 27.

—— (2007) *External Arguments in Change of State Contexts: On the Source of Anticausative Morphology.* PhD dissertation. University of Stuttgart.

Scheiner, Magdalena (2002) 'Temporal anchoring of habitual', in M. van Koppen, J. Sio, and M. de Vos (eds.), *Proceedings of ConSole XI.* http://www.sole.leidenuniv.nl.

Schmitt, Christina (2001) 'Cross-linguistic variation and the present perfect: the case of Portuguese', *Natural Language and Linguistic Theory* 19: 403–53.

Schubert, Lenhart and Francis Pelletier (1989) 'Generically speaking, or using discourse representation theory to interpret generics', in G. Chierchia, B. H. Partee, and R. Turner (eds.), *Properties, Types, and Meanings*. Dordrecht: Kluwer, 193–268.

Scott, Daryl, Rivka Carmi, Khalil, Elbedour, Geoffrey Duyk, Edwin Stone, and Val Sheffield (1995) 'Nonsyndromic autosomal recessive deafness is linked to the DFNB1 locus in a large inbred Bedouin family from Israel', *Am. J. Hum. Genet.*, 54(4): 965–8.

Senghas, Ann, Marie Coppola, Elissa Newport, and Ted Supalla (1997) 'Argument structure in Nicaraguan sign language: the emergence of grammatical devices', in E. Hughes, M. Hughes, and A. Greenhill (eds.), *Proceedings of the Boston University Conference on Language Development*, 21(2). Boston: Cascadilla Press, 550–61.

Sevi, Aldo (1998) '*A semantics for* almost *and* barely', unpublished MA thesis. Tel Aviv University.

Shibatani, Masayoshi (1972) 'Three reasons for deriving "kill" from "cause to die" in Japanese', in John P. Kimball (ed.), *Syntax and Semantics Vol. 1*. New York: Academic Press, 125–37.

—— (1990) *The Languages in Japan*. Cambridge: Cambridge University Press.

Shlonsky, Ur (2004) 'The form of semitic noun phrases', *Lingua* 114: 1465–1526.

Siloni, Tal (1997) *Noun Phrases and Nominalizations*. Dordrecht: Springer.

—— (2002) 'Active lexicon', *Theoretical Linguistics* 28: 383–400.

Singh, Mona (2001) 'The perfective paradox: or how to eat your cake and have it too', in L. A. Sutton and C. Johnson (eds.), *Proceedings of the 17th Annual Meeting of the Berkeley Linguistics Society*. Berkeley, CA, 479–89.

Smith, Carlota (1970) 'Jespersen's move and change class and causative verbs in English', in M. A. Jazayery *et al.* (eds.) *Linguistics and Literary Studies in Honor of Archibald A. Hill, Vol 2. Descriptive Linguistics*. The Hague: Mouton, 101–9.

—— (1991) *The Parameter of Aspect*. Dordrecht: Kluwer.

Smith, Wayne (1990) 'Evidence for auxiliaries in Taiwan sign language', in S. D. Fischer, and P. Siple (eds.), *Theoretical Issues in Sign Language Research, Volume 1: Linguistics*. Chicago: University of Chicago Press, 211–28.

von Stechow, Arnim (2000) 'Temporally opaque arguments in verbs of creation', Ms. University of Tübingen, 278–319.

—— (2001) 'Temporally opaque arguments in verbs of creation', in Carlo Cechetto, Gennaro Chierchia, and Maria Teresa Guasti (eds.), *Semantic Interfaces: Studies Offered to Andrea Bonomi on the Occasion of his Sixtieth Birthday*. Stanford, CA: CSLI Publications, 278–319.

Stowell, Tim (1991) 'The alignment of arguments in adjective phrases', in S. Rothstein, (ed.), *Perspectives on Phrase Structure: Heads and Licensing*. Syntax and Semantics 25, Academic Press, 105–35.

de Swart, Henriëtte (1998) 'Aspect shift and coercion', *Natural Language and Linguistic Theory* 16: 347–85.

de Swart, Peter, Monique Lamers, and Saunder Lestrade (2008) 'Animacy, argument structure, and argument encoding', *Lingua* 118: 131–40.

Szabolcsi, Anna (1986) 'From the definiteness effect to lexical integrity', in Werner Abraham and Sjaak de Meij (eds.), *Topic, Focus, and Configurationality*. Amsterdam: John Benjamins, 321–48.

Tagliamonte, Sali and Helen Lawrence (2000) '"I used to dance but I don't dance now": the habitual past in English', *Journal of English Linguistics* 28 (4): 324–53.

Takami, Den-ichi (1992) *Preposition Stranding: From Syntactic to Functional Analyses*. Berlin: Mouton.

Talmy, Leonard (1975) 'Semantics and syntax of motion', in J. P. Kimball, (ed.), *Syntax and Semantics* 4. New York: NY Academic Press, 181–238.

—— (1983) 'How language structures space', in H. Pick and L. Acredolo (eds.), *Spatial Orientation: Theory, Research and Application*. Plenum Press.

—— (1985) 'Lexicalization patterns: semantic structure in lexical forms', in T. Shopen (ed.), *Language Typology and Syntactic Description vol. 3: Grammatical Categories and the Lexicon*. Cambridge: Cambridge University Press, 57–149.

—— (1991) 'Path to realization—via aspect and result', *BLS* 17, 480–519. A revised version appears as Chapter 3 of Talmy (2000).

—— (2000) *Towards a Cognitive Semantics II: Typology and Process in Concept Structuring*. Cambridge, MA: MIT Press.

Taylor, Allan (1969) *A Grammar of Blackfoot*. unpublished PhD dissertation. Berkeley, University of California.

Tenny, Carol (1987) *Grammaticalizing Aspect and Affectedness*. PhD thesis. Cambridge, MA: MIT.

—— (1992) 'The aspectual interface hypothesis', in Ivan A. Sag and Anna Szabolcsi (eds.), *Lexical Matters*. Stanford, CA: CSLI, 1–27.

—— (1994) *Aspectual Roles and the Syntax–Semantics Interface*. Dordrecht: Kluwer.

—— (2000) 'Core events and adverbial modification', in Carol Tenny and James Pustejovsky (eds.), *Events as Grammatical Objects*. Stanford: CSLI Publications, 285–334.

Terada, Michiko (1991) *Incorporation and Argument Structure in Japanese*. Doctoral dissertation. University of Massachusetts, Amherst, Amherst: GLSA.

Theophanopoulou-Kontou, Dimitra (2000). '-O/-me alternations in MG patient oriented constructions: anticausatives and passive', in the proceedings of the 20th Annual Meeting of the Linguistics Dept. of the University of Thessaloniki.

Thomas, Paul-Louis (1998) 'Remarques sur l'aspect en serbo-croate', in Andrée Borillo, Carl Vetters, and Marcel Vuillaume (eds.), *Regards sur l'aspect. Cahiers Chronos 2*. Amsterdam: Rodopi, 231–46.

Thompson, Ellen (2006) 'The structure of bounded events', *Linguistic Inquiry* 37, 211–28.

Torrego, Esther (1989) 'Unergative–unaccusative alternations in Spanish', in *MIT Working Papers in Linguistics* 10: *Functional Heads and Clause Structure*. MIT, 253–72.

Tortora, Christina (1997) *The Syntax and Semantics of the Weak Locative*. PhD dissertation. University of Delaware.

Tsimpli, Ianthi Maria (1989) 'On the properties of the passive affix in Modern Greek', UCL Working Papers in Linguistics 1: 235–60.

Valois, Daniel (1991) *The Internal Syntax of DP*. PhD dissertation. UCLA.

Vandeloise, Claude (1991) *Spatial Prepositions*. Chicago, IL: University of Chicago Press.

Van Gelderen, Elly (2007) 'The subject cycle: linguistic change and cognitive principles', Ms. Arizona State University: Tempe.

Van Gestel, Frank (1995) 'En bloc insertion', in M. Everaert, E. J. van der Linden, A. Schenk, and R. Schroeder (eds.), *Idioms: Structural and Psychological Perspectives*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 75–94.

Van Valin, Robert and Randy LaPolla (1997) *Syntax: Structure, Meaning and Function*. Cambridge: Cambridge University Press.

Vendler, Zeno (1967) *Linguistics in Philosophy*. Ithaca, NY: Cornell University Press.

—— (1967) 'Verbs and times', *Linguistics and Philosophy*: 97–121.

Vergnaud, Jean-Roger (1985) *Dépendances et niveaux de représentation en syntaxe*. Amsterdam/Philadelphia: John Benjamins.

Verkuyl, Henk (1972) *On the Compositional Nature of the Aspects*. Dordrecht: Reidel.

—— (1989) 'Aspectual classes and aspectual composition', *Linguistics and Philosophy* 12: 23–94.

—— (1993) *A Theory of Aspectuality: The Interaction between Temporal and Atemporal Structure*. Cambridge: Cambridge University Press.

Vinay, Jean-Paul and Jean Darbelnet (1958) *Stylistique comparée du français et de l'anglais*. Paris: Didier.

Visser, Frederik (1970) *A Historical Syntax of the English Language. Part One: Syntactical Units with One Verb*. Leiden: E. J. Brill.

Vlach, Frank (1993) 'Temporal adverbials, tenses and the perfect', *Linguistics and Philosophy* 16: 231–83.

Vogel, Irene (1989) 'Prosodic constituents in Hungarian', *Acta Linguistica Hungarica* 39: 331–51.

Volpe, Mark (2005) 'Morphologically motivated lexical semantic representations: the causative alternation and change of state verbs', in Levin and Rappaport Hovav (1995), Ms.

—— (2007) 'A late insertion approach to Levin and Rappaport Hovav (1995): the causative alternation and change of state verbs', Ms.

van Voorst, Jan (1988) *Event Structure*. Dordrecht: John Benjamins.

Wechsler, Stephen (2005) 'Resultatives under the event-argument homomorphism model of telicity', in N. Erteschik-Shir and T. Rapoport (eds.), *The Syntax of Aspect—Deriving Thematic and Aspectual Interpretation*. Oxford: Oxford University Press, 255–73.

Weinreich, Uriel (1969) 'Problems in the analysis of idioms', in J. Puhvel (ed.) *Substance and Structure of Language*. Berkeley: University of California Press, 23–81.

Weir Smyth, Herbert (1920) *Greek Grammar* (revised by G.M. Messing). Cambridge, MA: Harvard University Press.

Westerståhl, Dag (1998) 'On mathematical proofs of vacuity of compositionality', *Linguistics and Philosophy* 23: 635–43.

Williams, Edwin (1981) 'Argument structure and morphology', *The Linguistic Review* 1: 81–114.

Wright, Saundra (2002) 'Transitivity and change of state verbs'. Proceedings of BLS.

Wunderlich, Dieter (1997) 'Cause and the structure of verbs', *Linguistic Inquiry* 28: 27–68.

—— (2000) 'Predicate composition and argument extension as general options', in B. Stiebels and D. Wunderlich (eds.), *Lexicon in Focus*. Berlin: Akademie Verlag, 247–70.

Zombolou, Katerina (2004) *Verbal Alternations in Greek: A Semantic Approach*. PhD Dissertation. University of Reading.

Zubizaretta, Maria (1987) *Levels of Representation in the Lexicon and in the Syntax* Dordrecht: Foris Publications.

Zubizarreta, Maria and Eunjeong Oh (2007) *The Lexicon–Syntax Interface: The Case of Motion Verbs*, Cambridge, MA: MIT Press.

Zucchi, Sandro (1999) 'Incomplete events, intentionality and imperfective aspect', *Natural Language Semantics* 7: 179–215.

Zucchi, Sandro and Michael White (2001) 'Twigs, sequences and the temporal constitution of predicates', *Linguistics and Philosophy* 24: 187–222.

Zwarts, Joost (2005) 'Prepositional aspect and the algebra of paths', *Linguistics and Philosophy* 28: 739–79.

Zwicky, Arnold (1989) 'Idioms and constructions', *Proceedings of the Eastern States Conference of Linguistics* 1988: 547–58.

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