The Aspectual Nature of Thematic Relations: Locative and Temporal Phrases in English and Chinese

by

Elizabeth Mary Klipple


Submitted to the Department of Linguistics and Philosophy in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Linguistics

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 1991

© Elizabeth Mary Klipple

The author hereby grants to MIT permission to reproduce and to distribute copies of this thesis document in whole or in part.

Signature of Author

Department of Linguistics and Philosophy

March 27, 1991

Certified by

James Higginbotham

Professor, Department of Linguistics and Philosophy

Thesis Supervisor

Accepted by

Wayne O’Neil

Chairman, Department of Linguistics and Philosophy
The Aspectual Nature of Thematic Relations:

Locative and Temporal Phrases

in English and Chinese

by

Elizabeth Mary Klipple

Submitted to the Department of Linguistics and Philosophy
on March 27, 1991, in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in Linguistics

Abstract

This thesis investigates the properties of elements on the "border" of thematic structure. It deals primarily with various sorts of locative and temporal phrases, with the aim of elucidating which of these phrases should be considered to be thematically related to the verb, and what the factors are which determines this division. It is proposed that the Internal/External distinction is the major dividing line between thematic and non-thematic elements; an element is "internal" if it adds to the information about the internal aspectual structure of the event denoted in a sentence; it is external if it does not contribute information about this structure. Thus, thematic structure is closely tied to aspect and event structure.

This approach predicts that certain elements which are normally not considered to be relevant to thematic relations should be included as part of thematic structure. These elements are locative phrases indicating goal, direction, path, source, and posture, temporal phrases indicating iteration and duration, measure phrases, and resultatives.

It is further maintained that there is a tight syntax/semantics correlation, and that the semantic property of contributing to the internal aspectual structure of an event corresponds to the syntactic property of being within the lowest projection of the VP.

Chapter 2 provides syntactic evidence in English for the internal/external distinction, and shows that for the most part the types of phrases predicted to be event-internal are also VP-internal. Chapter 3 presents evidence from Mandarin Chinese; in this language, the surface order alone of the various types of locatives and temporals provides a strong argument for the distinction as we have drawn it.
In chapter 4, we look at binding relations between various types of VP-internal and VP-external phrases, in order to probe the structure of the VP. We consider the proposal of Larson (1987) that all post-verbal PPs are within the VP, but show that in fact it is better to treat these elements as VP or IP adjuncts, as is traditionally done.

In chapter 5, we explore in more detail the semantic properties of internal locatives and temporals. Goal and Posture phrases are argued to be secondary predicates which combine with the main verb, on a par with resultative complements. Direction, path and durative phrases are modifiers of a parameter associated in the lexicon with the main predicate. Iterative phrases are taken to be something like numerals which quantify subparts of the event. Finally, we compare our approach with the theories of Gruber and Jackendoff, and that of Davidson (1967) as modified by Parsons (1990).

Thesis Supervisor: James Higginbotham
Title: Professor, Department of Linguistics and Philosophy
Contents

1 Introduction ................................................. 11
   1.1 The Internal/External distinction: the Hypothesis ............. 11
   1.2 Background ............................................ 15
      1.2.1 Argument Structure .................................. 15
      1.2.2 Event structure ..................................... 18
      1.2.3 A Note on Aspect and Aktionsart ...................... 20
      1.2.4 Selection and Selecdional Restrictions .................. 22
   1.3 The types of phrases under consideration ........................ 24
      1.3.1 Types of Locative Phrases ............................ 24
      1.3.2 Semantic Selection of Locatives ....................... 28
      1.3.3 Types of Temporal Phrases ............................ 30
   1.4 Preview of the central ideas ............................... 31

2 Arguments and Adverbials in Syntax .......................... 35
   2.1 Traditional criteria for the argument/adjunct distinction .......... 39
      2.1.1 Optionality ........................................ 41
      2.1.2 Iterability ....................................... 43
2.1.3 Ordering and the base position of adjuncts .......... 47
2.1.4 VP-constituency tests .. 49
2.1.5 Verbs that take events as arguments .......... 58
2.2 Passives and Pseudopassives .......... 60
2.3 Verbal Diathesis .. 65
  2.3.1 Locative Alternations .......... 65
  2.3.2 Locative Inversion .......... 67
  2.3.3 Alternants with measures and duratives .......... 68
  2.3.4 Conflations .......... 69
2.4 Summary .......... 70

3 Chinese Locatives and Temporals .. 71
  3.1 Chinese locative phrases .......... 72
    3.1.1 A note on the Chinese locative prepositional phrase .......... 73
    3.1.2 Postverbal Locative Phrases .......... 76
    3.1.3 Other locative PPs .......... 85
  3.2 Temporal Phrases in Chinese .......... 88
    3.2.1 Duratives and Iteratives .......... 90
  3.3 The Problem of Chinese VP structure .......... 95
  3.4 Summary .......... 98

4 Argument/Adjunct Asymmetries in Binding Theory 99
  4.1 Double Object constructions and a challenge to the traditional view .. 100
    4.1.1 Binding and Adjuncts .......... 102
    4.1.2 Reflexives and Reciprocals .......... 108
5 Arguments and Adverbials in Semantics

5.1 The semantics of prepositions and the reference of PPs

5.2 The Internal/External distinction

5.2.1 Event Structure, Delimitedness and the Aspectual Interface Hypothesis

5.2.2 Motion verbs, locatives and the internal/external distinction

5.2.3 Paths, Statives and the notion of “Co-Extension”

5.2.4 Directions

5.2.5 Sources

5.2.6 Internal and External Temporal Phrases

5.2.7 External Elements and the Framing Relation

5.3 The Composition of VPs and Events

5.3.1 Complex Predicates

5.3.2 Other VP-internal PPs

5.3.3 Summary
5.4 Other approaches ........................................ 177

5.4.1 Jackendoff ............................................. 178

5.4.2 Davidsonian Approaches .............................. 181
Acknowledgements

Truly new ideas are scarce. This is why every work of this type begins with gratitude to others who have helped create an environment of ideas within which one can develop.

I would first like to thank my thesis committee: Jim Higginbotham, Ken Hale and Irene Heim. Since my first semester at MIT, I have benefitted from Jim's deep insights into semantics and its place in linguistics. Ken has continually amazed me with his unparalleled appreciation of languages, and has taught me much of what I know about the relationship between the lexicon and the syntax. Irene has helped me with her keen understanding of many semantic and syntactic issues, and she also presented me with the challenge of comparing my views on semantics with a very different approach. Richard Larson, who supervised the beginnings of this project, also belongs on this list; I thank him for his clarity as a teacher, and much helpful discussion and support throughout my time at MIT.

I am grateful also to Noam Chomsky, for his careful criticism of my work, and for his influence on my thoughts about linguistics that goes back to my first course in the subject. I have learned a lot from David Pesetsky, through his thoroughness in all domains of syntax and particularly his attention to questions of argument structure. Jay Keyser has instructed me in matters of phonology, syntax, style and wit. In my years at MIT I have also had the great privilege of studying with Richard Kayne, Wayne O'Neil, Luigi Rizzi, Donca Steriade, Bob Berwick, Suzanne Flynn and Barbara Grosz at Harvard University.

Next I would like to express my gratitude to (or for) an entity of a different type, which has been extremely important to my education in linguistics: the MIT Lexicon Seminar. A big thanks to its organizers Beth Levin and Carol Tenny, and speakers and participants too numerous to remember.

For helpful discussions on topics related to this thesis, I would like to thank: Howard Lasnik, Alec Marantz, Carol Tenny, Jane Grimshaw, Ray Jackendoff, Wendy Wilkins, Anna-Maria Di Sciullo, George Boolos, Chisato Kitagawa, Peggy Speas, Tova Rapoport, Janet Randall, Yuki Ike-Uchi, Viviane Deprez, Kate Kearns, Lisa Cheng, Peter Kipka, Li Yafei, Graziella Saccon, Chris Collins, Michael Hegarty, Mark Kantor. Thanks to audiences at Arizona State University, the University of Leiden, and l'Université du Québec à Montréal, where I have had the chance to present some of the material in this dissertation.

I am very appreciative of the willingness of Bao Zhiming, Lisa Cheng, Li Yafei to share their native intuitions of Mandarin with me.

I am grateful also to those who introduced me to linguistics in college: George Miller, Scott Soames, Paul Benacerraf, Robert Ebert, and Jay Atlas.

The list of students at MIT and in the environs who have helped me along the linguistics road would be as long as the combined departmental phone lists of the last seven years; here are the names of some who have touched my life in the last few years: Carol Tenny, Tova Rapoport, Bao Zhiming, Graziella Saccon, Viviane Deprez,
Kate Kearns, Lisa Cheng, Li Yafei, Harry Leder, Tom Green, Chris Collins, Peter Kipka, Michael Hegarty, Mika Hoffman, Mark Kantor, Paul Law, Friederike Moltmann, Kelly Sloan, Doug Saddy, Michelle Sigler, Chris Tancredi, Utpal Lahiri, Anand Ramachandran, Betsy Ritter, Alicja Gorecka, Janis Melvold, Kate McCreight Young, David Feldman, Marc Ryser, Itziar Laka, Anoop Mahajan, Sabine Iatridou, Phil Branigan, Scott Meredith, Eulalia Bonet, Rolf Noyer.

In the last few months in Montreal, I have benefitted from discussions with and friendship of Betsy Ritter, Mireille Tremblay, Anne-Marie Di Sciullo, Ilan Hazout, John Lumsden, Marie Labelle, Jan van Voorst, Pierre Pica, Ur Shlonsky, and many others.

My parents and other non-linguist friends like Kathy H., Penny, Debbie, Alicia, Steve, Kathy F., Stuart, Noble, Esther, Jeremy, Kevin and Dawn, have helped me get through some of the tough spots of this experience — love to all of you. And I owe an extra special thanks to Ethan Jacobson, who had the dubious privilege of experiencing grad school vicariously through me.
For my parents

Mary Jane Klipple and Raymond Wallace Harwell

for everything,

but especially for their amazing ability to follow their own paths.
Chapter 1

Introduction

1.1 The Internal/External distinction: the Hypothesis

This thesis investigates the borders of the area of thematic relations, inquiring into the nature of elements that are often called "oblique" arguments. We concentrate primarily on two semantic classes of "borderline" elements: locative and temporal and phrases. Locative phrases are well-studied, and are recognized by most researchers as important to thematic relations. Phrases referring to time, however, are not often considered in relation to thematic structure; part of the aim of this study is to show that certain of them should be.

These elements are chosen with two purposes in mind. First, there is a growing amount of evidence that the aspectual structure of the event indicated by a sentence has an important influence on thematic structure; since locative and temporal have clear relevance to event properties, they provide insight on the relation between thematic
structure and event structure. Second, these phrases exhibit “mixed” behavior in terms of their “argument-like” and “adjunct-like” properties; a refinement of our knowledge about the varieties of locatives and temporals of these groups allows us a deeper understanding of the basis of the argument/adjunct distinction.

Throughout this study, we will explore the repercussions of the following hypothesis: that the elements that should be considered part of the thematic structure of a clause are those which provide semantic information about the internal aspectual structure of the event associated with that clause. We call these elements internal elements; those which do not have this semantic function will be considered external. Thus, thematic relations are understood as the relations that hold internal to the event, and the internal/external distinction is identified with the thematic/non-thematic distinction\(^1\).

Tying thematic structure to event structure and aspectual properties leads us to include as thematic certain elements which are not usually thought of as such. Among these are locative phrases which locate a subpart of the event, and temporal phrases which indicate the duration or iterative properties of the event. Also included are resultative and measure complements, although we will not be primarily focused on these elements in this study\(^2\).

The internal/external distinction, as we have just presented it, is fundamentally a semantic distinction; however, we will assume a strong syntax/semantics correlation, and thus expect that the internal/external distinction has a direct syntactic correlate. We take this syntactic correlate to be the lowest projection of the verb phrase (VP), that is,

---
\(^1\)The Internal/External distinction appears in the literature in Chomsky (1965), and is applied to locatives by Hornstein and Weinberg (1981) and Baker (1985). It is also found in Boons (1985) as the distinction between nuclear and non-nuclear complements, and in Tai (1988).

\(^2\)The hypothesis also has implications for other “borderline” phrases, such as benefactives, instrumentalities, comitatives, etc., but we will not have the space to explore these.
the VP that is projected at D-structure\(^3\), (and not higher VP nodes which may be formed by adjunction). Thus, elements which are semantically event-internal are predicted to be syntactically VP-internal. Chapters 2–4 of this study are devoted to presenting evidence for these claims.

Maintaining that a phrase participates in the thematic relations of a clause does not necessarily imply that it is an argument of the verb. In fact, it is proposed in chapter 5 that many of the elements treated here are secondary predicates, which combine with the thematic/event structure of the main verb to form a complex predicate. Typical instances of this sort of complement are goal and resulative complements. There are still other ways that a complement may be related to the main predicate; we suggest that elements like direction phrases and measure phrases modify or specify some parameter of the event associated with the VP; specifically, these elements provide further information about an event which has inherent trajectory or scale, respectively.

Note that this approach provides a natural way of understanding the notion "complement" of a verb which is not limited to just its arguments; a complement "completes" the event expressed by a verb, in one of a number of ways. Arguments, which specify some participant of the event, are one type of complement, but there are also other possibilities. Also note that we do not expect secondary predicates and other VP complements to share all of the syntactic properties of arguments.

The view of thematic structure that emerges in this study differs strikingly from the traditional view. The idea that the structure is based on a main predicate, generally a verb, "reaching out and grabbing" its arguments, something like an octopus with

\(^3\)We assume a theory of syntax in the general framework of Chomsky (1981), (1986), although the proposals made here should be equally compatible with other approaches as well.
tentacles⁴, is rejected. Instead, different elements are understood to compose thematic structure, and each contribute to it, although some elements may be more central than others. The image to associate with this approach is that of a molecule composed of separate atoms, each contributing to the structure of the whole, but in different ways⁵.

In considering the relation of aspect and event structure to thematic relations and argument structure, we will be generalizing a proposal by Tenny (1987), who followed studies on aspectral structure of verbs and verb phrases by, among others, Dowty (1979), Vendler (1967). Tenny argued that the direct object of the verb is just the element which provides a parameter by which the event denoted by a verb is temporally measured out and delimited. That is, in a sentence like “John ate an apple”, the direct object, *apple*, delimits or marks the ending point of, the event, because the event ends at the point when the apple is totally consumed. She proposed the Aspectual Interface Hypothesis⁶:

**Aspectual Interface Hypothesis (AIH)**: “The mapping between cognitive (thematic) structure and syntactic argument structure is governed by aspectral properties. The aspectral properties associated with internal (direct), external and oblique (internal indirect) arguments constrain the kinds of event participants that can occupy these positions. Only the aspectral part of cognitive or thematic structure is visible to the syntax.”

This states that aspectral properties of various types of arguments constrain the way they may be expressed in syntax; thus, *an apple* is allowed in direct object position in virtue of the fact that its referent is the delimiting element. In our extension of this

---

⁴Image due to Ken Hale.
⁵Although I do not wish to push this analogy to chemistry beyond the initial image.
⁶Tenny uses the term thematic structure somewhat differently from the way we use it here, partly because of different assumptions about the lexical/syntactic interface.
approach, arguments are considered a special case among theta-related elements. We understand our extension of the AIH to serve as a licensing condition for VP-internal constituents, both arguments and non-arguments alike.

1.2 Background

1.2.1 Argument Structure

We will take as a starting point the view, argued for by Rappaport and Levin (1986) and Jackendoff (1987) among others, that thematic relations must be seen in terms of the relations between the various elements of thematic structure at the level of Lexical-Conceptual Structure (LCS), rather than in terms of a predicate with a list of arguments. Theta-role labels such as Agent, Theme etc. are not grammatical primitives, though they may be used as convenient mnemonics for places in certain LCS configurations, or have a certain definition in terms of LCS.

The nature of LCS, and of the relations that are central to thematic relations, is understood in two different ways in the literature. One view is that it is a level of conception which includes encyclopedic knowledge about lexical items. To others, such as Jackendoff (1987), it is composed of primitive predicates such as \textit{CAUSE}, \textit{BE}, and \textit{GO}, which combine to form a semantic structure which is a linguistic level, rather than a purely cognitive one. The view of LCS taken here will be closer to this second approach; we will posit that LCS is a level of structure that is part of the grammar, at which certain primitive relations associated with particular lexical items combine. These relations take certain arguments, intrinsically; thus the structure resulting from the combination of the
primitive predicates contains certain argument slots which are eventually projected to D-structure.

This approach assumes a form of lexical decomposition; it implies that lexical items can be "taken apart" into primitive relations that underlie their semantic representation. However, it is important to clarify how this decomposition is to be understood. It does not entail that the meaning of a lexical item must be fully decomposable into a set of basic concepts, especially basic concepts that are relevant to the grammar. Instead, we will view this "decomposition" as an abstraction from the more general meaning of a lexical item. That is, we will assume that there is some level of cognition\(^7\) at which a lexical item is associated with all sorts of encyclopedic information; however, the mechanism specific to language is only sensitive to certain pieces of this information. These linguistically relevant "pieces" form an abstraction of the semantic information associated with a lexical item; these pieces are the primitive relations and concepts at the level of LCS\(^8\).

What the set of primitive predicates of LCS is must be discovered. Many authors have proposed systems of abstract predicates, and several predicates are found over and over again in the literature. These include predicates like CAUSE, BE and DO, and an inchoative predicate, such as BECOME (instantaneous change of state, as defined by Dowty (1979)), or Gruber and Jackendoff's GO (change - instantaneous or gradual - from one state to another). Such systems seem to be basically on the right track, although which set of predicates are really grammatically primitive is a matter to be tested over and over again.

\(^7\)This "level" might in fact be many levels; human cognitive mechanisms may be highly modular - nothing said here would contradict this possibility, but we have little to say about it.

\(^8\)Note that they need only be considered primitive at that level - they could be decomposable elsewhere, in other cognitive processes.
Note that the relationship that we are postulating between the cognitive system which contains all of the encyclopedic information about a lexical item, and the LCS associated with a lexical item, is similar to the relationship between phonetic and phonological representations. The human auditory system is capable of making a huge number of distinctions between sounds which occur in languages; yet, only a handful of these distinctions turn out to be relevant to language. Similarly, the human cognitive system is capable of distinguishing myriad different concepts; yet relatively few seem to have any influence on grammatical structure.

We will also hold that there is a direct mapping from LCS to D-structure. Thus, we predict that the VP includes all and only elements that are semantically part of thematic/event structure.

We will maintain that the apparent optionality or obligatoriness is not a criterion for determining whether or not it is an argument, and whether or not it is a part of thematic/event structure. However, we do not deny that there are very interesting questions about when an element is obligatory and when it is not. A principled account of the facts seems possible; we will look to regularities in the semantic differences associated with the alternants in several well-known argument structure alternations, and also regularities in

---

9I am not interested in pushing a parallel with phonology any further. However, I take the idea that only a select few distinctions are "paid attention to" by linguistic systems to be one of the most fundamental and intriguing notions in the field.

10Included in the "semantic fields" that are "noticed" by the grammar are the types of predicates discussed, and also things like gender, number, animacy, specificity, tense, class (i.e. classifiers for shape, etc. - found in languages like Chinese, ASL).

11Note also that, as in phonology, it is possible that the set of grammatical concepts that are "paid attention to" is to some extent language-specific; for instance, number and gender do not seem to influence the grammar in Chinese, although other types of object classification do; the opposite is true of English. This implies that the primitive predicates, and hence decomposition, might be different in different languages.

12This is possibly mediated by Predicate-Argument Structure, as argued for by Levin and Rappaport for Adjectival Passives - we will have nothing to say about this.

13Where inclusion does not include adjunction.
the interpretation of "implicit arguments". 14

1.2.2 Event structure

Before we can adequately characterize what is internal to an event and what is external, we must characterize the "event structure". By the term "event structure" will be meant temporal, spatial, physical and other abstract characteristics which make up the form of an event, and by which we conceptualize it. The term "event" will be used, as it is often in practice used in the literature, to refer loosely to all sorts of situations, both states of affairs, and those which are properly called events involving activity and change. Events may be treated as being composed of smaller subevents15; these subevents, their properties, and their relation to each other form part of the structure of the whole main event.

We distinguish the "internal" structure of an event from its "external" structure. The internal structure of the event includes properties, temporal and otherwise, which contribute to the form of the event itself, independent of its relationship to the outside world. Thus, it comprises information about an event's beginning, middle and end, and what subevents it involves. Aspectual properties such as delimitedness (i.e., whether the event has a final endpoint), measure, duration, inception or initial boundedness, and stativity are all part of the internal structure of the event. Indeed, what we are referring to as "internal structure" is often called "aspect", in the broadest sense of the word. The internal structure may also include the causal structure of the event, which is tied to its

14The worst case view of obligatoriness/optionality is that this information must be annotated somehow in the grammar, either with subcategorization frames, or with indices such as are employed in Jackendoff (1989). There will, no doubt, under any account, be some residue of cases which must just simply be listed; however, the strategy is, as usual, to generalize wherever possible.
15See Pustejovsky (1988).
subevent structure; and also whether or not the event is an iteration of subevents. Last but not least, the participants of an event play a part in its internal structure; that is, the arguments of a predicate (which refer to the participants of the event indicated by the predicate) are part of the representation of its internal structure.

The internal structure of an event, which we have just characterized, must be distinguished from its *external* structure. The external structure of an event comprises its temporal, spatial and physical relations to other events, times, and the rest of the world. It "frames" the event in a context; that is, it places the event, including all of its internal parts and subevents, in an external context. Whereas, from the point of view of the internal structure, an event is viewed as having many different and heterogeneous parts, it is treated as an undifferentiated whole from the point of view of external structure. For instance, the internal temporal structure of an event like the building of a house includes that it has a beginning, a continuation, and a final point, and that it extends over an interval of some duration (possible with some breaks). On the other hand, the external structure does not include this information at all; instead, it relates the time of the event to other specified periods of time, such as a particular date indicated by a temporal phrase, or the time of utterance, which is usually given by the tense.

The distinction between internal structure and external structure is parallel to that between (narrowly defined) aspect and tense, and in fact subsumes this distinction. Tense relates the time of an event to the time of utterance of a sentence\(^{16}\), and thus contributes to the external temporal structure. Many adverbials, temporal and otherwise, also add to external event structure; these will be called "frame" adverbials here. Examples of frame

\(^{16}\)The proper characterization of tense in English, and probably in other languages, is somewhat more complicated; I take the view that the relation between the event time and the utterance time is mediated by the reference time, following Reichenbach (1945).
adverbials are those which indicate an absolutely specified time, such as on April 7th, 1963; those which provide time reference indexically, relative to utterance time, such as in two weeks; and those which provide general spatial reference for events, both indexical and absolute, such as three miles from here or in Miami.

1.2.3 A Note on Aspect and Aktionsart

A few remarks on the term "aspect" are necessary. First, aspect is often understood as involving only temporal properties; aspectual delimitedness is temporal delimitedness, and duration is temporal duration. According to Comrie (1976), aspect involves "the different ways of viewing the internal temporal constituency of a situation"\(^{17}\). We may think of this internal structure as the spatio-temporal "shape", "geometry" or "topology" of the event\(^{18}\). Aspect differs from tense, which relates the time of an event or situation to another, external time point, such as the moment of utterance. Information about the internal structure of the event is provided not only by aspect morphemes, but also by the verb and its complements.

Internal event structure, as described in the preceding section, involves more than just temporal properties. One of the main points of this study will be that the temporal structure of an event is influenced by its non-temporal structure, and vice versa; so that the domain which is traditionally called "aspect" will be seen to be affected by information outside that domain. The term "internal event structure" covers interacting properties from various semantic domains, and is neutral in regard to which domain it takes as basic.

\(^{17}\)Comrie, p. 3

\(^{18}\)The last two terms are from Pustejovsky (1988).
The aspectual properties associated with a predicate itself, that is, the semantic contributions of a predicate to aspectual interpretation, are often discussed under the heading *Aktionsarten*. Thus, the aspectual classes of verbs distinguished by Vendler (1967) and Dowty (1979) are a classification of different types of aktionsarten. "Aspect", in the narrow sense of the term, refers to aspectual morphemes, such as the progressive *-ing* in English, and their semantic contribution. Both aktionsart and aspect, narrowly defined, influence the aspectual interpretation of a sentence. Aktionsart just is the aspectual information provided by a verb and its complements. Aspect is sensitive to aktionsart, and adds aspectual meaning; it is able to "look into" the internal temporal representation, and contribute to it. In the rest of this study, I will tend to use the word "aspect" for both aktionsart and narrow aspect, as do many authors; how to understand the term will generally be clear from context.

It is important to note that the aspectual interpretation of a sentence is determined compositionally. The "most internal" contributor to the aspectual structure, generally the predicate, may add one aspectual property to the structure; aspectual elements with scope over the verb, particularly aspectual morphemes and adverbials, may add information about that aspectual property, specify it, or may actually change the overall interpretation in regard to it.

The following sentence demonstrates the compositional semantic structure for the property of delimitedness:

(1) John was building a house until last Tuesday.

The verb "build", with no complements, indicates a non-delimited event: building is a
process, and not an event with a specified endpoint\textsuperscript{19}. However, with a specific direct object, the VP “build a house” yields a delimited interpretation. When the progressive morpheme operates on this VP, it again yields a non-delimited structure; but then a delimiting temporal adverbial indicates a definite temporal endpoint for the process “building a house”, and the entire sentence is interpreted as aspectually delimited. The composition of this sentence is summarized by the following representation:

\begin{equation}
\begin{array}{l}
\text{[Until last Tuesday ( progressive } [ (\text{build}) \text{ a house})])} \\
\text{[ +del } \quad \text{[ -del } \quad [ ( -del) \quad +del]])}
\end{array}
\end{equation}

In this example, the value for delimitedness “toggles” back and forth, but note that this need not always be the case.

1.2.4 Selection and Selectional Restrictions

There are at least two notions of (semantic) “selection” that are found in the literature: the notions of “selected for” and “selected against”.\textsuperscript{20} A predicate selects for elements which it requires, which it is in some sense incomplete without, such as its obligatory arguments. For instance, the verb hit selects an agent or actor, the hitter, and a patient, the object hit; these participants are implicit in the meaning of the verb. A selected element could be selected, but semantically optional; for instance, the internal argument of eat is selected, but may not be present syntactically.\textsuperscript{21}

An element is selected against when it is in some sense incompatible with a predicate; the predicate is said to impose a “selectional restriction”, which rules out a restricted

\textsuperscript{19}The verb could also be regarded as underspecified for delimitedness.
\textsuperscript{20}Need not be agentic.
\textsuperscript{21}Jim Higginbotham (p.c.) has suggested that there might be elements that we should treat as selected, but not part of theta-structure — for instance, obligatory manner adverbs, as in behave badly. Clearly, we need to make this kind of distinction, but it is not obvious what to base it on.
element from cooccurring with it. There seem to be two kinds of cases where this notion is employed. Often, the term "selectional restriction" is used when talking about the kind of semantic restrictions that a predicate places on its arguments; so, for instance, that know requires its subject to refer to a sentient being, or that hit requires its participants to be physical objects, and not abstract concepts. Selectional restrictions can also be imposed on the types of adverbials that can occur in a sentence; for instance, statives can not generally occur with locative and temporal adverbials. Information of this type (in fact, this specific example) is sometimes taken to be a fact about the grammar (cf. Kratzer), and sometimes argued to be pragmatic — part of our world knowledge, but crucially not part of our linguistic knowledge.

Another way to look at this difference between selection and selectional restriction is to make a three-way distinction between what must go with a predicate, what can go with a predicate, and what cannot go with a predicate. The first type of element, those that must, are implicit (semantically); whether they are realized or not may be based on some other property of language, or may be somewhat arbitrary.22 With the second type, those that can, we must ask the question whether these are also always implicit, or whether some of them are simply compatible with a predicate, without being really selected23 Once we have asked this question, we must ask what makes an element not be compatible with a predicate.

---

22For instance, put.
23I think this is the same as the issue of semantic optionality raised by McConnell-Ginet.
1.3 The types of phrases under consideration

1.3.1 Types of Locative Phrases

The examples in (3) illustrate typical external, or frame, locatives, which serve to place and event in a general location in space:

(3)

a. Mary knitted a sweater in the living room.
b. Victoria stabbed Bill in the parking lot.

These may be contrasted to various types of internal locatives, which add to the aspectual information about an event in different ways. We distinguish Goal, Source, Path, Direction and what we will call "Posture" phrases, such as the locative in sit on a chair. This is not meant to be a classification scheme for locatives, but only a clarification of the ways a locative can be said to participate in an event. 24.

Goal locatives provide a spatial endpoint for an event, and by extension, also provide a termination for the event. For instance, in:

(4)

Bill walked to the store.
Mary put the book on the shelf.
The troops marched onto the ship.

the store, the shelf and the ship mark the final spatial endpoint of the walking, putting and marching, respectively. We will mainly focus on a subclass of the semantic roles often called "goals" in the literature; those which indicate only destination. We will take "destination" to indicate a primarily spatial notion, and distinguish these locatives from other "goals", such as the indirect object of verbs of transfer:

24The types of locatives discussed here are mainly those posited in Jackendoff (1983) (although he does not treat the "Posture" phrases in this way). Although they seem a fairly reasonable set, I make no claim as to the correctness or completeness of this classification.
(5)  
Jane sent the book to Bill.

While the notion of a goal like that occurring in (5) is very similar to the idea of destination, and may in fact subsume it, it comprises the additional notion of "recipient", which the term destination does not. The "goals" of events of transfer are usually human, and are appropriately interpreted as both recipient and destination; the destinations of motion events are generally areas in space, and may not be understood semantically as recipient. Goal and destination phrases have different syntactic properties; for instance, goal phrases may participate in "dative shift", whereas destinations may not. Compare the following sentences with the verb send, which may take either a destination or goal/recipient argument:

(6)  
a. Mary sent the book to John.
b. Mary sent John the book.

(7)  
a. Mary sent her son to Boston.
b. *Mary sent Boston her son.

Source phrases indicate spatial locations which correspond to the temporal beginning of an event, as in:

(8)  
John walked from the store.
The cat jumped off of the table.
The train left from the station.

Like goals, sources mark an endpoint of an event; however, there are important dissimilarities between initial and terminal endpoints. Most notably, sources do not have the same sort of ability to delimit an event. Destination phrases always delimit the event, but

\[\text{\footnotesize Note that (7b) is acceptable with a poetic interpretation of Boston as recipient.}\]
sources do so only when they provide an inceptive interpretation, where the beginning of the event is regarded as an event in itself, which is momentary and therefore delimited.

*Path* phrases indicate the trajectory of an event (generally a motion event), and thus provide information about the topology of the middle of the event. They are exemplified in (9a-c):

(9)

a. Victoria walked along the river.
b. The bird flew across the road.
c. The boys ran through the park.

In general, a path phrase does not indicate the location of either endpoint of an event, but only the location of the "middle" of the event. However, some prepositions that commonly introduce path phrases, such as *across* and *through*, may imply a final endpoint, at least on one reading. For instance, sentence (9b) may be interpreted either to mean that part of the bird's flight included crossing the road, or that the flight terminated when it had crossed the road; this ambiguity stems, at least in part, from the ambiguity (or non-determinacy) of the preposition *across*.

*Direction* phrases are similar to path phrases in that they indicate trajectory. However, they are distinguished here in that direction phrases imply that an event is directed towards a final endpoint, whereas path phrases do not; on the other hand, path phrases provide information about the location of the middle of the event, while direction phrases may not. Some typical examples of direction phrases are demonstrated in (10a) and (10b):

(10)

a. Bill strode towards the house.
b. John aimed the gun at the target.

What we will call *Posture* phrases are a type of locative which occurs mainly with verbs indicating posture and related notions, such as *stand, sit, sleep* and *live*. They are
exemplified in (11a) and (11b):

(11)  

a. Jane sat on the chair.  
b. We lived in that house for many years.

Like frame locatives, they seem to refer to the entire location of a situation. As such, they are unlike all the other internal locatives, which indicate only subparts of the location of the event; and the reader may wonder why they are included among the internal locatives. Yet, these phrases also add information about the geometry of the state of sitting, for they have a very close spatial connection to this state. Moreover, they do in fact pattern syntactically with the internal locatives, as we will see in chapters 2 and 3.

The semantic and syntactic behavior of Posture locatives is sensitive to what might be called the relative "size" of the location indicated and the event. The location must be of a sort that it provides information about the "shape" (or the posture assumed) in a state or event of posturing. For instance, in (11a) above, the fact that Jane sat in a chair indicates a very specific posture, and has an intimate relation to the spatial properties of the entire situation. This relation is not found with a locative like that in the following example:

(12)  

Jane sat on the mountain.

A mountain is somehow not "small" enough to participate in the event of sitting in the same way that a chair can; and the locative in this sentence is much more likely to be interpreted as a frame locative.
1.3.2 Semantic Selection of Locatives

Internal locatives must be semantically selected by the verb with which they occur; it is from this fact that they derive their argument-like behavior. It follows, then, that the type of internal locative that can occur – i.e., the semantic role of a locative – depends on the verb, and that verbs may only take the types of internal locatives that they select for. Motion verbs, such as walk, run, swim, etc., may take a wide variety of internal locatives, since many sorts of spatial relations are involved in their semantics:

(13)  
John walked from the school / to the store / along the river / towards the beach.

Other semantic classes of verbs are much more restricted in the types of internal locatives they select. For instance, posture verbs may only take the Posture type locatives:

(14)  
Mary stood on the table / at the blackboard / * from the table / * to the table / * towards the blackboard.

Other types of verbs will place different selectional restrictions on internal locatives:

(15)  
Bill aimed at the target / towards the tree / * to the tree.  
Jane left from the station / * to New York.

The semantic restrictions on internal locatives may involve other semantic factors in addition to the spatial relation involved:

(16)  
Read to the third line / * to the tree.

There are cases where a verb which does not select for a certain type of internal locative nevertheless occurs with a phrase which seems at first glance to be a internal locative. For instance, in (17) knit seems to take source and destination phrases, although it clearly does not semantically select for these locatives:
(17)  
a. Mary knitted a sweater all the way to the fair.  
b. Mary knitted a sweater from the school to the fair.

The view taken here of these phrases is that they are in reality complex frame locatives, which happen to be similar in form to internal locatives. Although, in some sense, the locative to the fair indicates the final endpoint of the event of knitting, it does so only in combination with other locative phrases in the sentences above. In fact, it cannot occur by itself with this verb:

(18)  
?* Mary knitted a sweater to the fair.

In (17a), to the fair modifies the way, which itself is a part of a frame locative indicating the general location of the knitting. In (17a), the source and destination locatives in combination form a frame locative, and neither can occur alone.  

Sometimes a internal locative and a frame locative may be identical in form, and are distinguishable only in terms of whether or not they may be interpreted as “participating” in the event. For instance, compare (19a) and (19b):

(19)  
a. John walked along the river.  
b. John ate along the river.

In (19a) along the river may be interpreted as a path locative selected by walk, but in (19b), this phrase may only be treated as a frame adverbial.

---

26It is possible to create a context where sentences like (18) are possible. For instance, if Mary is on a subway train, it is possible to say:

Mary knitted to the third stop.

This seems to show that a superordinate motion interpretation is allowed with almost any type of verb. Other notorious examples (discussed by Jackendoff, Marantz) are illustrated by:

We sang John onto the ship.  
Babe Ruth homered his way into the hearts of America.

(The second sentence is an example of the way-construction). These pose a similar type of problem for distinguishing verbs which inherently involve motion and location from those that do not. We note them, but will not have much to say about this type of problem.
1.3.3 Types of Temporal Phrases

There are many types of temporal phrases which are external to event structure, and serve to frame an event in a temporal context. One type is those that refer to particular time intervals\(^{27}\). These include those that have reference independent from context, as in (20), deictic time phrases, whose referent is fixed by the extra-linguistic context of utterance, as in (21), and those whose referent is relativized to the time reference of other parts of the sentence or discourse, as in (22)\(^{28}\).

(20) On April 19, 1775, a shot was fired that was heard around the world.

(21) Yesterday, a shot was fired that was heard around the block.
Five minutes ago

(22) At noon,
   On Tuesday, Edwidge made a tuna sandwich.
Before John left,

Syntactically, these may be expressed by prepositional phrases, NPs ("Bare-NP Adverbs" a la Larson) and by subordinate clauses like before I moved to Boston. We will expect that, for the most part, these all function in a sentence as frame adverbials; that is, they provide a general temporal "location" for the event expressed in the sentence, as frame locatives provide a general spatial location for an event. This implies that this type of temporal is never a part of the argument structure of a verb. There are certain exceptions, such as verbs like happen, take place and occur, which take an event as their subject, and may include a temporal phrase as part of their argument structure; however,

\(^{27}\)We will assume that they refer to intervals, not points, following Dowty.

\(^{28}\)The way in which time reference is fixed in such cases is a very interesting topic, but it is not important to the present discussion.
apart from these verbs, we will expect that most verbs do not have phrases referring to particular times as part of argument structure.

Another type of temporal phrases are those that express duration. These include phrases like the following:

(23)  
John chopped onions for three hours.  
Bill chopped onions throughout the day.

Phrases like in three hours, until 2, during break, from 9 to 5, since 9 o'clock might also be considered duratives.

Temporal phrases expressing iteration also contribute to aspectual interpretation, and are postulated to be internal. Among these are phrases which express the number of times and event occurs, such as in:

(24)  
The light flashed twice / three times.

There also exist temporal adverbials such as again, still yet and the like. These have some aspectual properties – for instance, again requires a telic event, and still a non-telic event; but they also seem to function to relate a sentence to the rest of a discourse, or the non-linguistic context and expectations of speaker/hearer. We will not consider this sort of function here.

1.4 Preview of the central ideas

In chapter 2, we examine phenomena in English which have traditionally been assumed to distinguish between thematic and non-thematic elements. These include optionality, iterability, ordering, VP-constituency tests, ability to passivize, and participation in argument structure alternations. We argue that the obligatoryness vs. optionality of an
element is not a good criterion for determining whether or not it is thematic, although this is a property that is probably quite important to the study of thematic relations. The rest of these phenomena are useful for determining the status of an element, though they may place additional conditions as well on the type of elements they can occur with. We use them as probes into the behavior of the locative and temporal phrases under discussion, and obtain results consistent with our hypothesis that the internal/external distinction is central to syntax. Goal, Direction, Path and Posture phrases are clearly shown to be (lowest) VP-internal, while locatives expressing general location are adjoined to VP or to a higher node. Source phrases are surprisingly mixed in their behavior. Durative and iterative complements appear to be external, contrary to our hypothesis; we argue that this results from the fact that in English, it is possible to have both internal and external versions of duratives and iteratives. Measure phrases are demonstrated to be VP-internal, consistent with our predictions.

Chapter 3 presents syntactic evidence from Mandarin Chinese for the divisions we have drawn between internal and external elements. The base positions alone of the various sorts of locative, temporal and measure phrases are enough to demonstrate the distinctions; goal and posture locatives, iterative and durative phrases, and measure and resultative complements appear in post-verbal position, which must be a VP-internal position in Chinese. Frame locatives and temporals may not ever appear in this position, but must be sentence-initial or preverbal. Thus, the data from Chinese clearly shows that elements with a clear effect on aspectual interpretation are VP-internal. The status of direction, path and source phrases is less clear, though it is possible to maintain that at least the first two are VP-internal. Our approach provides a better explanation than previous theories of the class of complements which may appear post-verbally, and sheds
some light on the difficult question of the structure of the Chinese VP.

Chapter 4 investigates phenomena involving binding of various types, with the aim of determining hierarchical relations between elements interior and exterior to the VP, and thus the structure of the VP. We consider first the proposal of Larson (1987)-(1990) that the structure of the VP is right-branching and that all post-verbal adverbials are VP-internal; this proposal constitutes a serious problem for our maintaining of the internal/external distinction as central to syntax. By looking more closely at quantifier binding and the possibilities for “backwards pronominalization” and Reconstruction, we are able to show that the PPs we have claimed to be external can in fact be adjoined to VP, higher than VP-internal constituents. However, a right-branching structure does appear plausible for the lowest VP projection itself.

The data on backwards pronominalization and reconstruction also suggests that external elements should be split into at least two types, those that may be adjoined to VP, and those that are adjoined to a higher functional projection. We suggest that there is a semantic difference between these two; VP-adjuncts straightforwardly locate the event in space or time, while higher adjuncts serve as restrictors on quantifications over the event.

In chapter 5, we take a closer look at the semantic relations which exist between the verb and the various types of event-internal elements. We propose that Goal phrases should be treated on a par with resultative complements: both are secondary predicates which combine with the main predicate to form a complex predicate. This syntactic process may combine both the argument structures of the predicate, identifying certain common arguments through theta-identification, and the aspectual structures, producing a more complicated aktionsart, with aspectual properties potentially different from those
of either predicate. We extend this type of combination to include the relation between a verb and a posture phrase (*sit on a chair*, in the stative reading); this combination does not emerge semantically as resultative, because it is a relation between two states, but it is otherwise similar to the case of Goal phrases.

We suggest that other types of complements, such as directions, measures, paths and duratives, are not generally predicated of arguments of the main verb, and do not undergo the same type of semantic and syntactic combination with the verb. Instead, they predicate of or modify some parameter associated with the verb, which is available from its lexical representation. If the verb fails to have this type of parameter, then it cannot take a complement of the required type; this accounts for the restrictions on the appearance of these various types of complements. Iterative complements seem to be a third type of event-internal modifier; they are quantifiers of sub-parts of the event.

At the end of the chapter, we compare our proposals with two other well-known approaches, that of Gruber (1965) and Jackendoff (1972–1990), and that of Davidson (1967), particularly as implemented by Parsons (1990). We argue that our approach makes the best predictions about the behavior of locative and temporal phrases.
Chapter 2

Arguments and Adverbials in Syntax

This chapter, and the two following, present syntactic evidence for differentiating between thematically-related and non-thematically-related elements. We investigate phenomena that have been used as evidence for a syntactic argument/adjunct distinction, with two purposes in mind. As we have seen in Chapter 1, the nature of argument structure and the existence of a distinction between arguments and modifier/adjuncts has become increasingly controversial; so the first aim will be to establish what grounds there is for maintaining this distinction. Second, in determining the relevance of each type of syntactic phenomenon to the argument/non-argument or thematic/non-thematic distinction, we will examine more closely the behavior of "borderline" phrases with regard to these phenomena, in order to articulate the finer distinctions and types among these phrases.

In this chapter, we examine criteria that are traditionally assumed to distinguish between arguments and adjuncts. These include obligatoriness vs. optionality of a
constituent, iterability, ordering, VP-constituency, ability to passivize, and ability to participate in alternations in thematic structure. In Chapter 3, we will see further evidence, from Mandarin Chinese, for drawing the lines of the internal/external distinction as we have outlined in Chapter 1. In Chapter 4, we will look at the interaction of the "argument/adjunct" distinction with binding theory, in an attempt to elucidate the structural properties of internal and external elements.

Though the syntactic "tests" that we will explore do not give uniform results, we will find that there are good reasons for maintaining a syntactic thematic/non-thematic or internal/external difference. That is, there is undeniable evidence that the notion of thematic/event structure is relevant to the grammar, and that there are elements that modify the clause that are not fully involved in this structure. However, we will see that when considered in detail, "borderline" elements may pattern with arguments in one construction and with adjuncts in another, and they vary widely from each other in their behavior. Furthermore, using syntactic phenomena as tests presupposes that the phenomena are well understood and correctly accounted for, and that they produce reliable results. Although these phenomena serve very well to distinguish the extremes of the argument/adjunct distinction (direct objects vs. purpose clauses, for instance), they do not turn out to be reliable when in-between cases are considered. We will seek an explanation for the variety of behavior in both the semantic and the syntactic properties of the phrases concerned, and argue that there are actually several distinctions involved in "the" argument/adjunct distinction, that can be isolated on both syntactic and semantic grounds.

Investigating the syntactic properties of these phrases necessarily involves exploring their structural properties: their attachment sites within the sentence, whether they are
part of the VP or not, and the hierarchical (c-command) relations between them. The approach that has become standard in syntactic theory holds that arguments are part of a constituent with the VP that adjuncts are not a part of, and that adjuncts are attached higher in the tree than arguments. Both of these points have been challenged in recent work, starting with Larson (1987).

Another issue involving the structure of the VP is whether or not the domain of the VP is identical to that of theta-structure. That is, does the (lowest) VP contain all and only elements that are theta-related, or could it include others as well? The position that theta-related elements are the only complements to the verb is often assumed, along with the standard view of the argument/adjunct distinction. Larson, of course, allows both arguments and (traditional) adjuncts to be internal to VP. We can imagine a third position, in which there is a tripartite distinction, between theta-related elements, VP-internal elements, and VP adjuncts. We will consider these options as we consider the variety of behavior that different types of "quasi-arguments" exhibit. We will find that there is a great deal of variability in the behavior of phrases that have been lumped together as adjuncts, and that they may display a wider range of combinations of argument-like and adjunct-like characteristics than the standard view would predict. This indicates that there are several syntactic properties by which arguments and adjuncts should be differentiated. We will try to discover what these syntactic properties are.

It is important to remember that the function of a constituent, particularly whether it is part of thematic structure or not, is not determined by its category. Rather, it is determined by the semantic relationship between the constituent and the main predicate of the clause. Such relationships include those which are thought of as "thematic", and

---

1This is implicit in Speas (1989), elsewhere.
perhaps some which are thematic but have not been regarded as such, and the "framing" relation. Thus, being an argument or adjunct is not an inherent property of a phrase itself, but is determined by its relationship to a predicate (or the relationship of its referent to an event). Note, though, that some elements could never be construed as having certain relations to any predicate/event. For instance, animate NPs can't frame an event, times can't be the moving object, etc.; yet, the relationship they do have in a particular case to the predicate still depends on the predicate.\footnote{This is generally, though not universally, the view maintained in recent literature. In a notable exception, Chomsky (1981, p. 101) says:}

The "borderline" cases investigated here are on the border not just with respect to the fact that they may pattern sometimes with arguments and sometimes with adverbials, but also because they are often judged by speakers as "marginal" in grammaticality in various constructions, and because there is a lot of idiolectal variation as to their acceptability. Some of this idiolectal variation may be due to ambiguity of borderline phrases: a phrase might be construed as part of the thematic structure, or outside of it, where it can have a Framing interpretation, with corresponding syntactic behavior\footnote{Let us now assume that arguments fall into the following categories: (i) overt anaphors (ii) pronouns (iii) R-expressions (iv) clauses. Non-arguments include other non-NP categories as well as NPs that are "non-referential": impersonal it, existential there, perhaps idiom chunks, ..."}. This ambiguity is often subtle, and speakers may have different preferences for resolving it, which lead to differences in grammaticality judgements. Other types of idiolectal variation might also be contributing; but the preponderance of variation and the difficulty for speakers to decide about particular cases with regard to this data seems to exceed normal idiolectal

\footnote{Though this list was perhaps intended for purposes of exposition only, the implication is that arguments are generally of the category NP, and "other non-NP categories" are not arguments. Cf. also Rizzi (1989)'s notion of "referentiality".}

\footnote{I will elaborate on this ambiguity in subsequent chapters.}

38
variation.4

Throughout this chapter, as in the rest of this thesis, we will look for a strong correlation between semantic and syntactic properties. There are several motivations for this approach. The first is that there are clear regularities between the semantics of a phrase and its syntactic behavior, and like any linguistic generalization, these need to be captured by linguistic theory. Arguments such as direct objects are semantically "required" by the verb, and are generally syntactically required as well. Adverbs regularly differ in interpretation depending on where they appear in a sentence; although the correlation is not 100 percent predictable, it is strong enough to be worth investigating. It cannot be an accident, either, that the "in between" cases, which are difficult to determine on semantic grounds are difficult on syntactic grounds as well. And even if one is in doubt as to whether a tight syntax/semantics correlation is maintainable, it is methodologically preferable to seek a correlation. For it is easier to find the weaknesses in a strong generalization, or to disprove it, than it is if we assume no regularity.5

2.1 Traditional criteria for the argument/adjunct distinction

There are several criteria which, according to pervasive linguistics lore, differentiate arguments and adjuncts. These include optionality, iterability, ordering, and VP-constituency. We will explore the validity of these in this section, and find reason to doubt each of them, although they are useful as heuristics.

4I don't know if this amount of variability is found in other languages as well, although the marginality of these "marginal" phrases seems to occur in Chinese as well.

5This paragraph may belong in the first chapter instead.
Standard theories of grammar hold that arguments are within the VP, either as specifier or complements (generally the latter) in an X' framework\textsuperscript{6}; post-verbal adjuncts are adjoined to the VP. Thus, this view maintains both that adjuncts are hierarchically attached higher in the tree than arguments (i.e., they c-command them), and that arguments and adjuncts differ in their structural relation to the VP — arguments are within the “lowest” VP, whereas adjuncts are not. This structure is illustrated in (25):

(25)

```
  VP
 /   \
VP /    adjuncts
 /     \
V'        PPs (arguments)
       /     \
V       NP (argument)
```

Each of the supposed criteria that we will look at lend support to this view. The obligatoriness of arguments is attributed to the theta-criterion, which applies to all complements of the verb; positions determined by a verb’s theta-structure must be filled. Adjuncts, however, lie outside of the (first) maximal V-projection, and adjunction is held to be a totally optional process, syntactically. Moreover, the theta-criterion does not apply to adjuncts. Adjuncts are purported to be completely iterable, while iterability of arguments is prohibited by the theta-criterion\textsuperscript{7} The typical order of arguments and adjuncts is explained — arguments are closer to the verb. The results of VP-constituency tests are also explained by this view. These “tests” are generally held to operate on,

\textsuperscript{6}X'-theory is not necessarily central to this view.

\textsuperscript{7}Though it is not prohibited by X'-theory — see section on iterability.
either by movement, deletion, or pronominalization, any node labelled "VP", so that the VP picked out must include all arguments, but may or may not include VP adjuncts. In the structure in (25), the "lowest" VP includes the verb and all its arguments, and the next VP includes that VP and one adjunct, and so on.

This traditional view has been challenged by an approach proposed in Larson (1987); the Larson structures differ in the questions of hierarchical relations and VP-constituency, for they entail that adjuncts are c-commanded by arguments, and thus structurally lower in the tree, and also that there is no difference in the kind of category that arguments and adjuncts are dominated by. Thus, this view brings into question the very existence of an argument/adjunct distinction. We will explore the consequences of this view in Chapter 4, after reviewing the arguments that support the standard view.

2.1.1 Optionality

The obligatoriness or optionality of an element is often taken as the sole determinant of whether or not it is an argument or an adjunct – arguments are supposed to be obligatory, adjuncts are not. However, it is increasingly being recognized\(^8\) that this criterion just does not hold in many cases in which the element in question seems intuitively to be an argument.

Many examples of this involve optionality of the direct argument. For instance, the internal arguments of verbs such as *eat*, *read* and *build* need not be present, and these verbs are usually interpreted in roughly the same way whether the arguments are overtly expressed or not.

---

(26)  
John is eating (the apple)  
Edwidge read (the book) for an hour

Many verbs have variants in which one argument may be left out, with a regular semantic difference occurring between the two alternants; unaccusatives like break and sink display this behavior, as do verbs like jump, which are intransitive but have a causative variant, as in (28).

(27)  
Tom sank the boat. / The boat sank.  
Mary broke the vase. / The vase broke.

(28)  
Ken jumped the colt over the fence / The colt jumped over the fence.

Some verbs allow cognate objects of various types, which are also optional, as in:

(29)  
Jane sneezed a big sneeze.  
Bob laughed himself silly.

On the other hand, there are verbs which require a locative PP, such as put and reside, and many others which take optional locatives whose semantic function seems almost identical to one of these.

(30)  
Edwidge put the book *(on the table).  
We reside *(in that house).

Some verbs, like behave and word, require adverbs, which are normally assumed to be optional.

(31)  
John worded the letter *(carefully).

There are also cases, discussed by Grimshaw (198?), in which some complement is required, but any of a number of elements may fulfill the requirement. An example of this is the middle construction ⁹.

⁹cf. Hale and Keyser, etc.
This meat cuts *(easily).
This meat won't cut.

We recognize that there are many deep and important issues raised by optionality; however, many of the really difficult cases involve subjects and direct objects, and are therefore beyond the scope of this study. Since there are so many cases where it is impossible even to assert that the direct internal argument is required by a verb, we will not take obligatoriness as a criterion for being part of thematic structure, or as part of the VP. In fact, most of the oblique elements we will concentrate on are optional. We believe, though, that this question is worthy of investigation, and is not simply a matter of listing subcategorization frames of verbs; for though there are sometimes changes in the meaning of a verb when it undergoes alternations, these changes are quite systematic. The questions raised by optionality hinge on the semantic properties of the verbs participating in the alternations. Discussion of some of these issues, as they relate to oblique elements, will be taken up again in Chapter 5.

2.1.2 Iterability

Another property often taken to distinguish arguments from adjuncts is iterability\textsuperscript{10}. Adjuncts, supposedly, are iterable without any fixed limit, and arguments are not. While it is certainly true that the traditional arguments do not iterate, and in fact there can only be one of each type, we will see that it is not true that an unlimited number of adjuncts can occur in a clause. Several apparent types of iterability turn out, on closer inspection, to have strict limitations. There do exist constraints on the number and types of adverbials, although these constraints are not as restrictive as those imposed on

\textsuperscript{10}This point is made in Larson (1983).
arguments.

Apparent iteration of adjuncts is illustrated in (33)\textsuperscript{11}:

(33) \textit{Fred deftly handed the toy to the baby by reaching behind his back over lunch at noon in a restaurant last Sunday in Back Bay without interrupting the discussion.}

The many prepositional phrases following the verb (the Goal excluded) seem to be fairly unconstrained as the number and order in which they appear. There are two manner adverbials, and several temporal and locative adverbials; and although it is perhaps more natural to group each type together (\textit{at noon on Sunday in a restaurant in Back Bay}), it is clearly possible to mix them, as the example above shows.

However, there are some restrictions on these adverbials. Locatives and temporals occurring in the same clause must be semantically "nested"\textsuperscript{12}, that is, they designate successively larger units of space or time, and cannot conflict:

(34) 
\begin{enumerate}
\item Dan saw a movie in a large movie theater in a small town in Western Massachusetts.
\item Dan saw a movie on Tuesday, July 3\textsuperscript{rd} at 7PM.
\end{enumerate}

(35) 
\begin{enumerate}
\item Dan saw a movie on July 3\textsuperscript{rd} on July 4\textsuperscript{th}.
\item *Dan saw a movie in a big city in Boston.
\end{enumerate}

This indicates that there may only be one specification of location and one specification of time per clause, though there may be several adverbials that contribute to each specification\textsuperscript{13}. In addition, note that the order of the adverbials is not strict in either

\textsuperscript{11}This example is from Larson (1982:p.3); he attributes it to Bresnan (1982).

\textsuperscript{12}This is argued in Brunson (1988).

\textsuperscript{13}This could plausibly be regarded as a purely semantic restriction. However, the relation between the syntax and the semantics must be stated carefully, so as not to exclude sentences like:

John saw a movie on Monday and on Tuesday.

Here, there is a conjunction structure, which is truly iterable. However, the interpretation of the sentence is more complicated than the syntax suggests – there must be two events of moviegoing.
case, although the "nested" order is preferred.\textsuperscript{14}

Another type of apparent iterability occurs in the following examples:

(36)  
\begin{itemize}
  \item a. Dan cut the meat carefully gracefully.
  \item b. Gracefully, Dan cut the meat carefully.
\end{itemize}

(37)  
\begin{itemize}
  \item a. ?The light flashed 4 times 5 times.
  \item b. 5 times, the light flashed 4 times.
\end{itemize}

In these sentences, the two adverbials are not interpreted as conjoined, but the one closer to the verb is somehow subordinated to the other, which can be either sentence-final or sentence-initial (though the conjoined reading may be possible for (36), and is contradictory for (37)). That is, (36) is paraphrasable as "Dan's careful cutting of the meat was graceful", where grace is attributed both to the cutting and to the carefulness, and (37) is paraphrasable as "What happened 5 times is that the light flashed 4 times", or "5 times, there were 4 flashes of the light". The "outer" adverbial modifies a conceptual unit of which the inner adverbial is a part.

The ability to have two semantically similar modifiers implies that they are iterable. However, if there are three modifiers, it is almost impossible to interpret the sentences (on the intended reading, parallel to 36 and 37).

(38)  
\begin{itemize}
  \item a. ????Gracefully, Dan cut the meat carefully with precision.
  \item b. ????5 times, the light flashed 3 times 4 times.
\end{itemize}

This suggests that there are only two positions for semantically similar adverbs — and "inner" position, and an "outer" one\textsuperscript{15}. The outer adverbial may appear at the beginning.

\textsuperscript{14}The order of nested elements is language particular. In English, it goes from smallest to largest, but in Chinese, it goes from largest to smallest. This is true both within sentences, and in the order of postal addresses.

\textsuperscript{15}Perhaps there is another, between the subject and the verb, which we will take to be adjunction to I'.
of the clause, or at the end (perhaps in “extrapsed” position); the inner one must occur within the VP. It is possible to conjoin manner adverbs, without multiplying events, and may be possible to leave out the conjunction. If iteratives are conjoined, it implies multiple events (they are contradictory). \(^{16}\)

(39)  
\begin{enumerate}
\item a. Dan cut the meat gracefully, carefully and with precision.  
\item b. Dan cut the meat gracefully, carefully, with precision.
\end{enumerate}

Thus, there is some iteration of adjuncts, although there are certain restrictions on semantically similar elements: the “nesting” requirement, and the requirement that there be only an “inner and “outer” adverbial of the same type. Where might the restrictions on the iterability of adverbials come from? It cannot come from X-bar theory, for X-bar theory must allow elements to optionally adjoin to various nodes, and allow multiple (unlike) adjuncts, as in 33. In fact, X-bar theory allows optionality and iteration of complements as well, and this is necessary for the theory to be able to permit predicates with varying numbers of arguments. It is not X-bar theory, but the theta-criterion, which prohibits the free iterability of arguments.

The theta-criterion does not apply to “outer” PPs. However, it is not implausible to

\(^{16}\)But it is possible to iterate arguments and predicates as well, with a conjoined interpretation. Several examples of iteration which is implicitly conjunction are found the following French poem. The example is in French, but works the same in the English translation (though it doesn’t scan as well):

Dans un chemin montant, sablonneux, malaisé,
Six forts chevaux tiraient un coche.
Femmes, moines, vieillards, tout étaient descendus;
L’attelage suait, soufflait, était rendu. (…)
(De La Fontaine, “La mouche et le coche.” )

On a climbing, sandy, toilsome road
Six strong horses pulled a coach.
Women, monks, old men, all had descended;
The horse-team sweated, puffed, were exhausted.

The interesting thing to note here is that this kind of iterability is just as possible for arguments and predicates as it is for adjuncts, as the above example shows.
suppose that there are principles which impose the desired restrictions, looser than the theta-criterion, but still part of grammar. These restrictions will, of course, ultimately be based on the semantic relations in the sentence; but this is also true of the theta-criterion.\footnote{These ideas will be developed in subsequent chapters, where the semantics is explored in more detail.}

2.1.3 Ordering and the base position of adjuncts

The relative ordering of locatives in English shows that Participant locatives are structurally closer to the verb than Frame locatives:

\[(40)\]

John walked to the store in Cambridge.
* John walked in Cambridge to the store.
Susan jumped onto the table in the living room.
* Susan jumped in the living room onto the table.
I slept in my bed in New York.
* I slept in New York in my bed.

Duratives are closer to the verb than Frame temporals, as are iteratives:

\[(41)\]

I ran for 3 hours today.
??I ran today for 3 hours.

\[(42)\]

The light flashed 5 times today.
??The light flashed today 5 times.

These facts follow from the standard approach, if we assume that Participant locatives, duratives and iteratives are part of theta-structure, or at least are "more internal" than Frame adverbials.

Frame locatives may be preposed more easily than Participant locatives, and if both a Participant and Frame locative are present, the Participant locative cannot prepose:
In New York, John met Larry.
In the box, Mary put the sweater.
In Cambridge, Sue walked to the store.
To the store, Sue walked in Cambridge.
In New York, I slept in my bed.
In my bed, I slept in New York.

This generalization holds as well for Frame temporals vs. duratives and iteratives, though the contrast is not as strong:

Today, I ran for three hours.
For three hours, I ran today.

Today, the light flashed 5 times.
5 times, the light flashed today.

It is not clear what this requirement stems from, although it suggests again that frame adverbials must be outside of PPs which are more closely involved in the event. For VP-internal elements like Participant locatives, this preposing must be Topicalization; For Frame adverbials, it is likely that they may be generated in presentential position; this would explain why it is always acceptable for them to occur in this position. This possibility suggests that there are multiple base positions for adverbials: presentential, preverbal (perhaps adjoined to I' or various functional projections), low in VP or right-adjoined to it. It is well known that there are sometimes semantic differences which correlate with position of attachment; this is true especially for manner adverbs. There are also restrictions on the occurrence of adverbs in various positions, according to their semantic properties. Iteratives and duratives may be interpreted differently depending on their position; although there is no detectable difference for Framing adverbials. These

---

18 This fact, and the contrast in preposing of the different types of phrases, is completely reproducible in Chinese.
facts again suggest that there are semantic restrictions on the occurrence of adverbials, similar to but looser than the conditions on theta-related elements. This issue will be explored further in chapter 5.

2.1.4 VP-constituency tests

There are various phenomena that are considered to be tests for VP constituency. These constitute the strongest evidence for standard view. As we will see, according to the traditional approach, these phenomena indicate that Participant locatives are VP internal, and Frame locatives are adjoined to the VP. Temporal phrases appear to be uniformly outside the lowest VP; measure phrases are always within the VP. Although we might question whether the constituent that is in question is really the VP, or some other syntactic unit, the most straightforward structural analysis of these facts requires the inner elements to be part of some constituent of which the outer elements can not be a member.

The do so test, discussed by Lakoff and Ross (1966), is one such phenomenon. Adverbials, such as those for time, purpose and manner, may remain outside the “do so” phrase, whereas arguments may not, as shown in (45a&b)):

(45)

a. John made a cake on Monday and Bill did so on Thursday.
b. *John made a cake and Bill did so a pie.
c. John made a cake and Bill did so, too.
d. John made a cake on Monday and Bill did so, too.

As we see in (45d), the adverbials may be included in the pronominalized VP, paralleling (45c). This is accounted for by saying that so\(^{21}\) is a pronominal that corresponds to a VP in the first clause, and the adverbial is adjoined to VP, as in (46)\(^{22}\):

---

\(^{21}\)Or perhaps the unit do so.

\(^{22}\)This is argued by Avery Andrews (1982).
Then, so may correspond to the higher VP, allowing (45d), or to the lower VP, allowing (45a); however, it may not pronominalize any subpart of the VP, and thus (45b) is ruled out.

Turning to locatives, we find that Frame locatives act like the VP-adjointed adverbials, while Participant Locatives in general come out as VP-interna.²³:

(47)
John chopped onions in the pantry and Bill did so in the kitchen.
John knit a sweater in the living room and Bill did so in the bedroom.

(48)
*John went to school and Bill did so to work.
*John aimed the gun at the target and Bill did so at the tree.
*John threw the ball over the fence and Bill did so over the wall.

This is brought out especially by the following minimal pair, where walk selects a Path locative, but eat does not, and so the locative can only be interpreted as a Frame locative:

---
²³While goal, path and direction phrases are all shown to be VP-internal, source phrases beginning with from seem to pattern with the Frame adverbials. As we will see, Sources in general behave differently from other Frame adverbials. We will look at this in detail in section ??.
John walked along the river and Bill did so along the canal.
John ate along the river and Bill did so along the canal.
Frame temporals, as expected, are VP-external:

John went to the library yesterday and Bill did so today.
Various kinds of durative and telic temporal phrases are also indicated to be VP-external:

a. John chopped onions for 2 hours and Bill did so for three (hours).
b. John chopped onions until 2 and Bill did so until 3.
c. John chopped onions during the Super Bowl and Bill did so afterwards.
d. John chopped onions during the Super Bowl and Bill did so during the playoffs.
e. John chopped onions from 9 to 5 and Bill did so from 10 to 6.
f. John built a sandcastle in 2 hours and B. did so in 3 (hours).
g. John has been chopping onions since noon and Bill has been doing so since 1.

This is also true of iteration phrases:

Bill ran the marathon 4 times and John did so 5 (times).
b. Bill ran the marathon twice and John did so 5 (times).
c. Bill ran the marathon 3 years in a row and John did so 4 years in a row.

These examples are counterexamples to our claim that duratives and iteratives are VP-internal. However, recall that in section ??, we argued that in English there are both external and internal duratives and iteratives.24 In cases where a semantically durative

24 Additional support for this claim (pointed out by Michael Hegarty, (p.c.)) is provided by the fact that VP-internal iteratives may appear closer to the V than manner adverbials, which themselves seem to be difficult to “leave behind”:
The light flashed three times quickly.
?? The red light flashed quickly and the green light did so slowly.
phrase appears in direct object position, with no preposition, the phrase can not be "left behind":

(53)  
*John worked 4 hours and Bill did so 5 hours.

This is evidence that in this case, the durative really is VP-internal. Note that it is not just because the temporal in this case is a bare NP that it can't be VP-external; for the following is perfectly acceptable:

(54)  
John watched MTV all day and Bill did so all night.

Measure phrases also are clearly VP-internal:

(55)  
*John ran a mile and Bill did so three.

In cases where there is more than one adverbial, frame locatives and temporal parts may appear in either order, but the outer one must always be "left outside the VP" if the inner one is. That is, we must assume parallel ordering of adjuncts in each half of the sentence. Consider:

(56)

a. John chopped onions in the pantry today and Bill did so in the kitchen yesterday.
b. John chopped onions in the pantry today and Bill did so yesterday.
c.?*John chopped onions in the pantry today and Bill did so in the kitchen.

(57)

a. John chopped onions today in the pantry and Bill did so yesterday in the kitchen.
b. ?John chopped onions today in the pantry and Bill did so in the kitchen.
c.?*John chopped onions today in the pantry and Bill did so yesterday.
These facts can be accounted for easily by the traditional analysis, which assumes that adjuncts are adjoined to successively higher VPs.\textsuperscript{25}

The Pseudocleft construction\textsuperscript{26} provides evidence very similar to that above. Frame locatives may remain outside the VP, while Participant locatives may not.\textsuperscript{27} In this construction, what is the wh-element corresponding to a VP; it undergoes wh-movement in the relative clause, and may leave behind any adjuncts external to the most internal VP node:

\begin{itemize}
\item[(58)]
\begin{align*}
\text{What Mary did in the living room was knit a sweater.} \\
\text{What}_\zeta [\text{Mary did} \text{ [ [ [}_\zeta \text{in the living room} \text{] } \text{was } ...]
\end{align*}
\end{itemize}

Again, Frame locatives are indicated by this test to be outside the lowest VP, while Participant locatives are within it:

\begin{itemize}
\item[(59)]
\begin{align*}
\text{What Mary did in the living room was (to) knit (a sweater).} \\
\text{What John did in the pantry was chop onions.} \\
\text{What Bill did along the river was eat.}
\end{align*}
\end{itemize}

\begin{itemize}
\item[(60)]
\begin{align*}
\text{*What Tom did to the store was walk.} \\
\text{*What Jim did at the target was aim (a gun).} \\
\text{?What Bill did along the river was walk.}
\end{align*}
\end{itemize}

\begin{itemize}
\item[(61)]
\begin{align*}
\text{??What John did on the chair was sit.} \\
\text{What John did on the mountain was sit.}
\end{align*}
\end{itemize}

\textit{What} may of course correspond instead to the higher VP, including the adjunct\textsuperscript{28}:

\begin{itemize}
\item[(62)]
\begin{align*}
\text{What Mary did was knit a sweater in the living room.}
\end{align*}
\end{itemize}

\textsuperscript{25}However, they are problematic for an approach like Larson's — see Chapter 4.

\textsuperscript{26}cf. Higgins (1973).

\textsuperscript{27}Some speakers require the infinitival morpheme \textit{to} in these sentences; perhaps this constituent includes some INFL morphology as well.

\textsuperscript{28}I must say something about the problem of "connexity" — cf. Higgins: \textit{What John did was hurt himself}.

53
Pseudocleft constructions again indicate that temporals are VP-external:

(63) What John did today was chop onions.
What John did until 2 was chop onions.
What John did the whole day through was chop onions.
?What John did twice was run a marathon.
?What John did in 3 days was build a house.

Here, we suggest again that it is the external varieties of durative and iterative adverbials which may be "left behind".

Measure phrases are again indicated to be VP-internal:

(64) *What John did 2 miles was run.

VP-preposing is also taken to be a diagnostic for VP-constituency. The most natural VP-preposing in English is that in which the outermost VP moves, as in (65a); however, it is also possible, although more awkward, to prepose only the innermost VP, and leave Frame adverbials in situ, as in (65b):

(65) a. John said he would fix the car today and fix the car today he did.
b. John said he would fix the car today and fix the car he did today.

With the latter type of VP-preposing, we find again that it is possible to separate the Frame locatives from the VP, but not the Participant locatives:

(66) John said he would knit in the living room and knit he did in the living room.
John said he would sit on the mountain and sit he did on the mountain.
(67)  
??John said he would leave Boston and leave he did Boston.  
??John said he would aim at the target and aim he did at the target.  
??John said he would put the book on the table and put the book he did on the table.

(68)  
??John said he would walk to the store and walk he did to the store.  
??John said he would sit on the chair and sit he did on the chair.

This test again indicates that most types of temporals are VP- external:

(69)  
a. John said he would chop onions for 3 hours and chop onions he did for 3 hours.  
b. John said he would chop onions today and chop onions he did on Tuesday.  
c. John said he would chop onions during the Superbowl and chop onions he did during the Superbowl.  
d. John said he would run the marathon in 4 hours and run the marathon he did in 4 hours.

Note that again, duratives in direct object position cannot be "left outside":

(70)  
*John said the rain would last 3 weeks and last it did 3 weeks.

Measure phrases seem better than expected in this construction:

(71)  
John said he would run 3 miles and run he did 3 miles.

VP-deletion \(^{29}\) also shows that Frame locatives and Frame temporals and duratives may "remain outside" the VP, though Participant locatives measure phrases may not.

Sam chopped onions in the kitchen, and Mary did in the pantry. 
Sam chopped onions on Monday, and Mary did on Tuesday. 
Sam chopped onions for 4 hours, and Mary did for 5. 
Sam ate lunch along the river, and Mary did along the canal.

*Sam went to the grocery store, and Mary did to the bank. 
*Sam walked to the grocery store, and Mary did to the bank. 
*Sam aimed at the apple, and Mary did at the target. 
*Sam walked along the river, and Mary did along the canal.

*Sam ran 5 miles, and Mary did 6.

Some Sources, though, pattern with frame adverbials:

Sam left from South Station, and Mary did from Back Bay.

Iteratives pattern with participant locatives here:

The red light flashed 4 times, and the green light did 5 times.

Note that multiple adjuncts are not as easy to separate as in do so test:

?Sam chopped onions in the kitchen on Monday, and Mary did on Tuesday.
??Sam chopped onions on Tuesday in the pantry, and Mary did in the kitchen.

Note that adverbials cannot be added after negation:

John chopped onions in the kitchen, but Mary didn’t. 
*John chopped onions in the kitchen, but Mary didn’t in the pantry.

Though-movement, which seems superficially like VP-preposing, replicates the general pattern of the other tests\textsuperscript{30}:

\textsuperscript{30}However, some Participant locatives are surprisingly good in this construction:
Chop onions though he did in the kitchen,  
on Monday,  
for 5 hours,  
... we still think John is lazy.

*Go though he did to the store,  
*?Push the cart though he did to the corner,  
*?Put the book though he did on the shelf,  
*?Work though he did 5 hours,  
... we know that John is still lazy.

*?Flash though it did 5 times, the light still isn't working properly.

?Run though he did 5 miles, ...

PP-preposing is also used by Jackendoff (1972) to distinguish "outer" PPs from inner ones. It is not a VP-constituency test, but rather indicates which PPs may be adjoined to I'. However, it does differentiate locative and temporal PPs along the same lines as before.

---

Aim though he did at the target, ...
Sit though he did on the chair,
Run though he did to the store,
?Leave though he did from South Station,
(79) Mary, in the living room (anyway), knit a sweater.
Mary, on Monday (anyway), knit a sweater.
Mary, for 5 hours (anyway), knit a sweater.

*John, to the store (anyway), walked.
*?John, to the corner (anyway), pushed a cart.
*Sam, at the target (anyway), aimed the gun.
?
Mary, for a mile (anyway), ran.
*Mary, a mile (anyway), ran.

Sam, along the river (anyway), ate lunch.
*?Sam, along the river (anyway), walked his dog.

*The light, 5 times (anyway), flashed.

**This book, 5 pounds (anyway), weighs.

In summary, these VP-constituency tests fairly consistently demonstrate that there are differences between different types of PPs and other “adjunct” phrases, and so maintain an argument/adjunct distinction. They show that Participant locatives and measure phrases pattern with arguments, and Frame locatives and most temporals pattern with adjuncts. There are exceptions to these generalizations, and some idiosyncracies to each construction. These phenomena fully support the standard view; this, of course, is natural, since they are the primary motivation for it.

2.1.5 Verbs that take events as arguments

The next test in English we will call the “Happened” test. It shows that only Frame locatives can be the complements of verbs like happen, occur, took place and the like—that is, verbs which are predicates of events, whose subjects are elements that refer to

---

31 This was inspired by Davidson (1966).
events:

(80)

John’s buttering the bread happened in the bathroom
John’s knitting the sweater happened in the living room
John’s throwing the ball happened/occurred in the park
  * into the park
  * from the park

*John’s living happened/occurred in Boston
*John’s sitting happened on the chair
?John’s sitting happened on the mountain
John’s sitting on the chair happened on the mountain
*John’s aiming happened at the target (OK Place reading)
*John’s putting the book happened on the table
??John’s jumping happened on the bed
  *onto the bed

If we assume that the nominal in subject position must refer to an entire event, including all of its subeventual structure, it is clear that Participant locatives may not then be added as modifiers on the event predicate.

Temporal phrases in general seem to be able to modify the event predicate:

(81)

John’s chopping of onions happened / took place yesterday.
  ? 3 times.
  during the Super Bowl after noon.
  until 2.

John’s chopping of onions has been going on since 9 o’clock.

John’s running of the marathon happened yesterday.
  frequently.
  ?many times.
  ?? 3 times.
  before 1982.
2.2 Passives and Pseudopassives

The pseudopassive construction, in (82), displays an argument/adjunct type asymmetry. This construction can be used as an indication of whether or not a PP is a VP complement, if we assume that a Prepositional Phrase can appear as a pseudopassive only if it is theta-marked by the verb, as argued by Baker (1985) and Hornstein and Weinberg (1981)\textsuperscript{32}. Participant locatives are in general much better than Frame locatives in this construction\textsuperscript{33} \textsuperscript{34}:

(82)
\begin{itemize}
  \item a. *The living room was knitted in by Mary.
  \item b. ?*This room has been knitted in.
  \item c. ?*New York has been slept in.
\end{itemize}

(83)
\begin{itemize}
  \item a. This bed has been slept in.
  \item b. This house has been lived in.
  \item c. That bridge was skied under by the contestants.
  \item d. The English Channel has been swum across by a few good athletes.
\end{itemize}

The contrast is especially striking in the following minimal pair:

(84)
\begin{itemize}
  \item a. This river is walked along frequently by local residents.
  \item b. *This river is eaten along frequently by local residents.
\end{itemize}

\textsuperscript{32}In Chapter 5, we treat the PP as forming a complex predicate with the verb, and introduce a different licensing condition than theta-marking. However, the basic account found in these sources is not significantly altered.

\textsuperscript{33}Some participant locatives are actually quite bad in this construction:

??This store is often walked to by neighborhood residents.
?*This train station is left from by many commuters.
?*This bed is jumped onto by children. (Contrast: This bed was jumped on by children.)

I have no real explanation of this fact; but note that the following sentence is much better:

This store can be walked to by neighborhood residents.

This suggests that there are additional semantic requirements on passivization.

\textsuperscript{34}The strength of the judgements in these cases tends to vary a bit from speaker to speaker, and also depends on the context; however, every native speaker I’ve checked with finds a definite degradation of acceptability with the Frame locatives.
Baker argues that an NP in a postverbal PP can undergo passivization only if the preposition and the verb are reanalyzed as a unit. Reanalysis involves coindexing of the verb and the preposition; it is like preposition incorporation, except that the preposition does not incorporate at S-structure, but at LF. The coindexing, in the case of both reanalysis and incorporation, can occur only if the PP is theta-marked by the verb; thus, it is predicted that the PPs that can participate in pseudopassivization are part of the theta-structure of the verb. (82) suggests that this is the case for locatives; Participant locatives can appear in pseudopassives, but Frame locatives cannot.

There seem to be two ways to pragmatically improve the *which city did you sleep in* type of pseudopassive. First, one can imagine a situation in which Godzilla is doing the sleeping; then, the relative "size" of the theme and location is similar, and the phrase is straightforwardly a Participant locative. The second way involves a more subtle notion. In a context where a traveller is spending the night in a different city each night, the above example improves dramatically (especially with a time adverb). This implies that the context can determine whether or not the PP is part of the theta-structure of the verb. This conclusion is somewhat startling; however, there is a way in which it makes sense. For *sleep* in this case is interpreted as involving the notion "staying" or "spending the night"; with this underlying semantics, the verb *sleep* could easily have a location like a city in its argument structure (and this would not be interpreted as a Posture phrase).

Many temporals cannot occur in passives or pseudopassives, as shown in (85):

---

35 This sort of example may provide insight into the aspectual properties of Posture phrases, if the semantic difference can be characterized adequately. See chapter 5.
(85)  
*Monday was played volleyball on by Mary.
*5 times was flashed by the light.
*Today was worked by John.
*9 o’clock wasn’t arrived at by any guest.
*4 hours were knit (for) by Mary.
*4 hours were run (for).

However, there are examples in which temporal phrases, particularly duratives, appear to undergo (pseudo)passivization quite easily:

(86)  
Four hours were worked by every man on the night shift.  
?Four hours were worked for by every man on the night shift.  
The same 4 hours were worked by every man on the night shift.  
The same 4 hours were worked for by every man on the night shift.  
?The same 4 hours were run (for) by everyone on the team.  
The movie was slept through by half of the audience.  
The 7th inning hasn’t been won in by any team.

These examples are improved if there is a quantified by- phrase, or if the same is put before the durative.

Measure phrases like a mile in run a mile are usually more difficult to passivize, but they improve under the same conditions as the duratives:

(87)  
A mile was run by every entrant of the marathon.  
The same mile was run by John, Bill and Ted.  
A 3-minute mile has never been run.

In all of these cases, the NP which undergoes passivization or pseudopassivization must refer not to a measure (of time, space, or anything else), but to a particular location, or block of time, that is picked out by that measure. Adjectives like same emphasize this reading, and perhaps the presence of a quantifier does too. Thus, there seems to be a requirement that a passivized NP refer to an entity, and not to a measure.

This notion seems to be very similar to that which Rizzi (1990) calls “referentiality”. He discusses this with respect to verbs like weigh. He notes that though weigh takes two
kinds of direct arguments, a theme or a measure, only the theme can be extracted out of a wh-island:\footnote{This observation is attributed to David Feldman.}

\begin{equation}
\text{John weighed the apples.}
\text{John weighed 200 pounds.}
\end{equation}

What did John wonder how to weigh t?
That is, the question can only be answered by “the apples”, not by “200 pounds”.

Measures of this kind are also difficult to passivize:

\begin{equation}
\ast \text{ 200 pounds were weighed by John.}
\end{equation}

With the verb \textit{gain}, though, it is possible to passivize the measure; it is also possible to refer with specificity to the measure of an entity, in the right contexts.

\begin{equation}
\text{Those 5 lbs. that you gained sure look good on you.}
\text{All 6 1/2 feet of him had to cram into that subcompact car.}
\end{equation}

Rizzi argues that the difference between measures and themes has to do with their “referentiality”, (which is close to the notion of reference to an entity); both are theta-marked. However, in the view of thematic relations we will articulate in Chapter 5, there are more possible ways for an element to be thematically related to a verb that just the predicate-argument relation. Measures may contribute to thematic/event structure in a way quite different from themes, and in fact themselves be predicative; this could be brought to bear to account for this kind of syntactic difference.

The conclusion of the section is that there are two requirements on (pseudo)-passives: the element must be part of the theta-structure (or more broadly, event-internal), and it must be “referential” or “specific”, i.e., indicating an object, or an area in space or
time. Therefore, the ability for an element to passivize is a good indicator that it is thematically related to the verb, though not all thematic elements will meet the other requirement on passivization.

Preposition Stranding, also discussed by Hornstein and Weinberg (1981) and Baker (1985, p.367.), shows some contrast in acceptability between Participant and Frame locatives.

(91)

Which school did you walk to?
Which target was the gun aimed at?
Which tree did he throw the ball towards?
Which train was momma thrown from?
Which bed did you sleep in (in New York)?

?? Which city did you sleep (in your bed) in?
?? Which room was the sweater knitted in?
?? Which school did you sing all the way to?

However, the judgements on preposition stranding are rather weak for many speakers, and may vary with context. Though Hornstein and Weinberg treat Preposition Stranding as a result of the same mechanism involved in Pseudopassives, Baker\textsuperscript{37} denies that the two are fundamentally related, for P-stranding is much freer than Pseudopassivization.

Moreover, many temporals can undergo Preposition Stranding. The first two examples are judged ungrammatical in Hornstein and Weinberg (1981), but I find them acceptable though awkward (but still better than the pied-piped alternants):

(92)

(*What time did John arrive at?
(*What inning did the Yankees lose the ballgame in?
At what time did John arrive?
In what inning did the Yankees lose the ballgame?

Thus, we do not take Preposition Stranding as an indicator of thematic structure.

\textsuperscript{37}And also Howard Lasnik (p.c.). Lasnik and Saito (to appear) have an analysis of P-stranding that accounts for the difference.
2.3 Verbal Diathesis

An important source of evidence about what sorts of elements may be part of thematic structure comes from an area at the very heart of the study of Thematic Relations, that of Verbal Diathesis, or Argument Structure Alternations. The very fact that an element may participate in alternations in thematic structure indicates that it takes part in this structure. Locatives, of course, are known to occur in many alternations; we will see that measure phrases and duratives may be involved as well, though there are not nearly as many cases. As always, though our emphasis has been on the data in terms of type of argument (secondary element), it must be remembered that whether an element is part of argument/event structure depends in large measure on properties of the verb. Verbs are often divided into classed depending on the types of complements they can take, and the alternations in which they participate.

2.3.1 Locative Alternations

There are several well-known argument structure alternations that involve locatives. One of these is the Locative Alternation, or the "spray/load" alternation, discussed by Levin and Rappaport (1989):

\[(93)\]
\[
\begin{align*}
a. & \text{ Gertrude loaded the truck with hay.} \\
b. & \text{ Gertrude loaded hay onto the truck.}
\end{align*}
\]

A similar alternation, pointed out first in Fillmore (1967), is the following:

\[(94)\]
\[
\begin{align*}
a. & \text{ Bees swarmed in the garden.} \\
b. & \text{ The garden swarmed with bees.}
\end{align*}
\]

Many other such locative alternations are presented in Levin (1990).
The example in (95) constitutes an alternation too:

(95)

a. Victoria walked on the bridge.
b. Victoria walked the bridge.

Though this may not at first sight look like the other alternations above, since there is no theme argument which varies in its position, it is clear on reflection that the relationship between the locative in the (a) and (b) alternants here is very similar to that of the locative in the (a) and (b) alternants in (93), and this type of example should indeed be considered as an instance of verbal diathesis. In all of these types of alternation, a location argument is expressed either by an NP in a clear argument position (object or subject), or by a PP.

Though theories vary on whether or not the same thematic roles are played by the arguments in different alternants, and whether or not the verbs in each alternant form should be considered the "same" verb, it is important that prominent theories of lexical semantic representation have always considered these types of locatives to be arguments, and represent them in thematic structure; this is true of Fillmore (1968), Gruber (1965), Jackendoff (1972)–(1990), Dowty (1979) etc. Theta-role labels such as "Goal", "Source", and "Path" are quite common in the literature, and "Goal", at least, is almost always listed as a role in the Thematic Hierarchy.

In all of the alternations above, when the locative is in subject or object position, the location is totally affected (see M. Anderson, Tenny, for discussion). In Tenny's terms, a totally affected object is one that measures out and delimits the event; this is true of the truck in (93a), and the bridge in (95b). The generalization, captured by Tenny's theory, is that the direct argument is the totally affected, delimiting element. Though we will not present any refinements of the notions of delimitedness or affectedness, we hold it as
central to our conception of thematic structure that regular alternations are associated with regular meaning changes, and we assume Tenny's account of the relationship between the direct argument and delimitedness.

2.3.2 Locative Inversion

Another type of alternation involving locatives is Locative Inversion. In Locative Inversion, a locative PP appears in apparently subject position, and the normal subject occurs after the verb.

(96)

a. Edwidge ran into the room.
b. Into the room ran Edwidge.

Locative Inversion, like other alternations, is restricted to occurrence with a small class of verbs - motion verbs, and stative verbs of location. However, unlike the alternations above, the inverted structure involves an entire PP which itself seems to appear in an argument position\(^{38}\). It is this feature of locative inversion which makes it unique, and also more controversial.

Bresnan (1989) presents an analysis of locative inversion in Chichewa. She argues that it is a lexical process, which means that it is indeed properly characterized as an argument structure alternation, rather than a phenomenon involving strictly syntactic movement\(^{39}\). On her account, the locative is an argument, and has a position in the thematic hierarchy. Under certain conditions (the most major of which being that there

\(^{38}\) This contrasts with Pseudopassives, where only an NP actually moves into an argument position, and the preposition is reanalysed as part of the verb.

\(^{39}\) Chomsky (class lectures Fall 1990) objects to their treatment, indicating that he favors a "syntactic" analysis, pointing to similarities between Locative Inversion and presentational (there is a man in the room) constructions. Similarities: agreement stays with theme (in English; Locative Inversion also "presentational" (maybe this is a semantic difference that is correctly captured at LF); both have restrictions on class of verbs (but are they the same?). Differences: no indefiniteness restriction.
is no agent theta-role which must be projected to subject position), the locative may project to subject position, and the theme project to object position, as it does when there is some other theta-position present which is higher on the thematic hierarchy.

Locative Inversion in Chichewa, as in English, is restricted to occurring with a certain set of verbs; exactly the same class that select locatives by other tests. This supports the view that the locative must be selected, and hence is part of the Thematic structure of the verbs in question.\footnote{Note that this requires that with a verb like run, the subject is a theme rather than an agent. Intuitively, the subject in fact plays both of these roles in the event. [See Parsons, also]. One must explain how the restriction of inversion with overt agents arises, and also how it is avoided with these verbs. The idea that the agent must be projected highest seems right (even though I'm not assuming that theta-roles, at least these, are primitives).}

However, note that there are differences in the form of locative inversion in Chichewa and in English. In Chichewa, unlike in English, the verb agrees with the inverted location, rather than the object. Since the class of verbs involved in Locative Inversion is very restricted, and is the same class that always has a close thematic relation to location, we will continue to include it as an argument structure alternation, albeit an unusual one.

\section*{2.3.3 Alternants with measures and duratives}

Alternations also exist with measure and durative phrases. The fact that measure phrases appear in direct object position, as bare NPs, is strong indication that they are VP-internal:

\begin{quote}
\begin{enumerate}
\item a. Weigh 5 pounds.
\item b. Run a mile.
\end{enumerate}
\end{quote}

There is in fact an alternation involving the (b) example here; the semantic difference seems again to be one of affectedness/delimitedness.
(98) John ran 5 miles.
    John ran for 5 miles.

In the (a) example, the measure phrase gives the entire extent of the running; in the (b) example, it provides a measure of the running, without the implication that the event ended after the 5 miles were up. The same kind of alternation can involve duratives (which can be seen as temporal measure phrases):

(99) Edwidge worked 5 hours.
    Edwidge worked for 5 hours.

2.3.4 Conflations

Hale and Keyser (1990), following Talmy (1985), propose that verbs may be "formed" in the lexicon by "conflation" of arguments with abstract predicates. Conflation is understood to be a process like Incorporation, except that it occurs at a lexical level and not a syntactic one. Thus, a verb like shelve is said to be formed in the lexicon from something like "put a book on the shelf".

It seems evident, from the assumption that this process occurs in the lexicon, that only elements thematically related to the verb may conflate with it. It is then of importance that a great many of the verbs they discuss involve locatives. For instance, the verbs in the following examples involve locative notions:

(100) Shelve the books
    Crate the oranges
    Corral the horses

    Even more interestingly, there are some verbs in which a durative has conflated:

(101) Summer in France
    Winter in the Carribean

We take this as a further argument that these notions are involved in thematic structure.
2.4 Summary

This chapter has shown that our distinction between Frame and Participant locatives is well supported by syntactic criteria in English. Our hypothesis that iteration phrases and duration phrases are internal to VP is not as well supported by these criteria, though there is evidence that there exist both internal and external variants of these phrases, particularly for iteratives. Measure phrases are clearly VP-internal.
Chapter 3

Chinese Locatives and Temporals

Mandarin Chinese provides evidence for differentiating various types of PPs and adverbials in a way that is not available in English. Adverbials in Chinese are more obviously restricted in their possible syntactic positions than their English counterparts. Chinese has basically SVO word order superficially, like English; however, many adverbials must occur in either directly preverbal or sentence-initial position, and may not appear postverbally; these include all frame adverbials. The kind of elements that can be situated in post-verbal position is highly limited, and there can usually be only one, or at most two. The types that are allowed should have a familiar ring by now; they include direct and indirect objects, goal and posture phrases among locatives, durative and iterative phrases among temporals, and measure phrases. We follow Huang (1982) and many

---

1 Some adverbials have more strict requirements, and must occur between the subject and verb. See Li and Thompson (1981) for details. Note, though, that there are strong restrictions in the placement of certain English adverbials as well (cf. Jackendoff (1972)). Frame locatives and temporals generally are not very restricted in Chinese (or in English).

2 The only other elements that may appear in this position are resultatives, a restricted set of manner adverbials, and "parts" in part-whole relations. Cf. Huang (1982), Li and Thompson (1981) for details. The fact that resultatives and "parts" may be in this position fits neatly with our hypothesis, since these elements contribute to aspectual interpretation. The manner adverbials are more difficult to subsume,

71
others in taking this post-verbal position to be VP-internal. The facts then support our hypothesis that these elements are both semantically and syntactically internal.\(^3\)

### 3.1 Chinese locative phrases

Mandarin Chinese locative PPs may appear in two syntactic positions: preverbal, and immediately postverbal. Most Chinese adverbials are found only in preverbal position – either directly preceding the verb, or before the subject. Locative phrases in this position usually indicate the general location of an event. As in English, these locative phrases can appear with almost any verb. Post-verbal locative phrases are much more restricted, on the other hand. They can only appear with a limited set of verbs – usually the locational verbs; and they in general are interpreted either as Goals, or as “posture” phrases. They also behave like other Chinese postverbal complements – with many verbs, there may only be one complement of any kind following the verb\(^4\), and nothing may intervene between the verb and the complement (except for aspectual markers). These facts suggest that these locative phrases are syntactically part of the VP, and semantically involved in thematic relations.

---

\(^3\)Tai (1985) also argues that locatives can be separated into “inner” and “outer” locatives, in a way that is relevant to aspectual considerations. In Tai (1975), he had already analysed this difference in a way that divided locatives into two classes that are somewhat similar to the frame/participant distinction, though not involving aspectual interpretation; I relied heavily on this earlier paper in the development of my present proposals.

\(^4\)Verbs may also be reduplicated to accommodate another complement, in the following order: V - Dir. Obj. - V -other complement. Double object verbs allow two post-verbal arguments, but this is not the general case.
3.1.1 A note on the Chinese locative prepositional phrase

The Chinese locative PP differs from its English counterpart, in that a single English preposition often corresponds to two different morphemes in Chinese. Typical Chinese locative PPs are given in (102):

(102)

a. zai pingzi litou.
   at vase in
   'in the vase'
b. dao gongyuan li
to park in
   'into the park'
c. wang fangzi houmian
towards house behind
   'towards behind the house'

Notice that Chinese has two morphemes which together correspond to a single preposition in English. For instance, in (102a), the word zai introduces the PP, and indicates that it is some sort of locative PP. The final word of the PP, litou\(^5\), specifies the spatial relation that the object, the pencils, are in with respect to the vase. Following Li and Thompson, we will call these categories of words "coverbs" and "locative particles", respectively. So, Chinese locative PPs have the general form:

(103)

Coverb - NP - Locative Particle

Locative particles, such as shang(mian) 'on', li(tou, mian) 'in', ziabian 'under', waimian 'outside', etc., are usually necessary to provide the spatial relationship. However, they are not always needed when the NP itself refers to a place, as in:

\(^5\)Tou and mian are separate, nominal morphemes, translating roughly to em-side as in English inside. Li and shang can be used alone, without such a morpheme attached; other locative particles, like hou, seem to require these morphemes.
a. cong Shanghai
   'from Shanghai'
b. zai gongyuan
   'at the park'

We will assume that the hierarchical structure of the locative phrase in Chinese is the following:
(105)

That is, the locative particle forms a constituent first with the NP, and then the coverb is attached.  

There is a long-standing debate over whether or not the "coverbs" are verbs or prepositions. There is also a debate over whether or not the "locative particles" are postpositions. These questions take part in the larger issue of whether or not Chinese is basically head-final. Several of the "coverbs" can in fact be full-fledged verbs, as in (106), while others cannot, as in (107):

(106) Ta zai tushuguan.
he AT library
He is at the library.

Ta dao le jia.
he arrive CM home
He arrived at home.

Ta de wuzi chao hai.
he DE room face sea
His room faces the sea.

---

6 This difference between Chinese and English in the structure of PPs may have certain ramifications, which will be discussed in Chapter 4.
7 Cf. Huang, Travis, A. Li, Ernst, Tai, among others.
The position taken here is that to try to identify either type of particle as pre- or postpositions is misleading; rather, these two types of morphemes serve two different functions in the grammar, and they are simply different. Coverbs are often predicative, possibly verbal; locative particles are essentially nominal elements which semantically take an object and yield a position in space relative to that object. In English, these two different functions are usually fulfilled by one morpheme; we will argue that this difference accounts for some of the differences in behavior of prepositions in English and Chinese. We will come back to the issue of headedness in section 3.

3.1.2 Postverbal Locative Phrases

The two positions for Chinese locative phrases, preverbal and postverbal, are exemplified in (108a) and (b), respectively:

\begin{enumerate}
\item Tamen zai fangzi houmian xiuli dianshiji. 
they at house behind repair television
They repair television sets behind their house.
\item Wo ba qianbi cha zai pingzi litou. 
I BA pencil put at vase in
I put the pencils in the vase.
\end{enumerate}

\footnotesize
\begin{itemize}
\item The data here is from various sources: informants, Li and Thompson, etc.
\item The following abbreviations are used:
CM = compleetive aspect
MW = measure word (nominal classifier)
BA is an accusative case marker, more or less. It is also associated with a definite reading for the NP it precedes; however, the details of this are not relevant to the present discussion.
\end{itemize}

76
Adverbials in general must not be post-verbal:

(109)

Zuotian ta lai le.
yesterday he come CM
He came yesterday.

Ta zuotian lai le.
he yesterday come ASP
He came yesterday

* Ta lai le zuotian.
he come CM yesterday

Frame locatives, like other frame adverbials, must not be postverbal. This is true for both intransitive verbs, as in (110), and transitive verbs as in (111), even when the direct object is preverbal:

(110)

a. Ta zai tushuguan xuexi.
he at library study
He studies in the library.

b. *Ta xuexi zai tushuguan.
he study at library

(111)

Tamen zai fangzi houmian xiuli dianshiji.
they at house behind repair television
They repair television sets behind their house.

* Tamen ba dianshiji xiuli zai fangzi houmian.
they TV fix at house behind

* Tamen xiuli zai fangzi houmian dianshiji.
they fix at house behind TV

* Tamen xiuli dianshiji zai fangzi houmian.
they fix TV at house behind
Two coverbs, *zai* "at" and *dao* "to, towards", may appear in both preverbal and postverbal locative PPs\textsuperscript{10}. The post-verbal occurrence of these coverbs is restricted to a fairly narrow set of verbs – motion verbs and other verbs which involve location, which can be said to select a location (on some version of selection).

**Zai**

According to Li and Thompson (1981, chapter 11), *zai* occurs postverbally only with four kinds of verbs. These are:

Verbs of displacement: *tiao* "jump", *tui* "push", *diao* "drop/fall", *liu* "flow", *mo* "spread, smear", *dao* "fall"

Verbs of posture: *zhan* "stand", *shui* "sleep", *zuo* "sit", *ting* "stop, zhu "live"

Verbs of appearing (or disappearing): *fasheng* "happen, occur", *(chu)*sheng "be born", *zhangda* "grow up", *si* "die"

Verbs of placement: *fang* "put, place", *hua* "draw, paint", *cang* "hide" *zie*, "write"

With many verbs, the postverbal *zai*-phrase serves as the goal, while preverbally it gives the location of the event:

\textsuperscript{10}*Gei* ("give", recipient/goal) may also occur postverbally; we will not consider the behavior of *gei* at this point. Other coverbs, like *cong* "from", *wang* "towards", and *zhang* "towards" may only appear in preverbal PPs. These are discussed below.
(112)

a. Ta tiao zai zhuozi shang.
   he jump at table on
   He jumped onto the table.

b. Ta zai zhuozi shang tiao.
   he at table on jump
   He is jumping on the table.
   (i.e. He is on the table jumping)

With other verbs, however, there is not as strict a correlation between the position and its ability to be interpreted as a Participant locative. This can be true either when the zai- phrase has a Posture interpretation, as in (113), or when it has a Goal interpretation, as in (114):

(113)

a. Ta zhu zai Shanghai.
   he lives at Shanghai
   He lives in Shanghai.

b. Ta zai Shanghai zhu.
   he at Shanghai live
   He lives in Shanghai.

(114)

a. Wo zai shu jia shang fang zazhi.
   I at bookcase on put magazine
   I put the magazine on the bookcase.

b. Wo ba zazhi fang zai shuju shang.
   I put the magazine on the bookcase.

In (113), there is a subtle difference in meaning that my consultants found difficult to characterize; it may be that (113a), with the postverbal PP, indicates a more permanent state than (113b). In (114), on the other hand, this kind of subtle ambiguity does not arise. The preferred reading for (114a) is the Goal reading, although some speakers allow a weaker and pragmatically unlikely reading with a Frame reading for the locative.
However, some speakers do not find (114a) very acceptable; these speakers allow (115) instead, in which there appear to be two post-verbal elements\textsuperscript{11}:

\[(115)\]
\[
\text{Wo fang le shu zai shujia shang.}
\]
\[
\text{I put ASP book AT bookcase on}
\]

Chinese posture verbs seem to show the same sensitivity to the relative "size" of the posturing event and the location as their English counterparts:

\[(116)\]
\[
a. \text{Ta zai chuang shang shui.}
\]
\[
\text{he at bed on sleep}
\]
\[
\text{He is sleeping on the bed.}
\]
\[
b. \text{Ta shui zai chuang shang.}
\]
\[
\text{he sleep at bed on}
\]
\[
\text{He is sleeping on the bed.}
\]
\[
c. \text{Ta shui zai Niu Yue.}
\]
\[
\text{he sleep at New York}
\]
\[
\text{He is sleeping in New York.}
\]
\[
d. \text{Ta zai Niu Yue shuijiao.}
\]
\[
\text{he at New York sleep}
\]

Like in English, \textit{sleep} can take a locative complement only when the location denoted is of a comparable size with the event.

Note that Chinese weather verbs, like their English counterparts, can take locative complements. For the locative to receive a goal interpretation, it must be postverbal.\textsuperscript{12}

\textsuperscript{11}This generally seems to be preferred by speakers of Taiwan Mandarin. Similar examples are reported in Tai (1975). There are also speakers who allow both types of construction.

\textsuperscript{12}Note also that the theme must be in subject position in these sentences, though the normal way to express "it is raining" in Chinese is to leave the noun \textit{rain} in object position:

\[
\text{Xia yu le.}
\]
\[
\text{fall rain ASP}
\]
\[
\text{It is raining.}
\]
(117)  
Yu zai wu li xia  
rain room in fall  
It is raining in the room. (NOT into the room)

*Yu zai diban shang xia.  
rain at ground on fall

Yu xia zai di(ban) shang.  
rain fall at ground on  
The rain is falling on(to) the ground.

Yu xia zai wu li.  
rain fall at room in  
It is raining into the room.

Dao

The coverb dao, like zai, can occur freely preverbally:

(118)  
Tamen dao gongyuan nian shu  
they to park read book  
They went to the park and studied  
to study

(119)  
Ta shitian dao caochang pao.  
he every day to field run  
Every day he goes to the field and runs.

(120)  
Wo dao Shanghai qu le.  
I to go CM  
I went to Shanghai.

In these sentences, dao seems to be a serial verb meaning "to go" or "to arrive". It is apparent, from the translations of (118) and (119), that the dao-phrase does not indicate a path along which an action occurs, but in fact gives the general location of the action, once that spot is reached. These sentences do seem to indicate that there are two
different events, and thus that dao is a full-fledged verb here. Sentence (120), however, indicates only one event; but it also has different syntactic properties.

Examples like (120) have different syntactic behavior from those in (118) and (119), although it is not clear what the structural difference is. In serial verb constructions involving dao and verbs like nian ‘read’, and aspectual marker can be placed after dao as in (121a). This is not true when dao is followed in the sentence by qu, as in (121b); if both another verb and qu occur after dao, the aspectual morpheme is still forbidden, as in (121c).

(121)

a. ?Tamen dao le gongyuan nian shu.  
   they arrive CM park read book  
   They went to the park and studied.

b. *Wo dao le Shanghai qu.  
   I arrive CM Shanghai go

c. Wo dao le Shanghai.  
   I arrive CM Shanghai  
   I arrived in Shanghai.

d. *Tamen dao le gongyuan nian shu qu le.  
   they arrive CM park read book go CM

e. *Wo dao le gongyuan san bu.  
   I arrive CM park walk

It is possible that qu is not functioning as a verb here, but as a directional particle; that it can sometimes have this function is shown by its presence in postverbal directional compounds:

(122)

Ta zuo xia qu.  
he sit down go  
He sat down.
However, this possibility does not explain the restriction on aspect markers with dao, although it does help to account for the fact that (120) expresses a single event, and (118) (119) two events. On the other hand, perhaps the dao phrase is a complement of qu; but note that dao cannot be postverbal with qu:

(123)
\[ \text{Wo qu dao Shanghai.} \]
I go arrive Shanghai

However, with manner of motion verbs, there may be the same restriction as with qu (as in (121e)).

*Dao*-phrases can occur postverbally only with motion verbs having natural destination, or with non-motion verbs with an appropriate abstract destination ((124c)), such as:

(124)

a. Ta pao dao caochang le.
He ran to the field.

b. Women fei dao Shanghai le
    we fly to Shanghai
    We flew to Shanghai.

c. Ni xian nian dao di san hang.
    you first read to third line
    First read up to the third line.

The behavior of the *dao*-phrases in these sentences supports the position that these postverbal PPs are selected, and part of thematic structure.

Postverbal *zai* and *dao* phrases are clearly part of the VP; but how are they licensed? There are two possibilities: either the entire PPs are arguments of the verb, or the coverb/preposition forms a complex predicate with the verb, and the complex then takes the locational NP as its argument.
There is evidence that the latter hypothesis is the correct one. At least for many speakers, the placement of aspectual markers indicates that the V + Coverb form a constituent, for these morphemes may not intervene between the two. The aspectual morpheme le may, at least marginally, occur between the coverb and following NP, though others may not appear in this position either:

(125)
*Wo ba zazhi  fang le zai shujia shang.
I BA magazine put CM at bookcase on

?Wo ba zazhi  fang zai le shujia shang.
I BA magazine put at CM bookcase on

*Wo ba zazhi  fang guo zai shujia shang.
I BA magazine put EXP at bookcase on

*Wo ba zazhi fang zai guo shujia shang.

(126)
*Ta zuo le zai yizi shang.
he sit CM at chair on

??Ta zuo zai le yizi shang.

*Ta zuo zhe  zai yizi shang.
he sit CONT at chair on

??Ta zuo zai zhe yizi shang.

*Ta zuo guo zai yizi shang.

*Ta zuo zai guo yizi shang.

(127)
Ta pao (*le) dao (le) caochang
he run TO playing field

Note that the aspectual marker guo 'experienced' and the continuous aspect marker zhe cannot occur in either site.
There is, however, dialectal variation here; some native speakers (of Taiwan Mandarin) allow aspectual morphemes to intervene between the verb and coverb. The same speakers allow an NP to intervene between the verb and "PP", forming a "double object" structure; this is shown by (115) (repeated here):

Wo fang le shu zai shujia shang.
I put CM book AT bookcase on

3.1.3 Other locative PPs

As we have seen, destination and place phrases with posture verbs exhibit argument-like behavior in Chinese. However, other elements that we have argued to be participant locatives may only occur preverbally. These are all of the locatives beginning with cong "from", wang "towards", zhang "towards" and many other coverbs. This poses a problem for the view of locatives we have been taking here, for Chinese seems to treat only goal and posture phrases as Participant locatives. Still, the claim that these preverbal locatives may be analyzable as arguments is not entirely untenable, for other arguments do appear in this position. For instance, in the ba-construction, a direct object is placed preverbally.\(^{13}\) We would then need to find some other reason for preventing the appearance sources, paths and directions post-verbally.

Path and direction phrases seem to be more closely tied to the VP than Frame locatives. Like goal and posture phrases, they are impossible to topicalize, while Frame locatives topicalize readily:

\(^{13}\)This construction is sometimes obligatory, when there is more than one complement with the verb. And for some speakers, the ba is not needed for object preposing.
a. Zai tushuguan ta nian shu.
   At library he read book

b. Zai fangzi houmian tamen xiuli dianshi.
   At house back they repair television

c. *Dao gongyuan ta qu.
   To park he go

d. Zai zhuozi shang ta tiao. --Frame reading only
   At table top he dance

e. ??Cong Meiguo ta lai.
   From America he come
f. *?Wang xuexiao ta zou.
   Towards school he walk

g. *?Xiang zhe xuexiao ta zou.
   Towards school he walk

h. *Yanzhe he ta zou
   Along river he walk

As (128a) and (b) show, Frame locatives are possible in topic position\textsuperscript{14}. Goal and Posture phrases are totally impossible pre-sententially, as are direction and path PPs. This suggests that these PPs may be VP-internal, but attached on the left side of the verb, though the evidence is far from conclusive. It is an attractive hypothesis, because of the evidence from English that these are VP complements, and we will entertain it in the absence of counterevidence. Note that cong ('from') PPs are better than the others in this position. Source phrases, as we have seen in English, are more semantically diverse, and do not always test as VP-internal. See chapter 5 for further discussion.

The inability for participant locatives to topicalize is unexpected, given that direct

\textsuperscript{14}It would be possible to posit that Frame locatives are generated in this position, though some speakers feel strongly that they are topicalized.
objects topicalize easily in Chinese and in English:

(129)

Shu, wo hen xihuan nian.
Book I very enjoy read
Books, I enjoy reading.

Nei ben shu, wo hen xihuan nian.
That book I very enjoy read
That book, I really enjoy reading.

Unfortunately, I do not have any explanation for this. But note that participant locatives do not topicalize well in English, either.

There is also evidence that some direction and path locatives, at least locational elements that are not PPs in Chinese but correspond to English PPs, can behave like arguments.

Some Participant locatives which in English require a locative prepositional phrase translate into Chinese with no overt locative morphemes; for instance, English aim at is translated in Chinese as a single verb, which takes the target as its direct object:

(130)

Ta miaozhun nei kuai da shitou.
he aim at that M big rock
He aimed at that big rock.

Ta ba qiang miaozhun le nei kuai da shitou
he gun aim at that M big rock

Thus, there are at least some verbs whose arguments are semantically Direction, and behave syntactically like arguments.

Some coverbs are restricted to occurring only with motion verbs; this suggests that they are in fact semantically selected by these verbs, although they still cannot occur in postverbal position:
(131) Ta yanzhe he zou.
    He along river walk

    *Ta yanzhe hebian chi fan
    He along river side eat food

    Ta zai hebian chi fan
    He at river side eat food

In some cases, locatives can appear as direct arguments, without any locative morphemes. This is true in (132) and (133); note that all of these sentences have contrastive readings:

(132) Ta shui shang pu, wo shui xia pu.
    he sleep top bunk I sleep bottom bunk
    He sleeps on the top bunk and I sleep on the bottom bunk.

(133) */OK Ta zuo yizi le.
    he sit chair ASP

    Ta zhu Shanghai.
    he live Shanghai
    He lives in Shanghai.

3.2 Temporal Phrases in Chinese

Temporal adverbials in Chinese do not usually contain morphemes of the "coverb" class but appear as bare NPs. A range of types is given in the examples below:
a. Wo zuotian lai le.
    I yesterday come CM
    I came yesterday.

b. Mei tian, ta qu xuexiao.
    every day he go school.
    Every day, he goes to school.

    Z. year 5 month 20 number marry

d. Ta changchang chang ge.
    he often sing song
    He often sings songs.

e. Lisi lai le yiqian, Zhangsan hen gaoxing
    L. come CM before Z. very happy
    Before L. arrived, Z. was very happy.

f. Lisi lai de shihou, Zhangsan hai gaoxing.
    L. come DE time Z. still happy
    When Lisi came, Z. was still happy.

g. Zhangsan kan dianshi kan san ge xiaoshi.
    Z. watch TV watch 3 M hour
    Z. watched TV for 3 hours.

h. Mei zhan deng shan le san ci.
    that MW light flash CM 3 time
    That light flashed 3 times.

i. Women tan dao san dianzhong.
    we talk arrive 3 o'clock
    We talked until 3 o'clock.

Words meaning today and every day, as in English, are expressed by bare NPs, which may
occur sentence-initially, or between the subject and verb. Other temporal notions which
are expressed by a PP in English are also expressed by NPs in Chinese, including dates as
in (134c), durations in (134g), and iterations as in (134h)\textsuperscript{15}. Before and after phrases and the like are expressed with a clause or NP followed by the head; when clauses are formed from relative clauses modifying a nominal \textit{shihou} ('time'). Until phrases are postverbal, and contain the copverb \textit{dao} ('to, arrive'); they are apparently the only temporals which contain a copverb.

### 3.2.1 Duratives and Iteratives

As just noted, most temporal phrases in Chinese are sentence-initial, or directly preverbal. However, certain temporal phrases must occur in post-verbal position; these are phrases expressing duration, iteration, and “until”-phrases. This is strong support for our claim that elements that contribute to aspectual interpretation are syntactically (and semantically) “internal”.

(135) illustrates that complements expressing iteration must be post-verbal\textsuperscript{16}:

\begin{align*}
\text{(135)}
\text{Ta da le Zhangsan san ci.} \\
\text{he hit CM Z. 3 time} \\
\text{He hit Z. 3 times.}
\end{align*}

\begin{itemize}
  \item \text{*San ci, ta da le Zhangsan.}
  \text{3 time he hit CM Z.}
  
  \item \text{*Ta san ci da le Zhangsan.}
  \text{he 3 time hit CM Z.}
\end{itemize}

These complements can also occur in a reduplicated structure\textsuperscript{17}. A reduplicated structure effectively allows two post-verbal complements, providing a way for both of

\textsuperscript{15}Ci is actually more like a measure word.

\textsuperscript{16}Ernst (1987) has some counterexamples to this. I do not know what conditions are required for this; I have not elicited any counterexamples myself.

\textsuperscript{17}According to native speakers, there is some semantic difference; (136) appears to allow the iteration to have occurred over a longer period of time, although this need not be the case, as shown in (c).
them to get case:

(136)

a. Ta da Z. da le san ci.
   he hit Z. hit CM 3 time
   He hit Zhangsan 3 times

   Nei zhan deng shan le san ci.
   that MW light flash CM 3 time

b. Ta qi ma qi le sanci.
   he ride horse ride CM 3 times
   He rode horses 3 times.

c. Zuoqian ta qi ma qi le sanci.
   yesterday he ride horse ride CM 3 times
   He rode a horse 3 times yesterday.

If the direct object of the verb is an indefinite NP, the reduplicated structure must be used; speakers find examples like (137a) very odd\(^\text{18}\):

(137)

a. ??Ta qi le ma san ci.
   he ride CM horse 3 time

b. Ta qi le nei pi ma san ci.
   he ride CM this MW horse 3 time
   He rode this horse 3 times.

It is also possible to express the iteration using other morphemes besides ci. In these cases, the morpheme which the numeral modifies is a nominal that is semantically related to the predicate – at least in (138b), it seems to be some sort of classifier, or cognate object (like laugh a laugh).

\(^{18}\)For some reason, an indefinite NP is sometimes odd with an iterative even in a reduplication structure:

a. ?Ta kan shu kan le san ci.
   he read book read
   Ta kan nei ben shu kan le san ci.
   Ta kan le nei ben shu san ci.

Perhaps this sentence is simply strange to say.
(138)  
a. Ta da le taitai san xia.  
   he hit CM wife 3 hit(lit. down)  
   He hit his wife 3 times (3 hits).

b. Ta de taitai ti ta yi (san?) jiao.  
   he DE wife kick he 1 3 kick  
   His wife kicked him 3 times.

If the *ba-*construction is used, there is only a single post-verbal complement (the
 iterative), and there is no reduplication:

(139)  
Wo ba zhei jian yifu xi le san ci.  
I BA this MW clothing wash

Durative phrases, like iteratives, must be postverbal.

(140)  
Nei zhan deng shan le san ge xiaoshi.  
that MW light flash CM 3 MW hour  
That light flashed for 3 hours.

*San ge xiaoshi, wo kan le shu.  
  3 MW hour I read CM book

*Wo san ge xiaoshi kan le shu.  
  I 3 MW hour read CM book

However, unlike iteratives, if these phrases occur with a verb taking a direct object, there
must be reduplication; i.e., the sequence V - Object - Durative is not acceptable, even if
the Object NP is definite.

(141)  
Ta kan shu kan le san ge xiaoshi.  
  he read book read CM 3 MW hour  
Ta kan zhe ben shu kan le san ge xiaoshi.

*Ta kan le shu san ge xiaoshi.

*Wo kan le zhe ben shu san ge xiaoshi.
Reduplication is not necessary if the object is topicalized:

(142)

Shu, wo kan le sange xiaoshi.

Oddly, however, a post-verbal durative is not possible if the direct object is in the ba-construction.

(143)

* Wo ba shu kan le sange xiaoshi.

* Wo ba nei ben shu kan le sange xiaoshi.

*Wo ba zhe jian yifu xi le san ge xiaoshi.

I BA this MW clothing wash CM 3 MW hour

There are restrictions based on animacy and definiteness. Animate NPs can not be modified by a durative, nor can definite NPs, in general:

(144)

*Ta da le san ge xiaoshi de taitai.

he hit CM 3 MW hour DE wife

Ta da le sange xiaoshi de qiu.

he hit CM 3 MW hour of ball

?* Ta qi le san ge xiaoshi de ma.

he ride CM 3 MW hour DE horse

* Wo kan le sange xiaoshi de nei ben shu.

Zhei bu dianying wo zhi kan le yige xiaoshi.

this MW movie I only watch CM 1 MW hour

“Until” phrases are also postverbal, and are expressed with dao (‘to, arrive’). They are best in reduplicated constructions:

93
Wo kan shu kan dao liang dian / tian liang
I read book read to 2 o'clock sky bright (dawn)

Wo da ta da dao san dian.
I beat he beat arrive 3 o'clock

* Wo kan shu dao liang dian. -- maybe poetic OK
* Wo dao liang dian kan shu.

A non-reduplicated structure is not allowed, even if the direct object is topicalized or in the ba-construction.

* Dao san dian, wo kan shu.
to 3 o'clock I read book

* Wo ba ta da dao san dian.
I BA him hit to 3 o'clock

*? Shu wo kan dao liang dian.
book I read to 2 o'clock

?* (Nei ben) shu, wo kan dao liang dian.
(Wo liang dian hai zai kan shu)
I was still reading at 2 o'clock.

In 3 hours phrases, which in English seem similar to duratives, are totally different from them in Chinese. They are expressed by a time nominal followed by zhi nei (‘within’), and this phrase is preverbal:

(147)
Wo san ge xiaoshi zhi nei kan wan le zhe ben shu.
I 3 MW hour within read finish CM this MW book
3.3 The Problem of Chinese VP structure

We have assumed throughout this chapter that post-verbal elements in Chinese are always VP-internal. This assumption is well-grounded; it is supported by many authors, including Huang (1982) (who cites Mei (1972), (1978) on this issue), A. Li (1985) and Ernst (1987). However, we have not elaborated on the structure of the Chinese VP.

To provide an articulated structure for the Chinese VP is difficult. Proposals by Huang (1982), Travis (1984), A. Li (1985) and Ernst (1987) deal with the issue in detail, though all have serious problems in accounting for the distribution of the types of complements we have been concentrating on. They all share the assumption that there is basically only one post-verbal position and propose a way to get this result, then make exceptions to this rule to account for the possibility of two complements.

Huang (1982) argues that Chinese is essentially head-final; however, enough parametrization is allowed of X-bar theory to permit one level to deviate from the normal direction. He proposes the following X-bar rules for Chinese:

\[(148) \quad [x^n X_{n-1} YP^*] \text{ iff } n = 1 \text{ and } X \neq N \]
\[ [x^n YP^* X_{n-1}] \text{ otherwise} \]

The VP structure resulting from this is:

\[(149)\]

\[
\begin{align*}
\text{VP} \rightarrow & \quad \text{VP} \\
\text{VP} \rightarrow & \quad \text{V'} \\
\text{V'} \rightarrow & \quad \text{V} \quad \text{NP}
\end{align*}
\]
That is, there is one complement position on the right of the verb, and then more permitted on the left. To allow for more than one VP complement on the right, he argues that an NP may be reanalyzed as part of the verb, and then another complement allowed on the right.

Travis (1984) takes a different tack in order accounting for the fact that there is usually only one complement to the right of the V. She says that theta-assignment is always leftwards in Chinese, so that the language is basically head-final; however, case-assignment is to the right. Li (1985) assumes this approach, but extends it to cover cases where there is a non-argument complement (durative, iterative or resultative), and where there are two NP complements. In her system, all NPs, whether theta-marked or not, need Case; this accounts for why duratives and iteratives appear on the right (but why does this not extend to all other temporals, which are also usually expressed by bare NPs?). To allow double object constructions, she must allow case to be transmitted from NP to NP, in certain configurations.

Ernst (1987) criticizes these approaches as stipulative, but himself adopts much of Li (1985), and adds stipulations to allow goal and locative PPs and durative and frequency adverbial post-verbally.

Our approach permits a much simpler characterization of the elements that may occur post-verbally in Chinese: they are exactly those that affect the aspectual interpretation of the event\(^\text{19}\). Elements, whether arguments or modifiers, are licensed in this position only if they contribute to aspectual interpretation. This implies that "theta"-assignment

---

\(^{19}\) This even (correctly) includes aspectual morphemes! There is one, but only one, class of post-verbal complements that is not covered naturally by this characterization: the manner adverbials. However, it is just a limited class of manner phrases that can appear here, with a particular semantic interpretation not found with most manner phrases; perhaps an investigation of this special interpretation will provide a solution to this potential problem.
(or what corresponds to it, in our system) is to the right; but all other complements, and adjuncts, may still be required by X-bar theory to be attached to the left, so that the language is still much more "head-final" than English.\textsuperscript{20} \textsuperscript{21}

Of course, we have still not explained why directional and path phrases, which look VP-internal in English, do not pattern with the rest of the VP complements. The reason for this probably lies also in their semantics; though we will argue in Chapter 5 that they do contribute to event structure, their contribution is not to properties such as delimitedness and measure, but involves the notion of "trajectory". We do not have a more elaborated explanation to offer at this point.

The generalization that usually only one postverbal complement is permitted remains to be accounted for\textsuperscript{22}. A case analysis of this problem, following Travis and A. Li, does seem to go part of the way in explaining this fact. Though we have not done a thorough treatment of the data here, we have seen some evidence that can be explained in this way. Recall that in many cases, either reduplication of the verb or use of the ba-construction can allow more than one VP-complement to be expressed without actually placing two complements after any one instance of the verb; if the complements need Case, and ba and a reduplicated verb both serve as Case-assigners, this can be dealt with straightforwardly. We saw examples where it is possible to have both an object NP and an iterative complement post-verbally; but since iteratives are probably not full

\textsuperscript{20}Requiring that delimiting complements, including resultatives, are on the right may explain Y. Li's (1987) observation that the temporal order is always "iconic", that is, that the linear order is also the temporal order of compound verbs. On our account, the direction of iconicity is accidental, but the constant temporal ordering is explained by the fact that delimiting elements are licensed to the right.

\textsuperscript{21}John Lumsden (p.c.) has proposed that there is a correlation between the assignment of structural case to an element and its aspectual properties with regard to the event. If this is true, then it is probably possible to unify my proposals about the characterization of post-verbal elements with the theories that deal with the phenomena in terms of case in an interesting and explanatory way.

\textsuperscript{22}Recall that the facts on this differ quite a bit between Mainland and Taiwan Mandarin.
NPs, but measure words, we can postulate that they do not need case, and therefore can appear as a second element on the right. Still, there are cases where it is not possible to have an iterative as a second complement, which we cannot explain; there also remains the problem of Double Object constructions, where two full NPs are post-verbal. Our conclusion is that Travis and A. Li are correct about attributing this restriction to Case Theory, but much remains to be explained.

3.4 Summary

We may conclude from this chapter that goals, posture, iterative, and durative phrases are clearly VP-internal in Chinese. These differ in syntactic behavior from paths, source and direction phrases; the latter must occur directly pre-verbally, and it is not as clear that they are within the VP; although there is some evidence from Topicalization possibilities that these pattern with other internal elements. Both types of phrases differ markedly from temporal frame adverbials, which must be external; frame locatives are also external, though they are do not appear sentence-initially as readily as temporals.

---

23 Of course, these present problems for Case Theory in many languages.
Chapter 4

Argument/Adjunct Asymmetries in Binding Theory

This chapter considers "argument/adjunct" asymmetries that occur in constructions involving binding. The first goal of this inquiry is to compare the argument/adjunct distinctions drawn here with those found in previous chapters, in order to further advance our understanding of these differences. We find, in fact, that the "cut" between arguments and adjuncts made by, for instance, VP-constituency tests is not exactly the same as that made by phenomena involving binding.

The second goal is to find more information about the structure of the VP; since binding relations are very sensitive to structural relations such as c-command, they provide a good probe. We will see, however, that the results are controversial, and that it is necessary to delve further into the conditions on binding by various types of elements. We explore the facts of quantifier binding, backwards pronominalization and Reconstruction in some detail in order to resolve the controversies.
4.1 Double Object constructions and a challenge to the traditional view

There are certain phenomena, involving binding of various types, which do not at first glance show syntactic argument/adjunct asymmetries. Noted by Barss and Lasnik (1986) for double object constructions, and reanalysed and extended to oblique PPs by Larson (1987, etc), these facts suggest either that the traditional VP structures motivated by VP-constituency tests are incorrect, or that the syntactic domain that is relevant to binding is determined by something other than purely c-command. We will first consider the theory of Larson (1987), who takes the first tack in accounting for asymmetries between the objects in double object constructions. Then, we will consider various problems with his assumptions about Q-binding, and his account of post-verbal adjuncts, which will lead us to a deeper understanding of the possible attachment sites for a variety of types of PPs.

Larson assumes that phenomena like anaphor binding, quantifier binding, binding by a wh-trace and licensing of negative polarity items all require that the element to be bound or licensed be in the c-command domain of the antecedent or licensing element. Thus, the sentences in (150–152) indicate that the first object asymmetrically c-commands the second.¹

\[(150)\]

\[\begin{align*}
\text{a. I sent every man's his paycheck.} \\
\text{b. *I sent his mother every man's paycheck.}
\end{align*}\]

¹The same effect is seen in structures with a "direct object" and an "indirect object" (in a to-phrase) — the direct object must c-command the indirect object.
(151)  
a. I showed each man the other's friend.  
b. *I showed the other's friend each man.

(152)  
a. Mary sent no one any letter.  
b. *Mary sent anyone no letter.

(153)  
a. Which man, did they send his, paycheck.  
b. *Whose, paycheck did they send his, mother.

These facts seem to contradict the structure usually assumed for the double object construction, in which the direct object is the sister of the verb, with dative and obliques attached higher in the VP as sisters of V' (cf. Chomsky (1981), etc.), as in:

(154)  

To account for this, Larson proposes the following structure for the VP with an accusative and a dative object:
The higher V in this structure is an empty V at D-structure; the lowest V raises to this position at S-structure via head-movement, which is required in order for V to receive tense and agreement features and for the NP a letter to receive case. Larson then argues that the double object construction arises by an operation similar to passivization, in which the indirect object raises to a position where it c-commands the direct object; since binding conditions and licensing conditions for negative polarity items apply at S-structure, this can account for the data in (150–152).²

### 4.1.1 Binding and Adjuncts

The c-command-sensitive phenomena which Larson uses to motivate his structures can be used to extend his analysis to the case of VPs with obliques as well. As we will

²Actually, Larson does not take the binding possibilities in the V - NP - PP example to be enough to motivate his structure in (155), because the asymmetry in binding possibilities can be argued to result from the embedding of the second NP within a PP. Comparing his analysis to that of Kayne (1987); he argues that only his theory can account for the facts in Double Object Constructions, where there is no PP node to create an asymmetry. His VP structure then extends to cover cases involving V-NP-PP cases. (We will see in ??, however, that the PP node is in fact not enough to block an embedded NP from Q-binding another NP in any case.)
see next, the evidence that emerges shows that obliques in general behave like the dative objects; on Larson’s analysis, this indicates that they also are c-commanded by the direct object.

Interestingly, internal and external PPs show the same behavior in such constructions, which according to Larson indicates that both are low in the VP, c-commanded by the direct object. This raises conflicts for the type of evidence that we have seen in chapters 2 and 3, where we saw clear differences between these types, traditionally attributed to different syntactic positions.

**Locatives**

A quantifier in direct object position may bind a pronoun in a locative which follows it:

(156)

a. I put every baby in its crib.

b. I walked every boy to his own school.

c. I walked each dog along its favorite path.

d. Jane stabbed every man in his own bedroom.

e. I met each man in his own house.

Constructions with each...the other also require that the NP containing the other be c-commanded by the NP containing each in order for there to be a reciprocal interpretation. The evidence again indicates that the direct object c-commands the locative, and not vice-versa.

(157)

a. I saw each man in the other’s house.

b. I met each man in the other’s house.

c. I put each baby in the other’s crib.

d. Jane stabbed each man in the other’s house.

e. I walked each child to the other’s school.

---

3Evidence from each other reciprocals below.
Negative polarity items, such as any, must be in the scope of a negative element in order to be licensed. (158) and (161) show again that the locatives are in the scope of — that is, c-commanded by — the direct object, and not vice versa:

(158)

a. Mary knit no sweater in any room.
b. Bill pushed no cart to any corner.

There is no weak crossover effect when a wh-element with a trace in direct object position is coreferent with a pronoun embedded in a following locative:

(159)

a. Which baby did Mary put in its crib?
b. Which man did Mary stab in his (own) house?

A quantifier in either type of locative may not bind a pronoun in the direct object position:

(160)

a. *I put it in every baby’s crib.
b. *I walked him to each boy’s school.
c. *Jane stabbed him in every man’s bedroom.

(161)

a. *Mary knit any sweater in no room.
b. *Bill pushed any cart to no corner.

(162)

a. *I saw the other in each man’s house.
b. *I put the other in each baby’s crib.
c. *I walked the other to each child’s school.

---

4 Or a modal or a question element.

5 One might think that these are excluded because the quantified NP is embedded in an NP (which itself is embedded in a PP, as discussed above and below); however, as discussed further below, this does not make Q-binding impossible in other circumstances; consider: Every man’s mother loves him. I have used examples with embedding because plausible examples without embedding are much harder to construct — I put it on every baby.
(163)
   a. *In which baby's crib did Mary put it?
   b. *Which baby's crib did Mary put it in?
   c. *Which man's house did Mary stab him in?

   These facts seem to preclude a structure for locatives such as (164a) or (b), where
   the locative is higher than and c-commands the direct object, for the direct object would
   not be able to license any element within the locative:

(164)
   a.   VP
        /   \
       /     \   locPP
      V'      VP
     /   \
    /     \   NP
   V      locPP
   V'      VP
   /   \
  /     \   NP
 V      V'
   |     |
   t

   However, they would still allow either a Larsonian structure, as in (165), or a ternary
   structure, as in (166):

(165)

(166)

   In the ternary structure, the direct object does indeed c-command the loc PP; and the
   PP itself c-commands the direct object, although the embedded NP does not. We might
   argue that the asymmetry found in (156–162) arises because the NP in the locative would
need to c-command the direct object in order to license a variable or negative polarity item in the direct object, but since it is embedded in a PP, it cannot.

However, this argument cannot be correct, for an NP embedded in a locPP can indeed license an element in the direct object, provided that the PP does in fact c-command the direct object at S-structure. This can occur if the PP is preposed, as in:\n
(167)
\begin{itemize}
  \item a. In no room did Mary knit any sweater.
  \item b. In each baby's crib, I put the other.
\end{itemize}

(168)
\begin{itemize}
  \item a. *In any room did Mary knit no sweater.
  \item b. *In the other's crib, I put each baby.
\end{itemize}

(169)
\begin{itemize}
  \item a. ? In each man's bedroom, I stabbed him.
  \item b. ? In his bedroom, I stabbed each man.
\end{itemize}

Thus, for examples like (160), (161) and (162) to be ruled out, it is necessary that the entire locative PP does not c-command direct object, and not just that the NP embedded in the PP not c-command the direct object. This precludes the ternary structure in (166), and leaves the Larsonian structure in (165) the only viable alternative.

Note, though, that the data in (167) shows not only that an NP within a PP can Q-bind a pronoun c-commanded by the PP; it also indicates that an NP which is in the Spec of another NP (which is embedded in a PP) can Q-bind a pronoun c-commanded by the PP. This indicates that a quantifier itself need not directly c-command a pronoun which it binds, but only that a constituent (a PP or NP, at least) in which the quantifier is

---

\textsuperscript{6}I don't know if this preposing is topicalization or not – but recall, as noted elsewhere, that participant locatives don't prepose as easily as frames. Also, note that when a negative is preposed, aux-inversion is required.
embedded must c-command the pronoun. This fact casts doubt on Larson's assumption that Q-binding is a good indicator of c-command relations.

**Temporals**

Not only locatives, but all post-verbal temporal phrases exhibit behavior that suggests that they too appear lower in the VP than the direct object. This is true for frame temporals:

(170)  
  a. I met every woman on her birthday.  
  b. *I met her on every woman's birthday.

(171)  
  a. I met no student on any Monday.  
  b. *I met any student on no Monday.

(172)  
  a. I saw each boy on the other's birthday.  
  b. *I saw the other on each boy's birthday.

It is also true for durative and iterative complements (although the examples are harder to construct):

(173)  
  a. John hit no student for any length of time.  
  b. *John hit any student for no length of time.

? John hit no student for any number of hours / any length of time.

Note that, as with locatives, a preposed time adverbial does c-command the direct object and is able to bind a variable or license a negative polarity item:

---


8(173a) is ambiguous—the preferred reading is probably free-choice any. This happens also with any number of times. Also, it is odd to quantify hours and times directly with any. Consider:

?? John hit no student any times.
* John hit any student no times.
* John hit no student for any hours.
(174)  
  a. On each boy's birthday I saw the other.
  b. On no Monday did I meet any student.

Thus, this data indicates that post-verbal temporals should occur in the same position
as locatives, attached quite low in a Larsonian-style VP.

4.1.2 Reflexives and Reciprocals

Constructions with reflexive anaphors also indicate that the direct object may bind ele-
ments in participant locative PPs. Some of the sentences that demonstrate this describe
impossible situations in the real world; nonetheless, they are grammatical9:

(175)  
  I put the book on itself.
  I pushed the cart towards itself.
  I crushed the carton in on itself.

(176)  
  *I put itself on the book.
  *I pushed itself towards the cart.
  *I crushed itself in on the carton.

Examples of this sort with a reflexive in a frame locative are more difficult to judge.
At first glance, (177a) seems to be acceptable, and certainly much preferable to (177b);
however, on reflection, it seems to be impossible to get the intended frame reading (that
is, the reading paraphrasable by “Jane knit a sweater while sitting on it”):

(177)  
  a. *?Jane knit a sweater on itself.
  b. *Jane knit itself on the sweater.

Examples with reflexives in temporal PPs are even more difficult to construct. The
intended interpretation of the following sentences is “I hate Monday on Monday”. (178a)

---

9Wilkins (1988) discusses examples like this. She notes a semantic difference between: John put the
blanket under him/himself and John pulled the blanket toward himself/under him.
is bizarre, at best, possibly because the notion "Monday" is being used both as an object of hate and a time, which are perhaps incompatible types of entities. Still, this sentence seems preferable to (178b):

(178)

a. ?? I hate Monday: on itself.
b. *I hate itself: on Monday.

Reciprocal anaphors in a locative PP may also be bound by the direct object\footnote{There is a dialect split on the judgements on these sentences; some speakers accept them readily, while others find them totally unacceptable.}:

(179)

Mary put the babies in each other's cribs.

Susie and Billy
The referee pushed the boxers into each other's corners.

Mary stabbed Bill and John in each other's living rooms.
Bill met John and Mary in each other's houses.
Jane kissed the boys in each other's houses.

(180)

Jane kissed the boys on each other's birthdays.
Mary gave the boys presents on each other's birthdays.
?Bill saw the students during each other's classes.

Note that it is practically impossible to test anaphors with iteratives. The examples are very bizarre:

(181)

*? John photographed Tom and Bill for each other's favorite number of minutes.

4.1.3 Heavy-NP Shift

Larson in fact reaches this conclusion for temporal adjuncts based on other phenomena. His analyses of Heavy NP Shift and of Parasitic Gaps both predict that post-verbal temporal complements are attached low in the multiple-VP structure. Heavy NP shift is
treated by Larson as “Light Predicate Raising”; that is, the apparent extraposition of a heavy NP results not from rightward movement of the NP, but from leftward movement of a “light” predicate, which can be a verb combined with a “light” complement. For instance, in:

(182)

John gave to his son every Teenage Mutant Ninja Turtle toy that he could find

The verb plus the indirect object combine, and then raise into the position of the higher abstract verb, leaving the heavy direct object NP in situ, as in:

(183)

\[ \text{VP} \\
\quad \text{V} \\
\quad \text{V'} \\
\quad \text{V} \]

Note that the combined verb+complement undergo head movement in this analysis; for this to be possible, Larson must treat the verb+complement as having reanalysed to form a new $X^0$ constituent\(^{11}\).

But not only arguments in double object constructions may participate in this sort of construction – temporal adverbials like yesterday, as Larson points out, can also participate in Light Predicate Raising. Consider:

(184)

John finished yesterday the long paper he was writing for his syntax class.

\(^{11}\)Jackendoff has a criticism of this.
The analysis for this sentence exactly parallels that for the double object construction; the verb and *yesterday* are reanalysed as an $X^0$ constituent, and then this constituent undergoes head movement into the position of the higher empty $V$.

### 4.1.4 Conflicting structures

The VP structures that Larson proposes are in direct contradiction with traditional structures motivated by VP-constituency tests. As we saw above in section 1, the structure most straightforwardly compatible with the various VP-constituency tests is the following:

(185)

```
    VP
   /   \
  VP    frame locatives & temporals
   |     \
  V'    participant locs
    \   / \
     V  NP
```

However, the structure that is most compatible with the various phenomena that are sensitive to c-command in the Larsonian-style structure, with the locatives and temporal attached under the lowest VP.

In fact, extending Larson's analysis to the facts about locatives and temporals seems to preclude any structure with right adjunction to VP at S-structure. For, suppose that we try to solve this problem in the following way. Suppose that the adverbials are indeed attached to the lowest projection of $V$ at D-structure, but are able to raise and adjoin to the highest projection of $VP$, thus creating a structure like:
Suppose further that participant locatives are not able to undergo this movement, probably because of some restriction on moving theta-marked elements in this way or to this position. Then, we could account for the results of the VP-constituency tests by maintaining the traditional account of these facts, that the frame PPs can be "left behind" when the VP is moved or pronominalized; however, instead of being generated outside of VP, they come to this position by movement. Since participant locatives cannot undergo this movement, they cannot be "left behind".

However, this proposal runs into trouble with the very problem it is trying to solve—the challenge to the traditional account raised by the phenomena sensitive to c-command. For if the structure in (186) is permitted, then we would expect the PP to be able to bind or license pronouns or negative polarity items in the NPs it c-commands, allowing (160), (161) and (162) (repeated here):

160

a. *I put it in every baby's crib.
b. *I walked him to each boy's school.
c. *Jane stabbed him in every man's bedroom.

161

112
a. *Mary knit any sweater in no room.
b. *Bill pushed any cart to no corner.

162

a. *I saw the other in each man's house.
b. *I put the other in each baby's crib.
c. *I walked the other to each child's school.

What this shows, then, is that allowing any attachment site for these PPs on the right side of a higher projection of VP is contradictory to the evidence from the phenomena Larson discusses, assuming, as he does, that they are determined purely by c-command relations. 12

The conclusions that we reach about the syntactic position of postverbal PPs, if we adopt Larson's assumptions, is that they are all "VP-internal", and are complements that are attached lower than the direct object in a multiple VP structure. Moreover, there is evidence that such PPs can not be adjoined to the right of VP, but higher than the arguments of the VP – that is, they can not be extraposed to the right. This seems to apply to all post-verbal PPs, even the frame adverbials for which we saw ample evidence in chapters 2 and 3 that they are VP-external. Essentially, the multiple-VP structure theory, which has no structural argument/adjunct asymmetry built in (because it was motivated by phenomena that display none), has problems handling any phenomena that do display argument/adjunct asymmetries. To maintain Larson's approach, it would be necessary to syntactically differentiate these elements within the multiple VP structures

12This is also true if we suppose, that instead of having a fixed D-structure position, these adverbials can attach at a variety of sites – low in the VP, adjoined to VP, or preposed.
by some other means. However, we will see next that there are reasons to doubt Larson's assumption that a quantifier must c-command the variable that it binds, at least at S-structure. Thus, q-binding and some of the other tests used by Larson are not adequate to determine VP structure.

4.2 Evidence for Extraposition

There is evidence that some frame adverbials are not c-commanded by VP-internal NPs, or at least they are not always in such a configuration. This evidence is of two types: instances of so-called “Backwards Pronominalization”, where a pronoun is coreferent with an R-expression that it precedes; and cases of a quantifier binding a pronoun which it can in no way c-command.

4.2.1 Q-binding and c-command

Stowell (1987) provides clear evidence that a quantifier or Wh-trace need not c-command the pronoun which it binds. This evidence considerably weakens Larson's claims that post-verbal adjuncts are within VP, c-commanded by the direct object. As we will see, Stowell's arguments do not show conclusively that the adjuncts cannot be VP-internal at D-structure or S-structure, but they do show that Q-binding is not a reliable indicator of c-command relations\(^\text{13}\). The crucial examples are given in (187) (Stowell's ex. (6)):

\(^{13}\text{There are differences in the behavior of various quantifiers, and also in that of negative polarity items; see section ?? below.}\)
(187)

a. Who did Mary say t\textsubscript{\texti{c}} was a fool after staying with him.  
b. Which boy did some girl believe t\textsubscript{\texti{c}} to be a fool after staying with him.  
c. Who, after she had stayed with him, did Mary say t\textsubscript{\texti{c}} was a fool  
d. Which book did you regret that you had bothered to read t\textsubscript{\texti{c}}, after 
you realized that it\textsubscript{\texti{c}} was written by a Nazi war criminal

In these examples, it is possible to construe the temporal adverbial with either the em-
bedded verb or the matrix verb. It is the latter case which is crucial here; for in this
case, it is not possible for the adverbial to be c-commanded by the wh-trace of the em-
bedded object, under any reasonable assumptions about the correspondence between the
interpretation of adverbials and their adjunction site. This means that a pronoun can be
coreferent with a wh-trace which does not c-command it.

Though not explicitly discussed by Stowell, the behavior of each is parallel to that
of which, although, of course, the quantifier remains in situ at S-structure. That is, in
the following sentences it is possible to construe the after-phrase as providing the time of
the matrix verb announce (as well as being possible to construe it with the subordinate
clause); that is, a series of announcements were made:

(188)

a. Mary announced [that she would marry each man] [after she stayed with him]  
b. Mary announced [that Jane would buy each horse] [after it\textsubscript{\texti{c}} won a race.]  
c. Mary announced [that Jane would buy each horse] [after John examined it.]

This demonstrates beyond a doubt that some quantifiers need not c-command a pronoun
at S-structure in order to bind it.\textsuperscript{14} It also shows that Q-binding can occur in this
configuration, for a distributive reading occurs with each; in the case where the pronoun

\textsuperscript{14}This was also argued by Higginbotham (1980), (1983) May (1983), based on examples such as (from
May, p. 72):

Somebody from every city despises it.

Here, every city clearly can bind it, though it obviously does not c-command it at S-structure.
is bound by a wh-element, it is not as obvious from the semantics that this a case of real Q-binding, and not just a case of accidental coreference.

Stowell proposes an alternate account of Weak Crossover and, by implication, quantifier binding, that allows the examples in (187). A consequence of his proposal, the most important for our enterprise here, is that the acceptability of the examples in (187) is evidence of a real argument/adjunct asymmetry; for the proposal allows q-binding of a pronoun that is not c-commanded by a coreferent wh-trace only when that pronoun is embedded in an element in an A'-position; elements in A-positions do not exhibit the same behavior.

Previous accounts of Weak Crossover (such as Koopman and Sportiche’s Bijection Principle, and Safir’s Parallelism Constraint on Operator Binding (PCOB)), Stowell says, assume the following condition on Weak Crossover, holding at LF:

\[(189)\]
If a pronoun \(P\) and a variable \(V\) are bound by the same quantifier, then \(V\) must c-command \(P\).

(187) is a direct counterexample to this condition, for, as we have noted, the wh-trace in these examples cannot c-command the pronoun embedded in the adjunct. Stowell thus argues that condition (189) is incorrect. He notes two features of sentences like (187) which might allow (189) to be violated: 1) there is no c-command relation between the trace and the pronoun, i.e., neither c-commands the other, and 2) the pronoun is in an adjunct, not an argument. He argues that this constitutes a real argument/adjunct asymmetry. This claim is further supported by the interpretations possible in the following sentences:

\[(190)\]
Who did Mary plead with \(t_P\) PRO to be allowed to visit him?
In this sentence, the with-phrase is an argument, and the subordinate clause can serve either as an argument of plead or an adjunct rationale clause. When it is interpreted as a rationale clause (i.e., the reason for the pleading), the pronoun can be coreferent with the trace; but when this clause is interpreted as an argument, the trace and pronoun cannot refer to the same person. Thus, the ability for a pronoun to violate principle (189) really does hinge on whether or not it is embedded in an adjunct.

Stowell provides an account for the argument/adjunct asymmetry, relying on the definition of a variable (???) and Binding condition C. Before we can understand this proposal, we must note a couple of his assumptions. First, he claims that the index of an NP can percolate up to higher maximal projections in which it is embedded, which he represents by slash indexing. Thus, a typical WCO sentence would look like:

(191) \[ \text{Which man does [his mother]} \, \text{love t} \]

As a consequence of this assumption, he can account for all cases of Weak Crossover as cases of Strong Crossover, for the slash index on the subject now c-commands the wh-trace\(^{15}\). Note that such a convention is needed to explain our examples in section 4.1, where a quantifier embedded in a preposed PP can bind a direct object.

Also note that this position necessarily rejects any biuniqueness between quantifiers and positions bound by them. Such a position was already taken by Higginbotham (1980) May (1983), and to some extent Safir ( ), and is not original to the proposal.

Stowell’s explanation of the argument/adjunct asymmetry in Weak Crossover effects then derives from Condition C of the Binding Theory, and from the definition of a variable of Chomsky (1981):

\(^{15}\)The difference in strength has to do with whether the violation is direct or the result of a slash index.
9. X is a variable iff X is locally A-bar bound and in an A-position (LGB). Condition C requires that the wh-trace in sentences like (187) not be bound by any element in an A-position. But, Stowell argues, adjuncts are in A-bar positions, and do not interfere with the binding relations of the trace.\(^{16}\)

Two consequences of this discussion are very important for our purposes here; 1) that Q-binding of a pronoun can occur without S-structure c-command of the pronoun by the quantifier, and 2) that a pronoun can only escape this requirement when it is in an A-bar position, and thus there is a real maintainable A/A-bar distinction. This weakens Larson's proposals, for some of his arguments rest on the assumption that Q-binding indicates c-command.

PPs

Note that there does not seem to be a strong contrast in acceptability between clausal and simple PPs in such constructions; the PP in (193) seems to be able to be interpreted as giving the time of the announcing:

(193) Mary announced that she would marry each man on his birthday.

(194)

Which boy did Mary announce that she kissed to his mother
Mary announced that she kissed each boy to his mother

Which candidate did Mary announce that she voted for in his hometown
Mary announced that she voted for each candidate in his hometown
Mary announced that each candidate would run in his hometown

This indicates that even these PPs are in A-bar positions.

\(^{16}\)Stowell does not discuss how the pronoun may be bound by the quantifier; in fact, by the definition of a variable, the pronoun cannot be a variable, for it is not in an A-position. This obviously is a problem for his account, especially as extended to binding by each. Thus, we can't adopt it entirely.
Differences among quantifiers

The behavior of quantifiers like every, no, and negative polarity is different from that of each (judgements given for the matrix construal of the adverbial only)\footnote{In the case of no, it seems that something else, like the emptiness of the set of men and the factivity of the after-clause, interfere.}:

(195)

??Mary announced that she would marry every man after staying with him;
*Mary announced that she would marry no man after staying with him;
*Mary announced that she would marry no man after staying with anyone.

??Mary announced that she would marry each man after staying with the other.

Judgements vary widely on the acceptability of (195a); some speakers find it almost perfect (yes, with the matrix construal of the adverbial), and some find it terrible. I suspect that this arises from difference in allowing every to be interpreted as distributive.

To get a distributive reading, some set must be presupposed, which may be quantified over. The reason that a quantifier like no is terrible in such a construction is that it denies the existence of such a set, while the higher adjunct presupposes that at least one element of this set exists.

The data from Stowell (1987) thus shows, contra Larson, that frame adverbials are not necessarily within the VP and c-commanded by the internal arguments. It does not exclude this possibility, however. Yet, it does show that there do exist real argument/adjunct asymmetries with binding phenomena.

4.2.2 "Backwards Pronominalization"

A source of evidence that certain adjuncts are structurally higher than direct objects comes from the ability to have "backwards pronominalization" of an R-expression in a
sentential adjunct (from Reinhart 1983, attributed to Lakoff (1968); Wasow (1972) also

discusses these):

(196)

The chairman hit him on the head before the lecturer had a chance to

say anything.

We finally had to fire him since McIntosh's weird habits had finally

reached an intolerable stage.

If we were to suppose, following Larson, that the direct object c-commands the clausal

adverbial, then we would expect a binding condition C violation here. Furthermore, a

condition C violation does occur when the pronoun is in subject position, thus showing

that it is not the case that R-expressions in clausal adverbials can somehow "escape"

ccondition C effects\(^\text{18} \).

(197)

*He was hit on the head before the lecturer had a chance to say

anything.

*He was fired since McIntosh's weird habits had finally

reached an intolerable stage.

Paralleling the behavior of post-verbal PPs which we saw in section ??, a quantified in

object position can bind a pronoun in a clausal adverbial, as in (198a). Yet, the reverse

is also possible; an NP quantified by each in a clausal adverbial can bind a pronoun in
direct object position as in (198b) and (c):

(198)

a. We gave each boy a present when he left for college.
b. ?We gave him a present when each boy left for college.
c. ?We gave him a present as each boy left for college.

Although these last two sentences are a little odd, they seem to be similar to the cases

of Backwards Pronominalization above.

---

\(^{18}\) This section indicates that NPs embedded in adjuncts can participate in binding relations; they

just can't induce WCO effects. But if Stowell is right that A-bar positions don't enter into A-binding

relations, this needs a new analysis. We do not follow Stowell completely in his analysis.
The same possibilities are allowed in cases of each ... the other binding:

(199)

a. We gave each boy a present when the other left for college.
b. ??We gave the other a present when each boy left for college.

However, "backwards" binding is less acceptable with other quantifiers\(^{19}\), similar to the results we saw in the last section:

(200)

a. We gave every boy a present when he left for college.
b. ??We gave him a present when every boy left for college.

(201)

a. We gave no boy a present when he left for college.
b. *??We gave him a present when no boy left for college.

And with wh-movement and negative polarity licensing, "backwards" binding is totally out\(^{20}\):

(202)

a. Which boy did we give a present to when he left for college?
b. ***Which boy did we give a present to him when he left for college?

(203)

We gave none a present as anyone left.
*We gave anyone a present as no one left.

Note that reciprocal binding is impossible in either direction\(^ {21}\):

(204)

*I gave them presents when each other left for college.
*I gave each other presents as they left for college.

These facts further suggest that there are important differences in the behavior of quantifiers. Each seems to be able to take wide scope much more easily than other quantifiers, and Condition C patterns with each.]

\(^{19}\)Again, judgements on these seem to vary quite a bit.
\(^{20}\)But in (202), the trace violates the ECP at S-structure.
\(^{21}\)Same for reflexives.
4.2.3 Clausal vs. simple PPs

All the examples above of "backwards" binding involve clausal adverbials that are headed by a preposition-like element. However, PPs composed of P + NP; do not show the same behavior; cases of "backwards" binding are noticeably less acceptable than with clausal adverbials. Backwards pronominalization is not as good with PPs:

(205)
??The chairman hit him, on the head on the lecturer's birthday.
??We gave him a fantastic present on John's birthday.

Neither is backwards binding with each22:

(206)
*?We gave him a present on each boy's birthday.
*?We gave the other a present on each boy's birthday.

(207)
*We gave him a plaque in each man's office.
*We gave the other a plaque in each man's office.

The difference does not seem to be between PPs with "normal" prepositions such as on or in, and prepositions like before, for simple PPs headed by the latter seem to have the same status as those with the former:

(208)
*?The chairman hit him on the head before the lecturer's birthday.
*?We gave him a fantastic present before John's birthday.

*?We gave him a present before each boy's birthday.
*?We gave the other a present before each boy's birthday.

---

22 These examples with give may be slightly better than the other examples; I don't know why. Still, they're not much better.

However, I kind of like these:
I put its label on each book.
I put the other's label on each book.
I put its chicken in every pot.

I haven't found another speaker who agrees with this judgement, however.
Instead, the difference really seems to be a difference between "simple" and clausal PPs.

Interestingly, this type of example becomes better when the NP denotes an event, rather than a time:

(209)

?The chairman hit him on the head before the lecturer's arrival.
??We bought him a fantastic present before John's arrival.

?We bought him a present before each boy's arrival.
?We bought the other a present before each boy's arrival.

Similarly, note that the clause embedded in "clausal PPs" seems to denote an event, rather than a time. This suggests that the type of thing referred to by the argument of the PP is responsible for the syntactic behavior of the PP. Although this may initially seem like an undesirable conclusion, there is a possible explanation if we consider the relationship between the PP, the embedded NP or clause, and the event associated with the main predicate. In a simple P + NP, the NP indicates a time or location associated with an event, which may somehow be an inherent property of the event, and connected closely with it. However, in a clausal PP, the argument of the preposition indicates an entire event which is distinguished from the main event of the clause; this subordinate event cannot be seen as a property of the main event.

Thus, there is evidence from Binding Condition C that clausal PPs may be extraposed, that is, adjoined to the right of VP. However, simple P + NP PPs still do not seem to be able to be extraposed easily. We will see a similar "cut" in the following section, on reconstruction.
4.3 Reconstruction Effects

Argument-adjunct asymmetries also exist in constructions involving reconstruction, which are discussed by Jackendoff (1972), Kuno (1975), Reinhart (1983), Gueron (1984), Lebeaux (1989), Barss (1986), and others. These are structures in which an element containing a pronoun or anaphor is preposed (or apparently so) by Topicalization or Wh-movement; in such structures a preposed argument behaves as if it must "reconstruct" to its base position at LF. Adjuncts, on the other hand, do not reconstruct; their surface syntax determines their coreference possibilities. This asymmetry is exemplified in (210) (from Jackendoff 1972, cited by Gueron 1984):

(210)  
   a. In John's picture of Mary, she looks good.  
   b. *In John's picture of Mary, she found a scratch.

Sentence (210b) is taken to be a violation of Binding Condition C. The preposed PP is assumed to be moved from a base position internal to VP. The PP contains an R-expression, Mary, which is to be construed as coreferent with she in the matrix clause; and though this R-expression is not c-commanded by the pronoun at S-structure, it is at D-structure and at LF (through reconstruction), and thus a Condition C violation results. In (210a), on the other hand, the R-expression in the preposed PP "escapes" Condition C; the PP in (210a) is taken to be an adjunct, and this contrast is evidence that adjuncts do not reconstruct (whatever reconstruction turns out to be).

---

23The actual mechanism of reconstruction is controversial; while theorists such as Van Riemsdijk and Williams () actually propose that an argument which has preposed at S-structure actually moves back to its original site at LF, others such as Barss (1986) show that this cannot be the case. Lebeaux (1989) also presents evidence that real reconstruction does not occur; in sentences such as the following (from Chomsky?):

Which claim that John made would he later deny?
*Which claim that John is intelligent did he later deny?
The argument/adjunct asymmetry found with these phenomena is quite strong (though not without complications), and we should be able to use these constructions to probe into various types of Verb-PP relationships. We should expect to find the same asymmetry that we find in other "tests", such as the VP-constituency tests. However, we will see evidence that this is not the case: specifically, Frame locatives seem to pattern with adjuncts for VP-constituency, and with arguments in preposed structures.

Speas (1989, p.c) notices the following contrasts in the behavior of various types of preposed PPs:

(211)

a. *In John's office, he lay on his desk.
   b. In John's office, he is an absolute dictator.

(212)

a. *For Mary's brother, she was given some old clothes.
   b. For Mary's valor, she was awarded a purple heart.

(213)

   b. With John's novel finished, he began to write a book of poetry.

(214)

a. *To Ben's office, he takes the bus.
   b. To Ben's surprise, he noticed that the others had left.

The (a) sentences in each pair seem to be required to "reconstruct". According to Reinhart (1983), only VP-internal (thematic?) elements have to reconstruct; Yet, the reconstructing phrases in these sentences are VP adjuncts, according to VP-constituency tests (except for (214a), which is a goal phrase, and therefore VP-internal on our story); in particular, (211a) is a frame locative:

---

both preposed phrases are arguments, but there is no violation in the first because the R-expression is embedded in a relative clause, which is adjunct to the preposed NP.

Reinhart seems to assume that the two types of tests will always pattern together; however, this is not the case.
(215) a. John lay on a desk in his office and Bill did so in the hall.  
b. Mary was given some  
c. John wrote a book of poetry with a computer and Bill did so with an old typewriter.

The puzzle is that frame locatives behave differently from frame temporals with respect to reconstruction effects, and this is not the behavior we find with VP-constituency tests. If this is a structural difference, this suggests an additional level of adjunction to VP, which can differentiate locatives and temporals. For the present purposes, the contrast that interests us the most is the contrast in (211). Speas notes that in (211a), the locative is functioning as a normal locative, but that in (211b), the reading that one gets for the locative is a temporal one: it is interpreted roughly as "the times when John is in his office." This implies that (semantically locative) locatives are VP-internal, and temporals are VP-external. Let us examine this contrast more carefully. First, note that preposed temporals in general do not have to reconstruct:

(216) ?On Jane's birthday, she went to the beach.  
After God made the world, he rested.  
When God made man, she was only joking. (bumper sticker)  
At the time when the dinosaurs lived, they were the largest creatures on earth.

It appears that Speas' generalization holds, and that all simple locative PPs (interpreted as such), including those we have dubbed "Frame" locatives, must reconstruct:

(217) *?In Mary's living room, she knit a sweater.  
*?In Jack's house, he had a party.  
*?Along John's favorite river, he ate lunch.

(218) *Near John, he saw a snake.  
*Along John's favorite river, he ran a mile.
However, the following data suggest that the conditions on being able to construe a locative as a temporal are more subtle:

(219)

a. *?In John's office, he lay on his desk.
   b. ?In John's office, he (usually) lies on his desk.

a. *?In John's house, he held a party.
   b. ??In John's house, he holds a lot of parties.

a. *?In Mary's living room, she knit a sweater.
   b. ??In Mary's living room, she knits sweaters.

Although the (b) sentences above are not perfect, they are markedly better than the (a) sentences. The (a) and (b) sentences are minimal pairs; the only difference between them is that in the (a) sentences, the matrix clause denotes a singular occurrence, and in the (b) sentences, the matrix clause is habitual. With a singular event, the locative must reconstruct; with habituals, it seems that they do not absolutely have to reconstruct. Why should this be so?

The locatives in the (b) sentences are understood as restrictive clauses on quantification over cases (cf. Lewis 1973); that is, they are understood roughly as indicating the times (or cases) when the subject of the matrix clause is in the situation indicated by the matrix clause. The locatives in the (a) sentences, on the other hand, can't be construed as restrictions on a quantification over times or cases, for the sentences involves only a single event.

We propose, therefore, that the need for reconstruction depends on whether an element is a "simple" frame adverbial, or whether it serves as a restriction on quantification. Thus, contra Lebeaux, reconstruction has nothing to do with whether or not an element is thematic. We further postulate that this difference in interpretation of adjuncts is associated with a difference in attachment sites: normal frame adverbials are adjoined to VP,
while restrictive adverbials are adjoined to IP. This idea needs much more exploration, and so is presented here more as speculation that as a proposal.

The following contrast is also attested (Lakoff (1968), Wasow (1972)):

(220)

*?In John's apartment, he smoked pot.
In John's newly renovated apartment on 5th Avenue, he smoked pot.

Reinhart suggests that lengthening the adjunct, or making it heavier, is producing the improvement in this example. However, it seems plausible that the more complicated PP, with more specification of the NP, is easier to interpret as a restrictive adverbial, and thus that we can assimilate this type of example to those above.

4.4 Problems and Solutions

We conclude that the following structure, close to the traditional structure, best supports the facts. It allows us to distinguish three types of PPs: those that are VP-internal, and then two types which are VP-external.

(221)

That is, we allow right adjunction to both VP and IP, and hold that only event-internal elements may be VP-internal complements. Note that the structure is untraditional in
that the lowest VP has a Larsonian structure; we use this structure within the VP because it best accords with the evidence from reflexives and reciprocals.

We further suppose that each level of attachment has particular syntactic properties, and different semantic properties as well. On the basis of reconstruction facts, we have suggested that only IP adjuncts may serve as restrictions on quantification over cases. Yet, it is not clear that the same distinction can explain the facts about backwards pronominalization. Note also that all types of adjunct PPs avoid Weak Crossover effects.\textsuperscript{25}

\textsuperscript{25}See also the discussion of Parsns in Chapter 5.
Chapter 5

Arguments and Adverbials in Semantics

In the three previous chapters, we have seen evidence from English and Chinese that certain prepositional phrases and other elements typically thought of as "adverbial" behave as if they are part of the VP, while others do not. Further, we have maintained that there is a strong correlation between the syntax and the semantics: that elements which are syntactically internal to VP are semantically internal to thematic/event structure. In this chapter, we will elaborate on the semantic contribution of these elements to thematic and event structures.

One of the aims of this study has been to explore the proposal that thematic structure of a sentence is at least partially determined by the structure of the event associated with the sentence. We will now turn our attention to the details behind the statement that elements which contribute information about the internal structure of the event should be considered thematic.
Recall that this proposal is a generalization of Tenny's (1987) Aspectual Interface Hypothesis: that the mapping of conceptual structure onto syntactic representation is mediated by aspect. Her study focussed on the way that internal arguments contribute to the event structure; the present study concentrates on the role that "oblique" elements play in thematic and event structure. Generalizing the AIH to apply to oblique elements has the consequence that a wider range of complements are predicted to be included in thematic structure than is usually assumed. It also imposes a division in the (heterogeneous) group of elements that are often lumped together as adjuncts, and makes predictions as to which ones are part of thematic/event structure.

In section 1, we will argue that "prepositions" in English are a conflation of categories with two different functions. In Chinese, and in other languages reported in the literature\(^1\), these two functions are served by distinct categories. This "mixed" nature of the English preposition gives rise to some of its unusual properties\(^2\).

In section 2, we will consider various types of elements, and elaborate on how each contribute to aspectual interpretation. We will argue that the composition of thematic/event structure should not be seen in terms of a single predicate and a list of arguments, but that there are several ways in which an element may participate in an event. Thematic/event structure is built from the interpretation of one or more predicates in combination (where one is often the "main predicate"), the arguments of the combined predicates, and other modificational elements (which perhaps should also be viewed as predicates, of some part or parameter of the event). Selectional restrictions hold between these various elements; however, the notion of selection should not be limited to a relation between a predicate

---

\(^1\)Kinyarwanda, for one, according to Kimenyi (1977).

\(^2\)Perhaps some differences in behavior between English and Chinese "PPs" can be accounted for by this difference in structure.
and its arguments, but as a relation also between two combined predicates, and between predicates and modifiers.

In developing this picture of thematic relations and event structure, several specific proposals will be made concerning the correct interpretation of PPs and other adverbials.

The extended AIH will be understood as a licensing condition on what can be within the D-structure projection of VP. However, we will argue that there are still many kinds of VP-internal elements: the main predicate, subordinated predicates, other internal modifiers, and of course arguments. PPs can serve many (all?) of these functions, a fact which partially accounts for the great variety we find among PPs. We will also make proposals about the lexical semantic representation of certain verbs which are crucial to the study of locatives, and about that of various types of locative PPs.

It follows from the extended AIH (and somewhat from Tenny’s original proposals) that aspectual temporal elements like duratives and iteratives, and also measure phrases, are part of thematic structure (although maybe not true arguments), and may be part of the VP. This differs from most views of these phrases, and clearly differentiates them from real “adjuncts”.

The “Framing” relation will be posited as a grammatically significant relation. We will take Framing elements to be real predicates of events, whereas event-internal elements may be predicates, but not of the entire event. The relation is represented by the structure itself; a PP may serve as a frame, and thus as a predicate of the event, but it is not inherently one, but only becomes one when it is in a certain syntactic position.

A consequence of our approach is that the argument/adjunct distinction, which this study started out by questioning, is maintained, but in a somewhat modified form; we admit elements that are complements of the VP, but are not arguments, and are also not
adjuncts.

In section 4, we will argue against the uniform treatment of prepositional phrases supported by Jackendoff (1983, p.c.). It is clear from previous chapters that PPs have a wide spectrum of possible syntactic behavior, and we will see that they have many semantic functions as well. We will criticize Jackendoff’s use of the “Path” argument in the argument structure of the abstract predicates *GO* and *BE*. However, we will see that there is a structure which the idea “Path” does capture, and try to reformulate this in other terms.

We will then turn to “Davidsonian” theories of event structure. These have the drawbacks that subeventual structure is not articulated (or maybe, not structured), and that the possible modifiers of the event are unconstrained. Most also preclude a representation of the internal/external distinction, although this seems to be captured in a way in Parsons (1990).

### 5.1 The semantics of prepositions and the reference of PPs

A comparison of the composition of English and Chinese ”prepositional” phrases suggests that the category preposition, though certainly a part of English syntax, is not universal; or at least, that the functions carried by an English preposition may not be carried by a single category in a typologically different language. In Chinese, as we saw in section 3.7, there are two morphemes that correspond to an English preposition, one that is more nominal, and one that is more verbal. This is evidence that many prepositions in English should be treated as conflations of these two types of categories, at a lexical
level. This treatment is essentially that proposed by Jackendoff (1983) for the reference of prepositional phrases; his analysis is strengthened by the evidence that the two semantic levels are completely separated in languages like Chinese.

In locative PPs, English prepositions often serve these two separable functions at the same time. A preposition typically takes an object NP; this object is associated with the area in space that it occupies. The preposition then indicates some kind of spatial relation relative to this area; the entire PP refers to another area in space. For instance, in the PP under the box, the NP the box refers to an entity, a box, which is associated with an area in three-dimensional space\(^3\); under provides a spatial relation to that area; and the PP yields a new area, the area that is "under" the area of the box.

The preposition can also contribute another sort of relation, a directional or copular predicate. That is, under can mean "to under", or possibly "at under", as in:

\begin{enumerate}
\item The ball rolled under the table.
\item Victoria stood under the bridge.
\end{enumerate}

However, the preposition does not have to include this additional piece of semantic information; the PP can refer just to the area, and the predicative component be expressed by another constituent, or not at all (in the case of (2c)):

\begin{enumerate}
\item The mouse ran from under the clock.
\item The ball rolled to under the table.
\item Under that bridge is where we first met.
\end{enumerate}

We take the view that a preposition like under, in its use in (1) above, is interpreted as a conflation of the spatial relation "under" and a directional predicative relation with

\(^3\)It is not clear whether or not we should regard the NP as referring directly to the area as well as object itself, or whether the presence of the preposition somehow triggers an operation abstracting the area from the object. This is a somewhat philosophical question about the semantics of NPs; it probably does not need to be resolved for what follows.
the meaning of "to" or "at". Following Hale and Keyser (1990), we take conflations to be a lexical process, similar to incorporation in the syntax, in which an (abstract) X0 constituent combines with another X0 constituent. In some English prepositions, such as into and onto, the incorporation process is overt; these forms are clearly derived from combination of in or on and to. Prepositions such as under, on, in, beside, over, then, have a variant which incorporates the abstract predicate TO, and possibly variants which incorporate other similar abstract predicates, though this conflation does not show up in the morphology.

This is in essence the treatment that Jackendoff gives for the reference of PPs. He calls the two types of functions "Path"-function and "Place"-functions; Path functions include directional relations such as TO, TOWARDS and FROM, and Place functions include spatial relations such as IN, ON and UNDER. Thus, a PP such as into the room is given the following semantic representation:

\[(224) \quad \text{TO} \quad \text{IN} \quad \text{the room} \quad \text{thing} \quad \text{path} \quad \text{place} \quad \text{thing} \]

The view taken here concurs with his analysis (although we do not necessarily adopt his entire ontology). However, we will differ from Jackendoff regarding the ways that PPs combine with the VP and the rest of the sentence, particularly with the "Path" argument; this will be discussed in a later section.

Not all English "prepositions" have this conflated interpretation, for they do not all have the appropriate spatial component. In particular, prepositions such as to, from, towards and at serve only to provide the directional or predicational component of the interpretation; they do not have the additional function that under has of setting up an area in space, relative to the area projected by the object, but only express some sort
of relation to the area of the object. This relation must be predicated of some other constituent of the clause; thus these prepositions are more "verbal" in their categorial nature.

In Chinese, as we saw in section 3.7, the two types of relation are expressed by two different types of morpheme. Thus, when "run into the room" is translated, a morpheme corresponding to to and one corresponding to in both appear:

(225)  
Ta pao dao fangzi li.  
he run to room in

A typologically very different language, Kinyarwanda, also has two different types of morphemes to express these two separate functions, according to Kimenyi (197?). A systematic comparison of languages would undoubtedly reveal many more in which the two "prepositional" functions are always separate. Thus, even a brief look at typologically different languages confirms the view that prepositions serve two separable semantic functions, that correspond to two different syntactic categories, one nominal and one more verbal (or at least predicable).

---

4Note that a "spatial relation" morpheme (or "locative particle", in Li and Thompson's terminology) is not always required; if the NP itself is easily interpreted as a location, as is the case for a place name or building, a "coverb" alone can appear:
Ta pao dao tushuguan/Shanghai.  
he run to library Shanghai

However, unlike in English, and NP referring to a person may not serve as the object of a coverb such as zai or dao; a locative demonstrative must occur with the NP, in the typical position of a locative particle:
*zai Zhangsan  
zai Zhangsan nar  
at Z. there

At Zhangsan's / in the place where Zhangsan is

5It is probably worth noting that languages such as German and Latin use case to provide at least a directional component; thus, the functions may be separated in these languages too, although a lot more must be said about the interaction. In Romance, there is not obvious separation, although there are some things that systematically cannot be expressed (i.e. paradigm cases like walk to the store). Japanese uses different cases also (according to Chisato Kitagawa(p.c.)).
5.2 The Internal/External distinction

We have proposed that the distinction between being "internal" and "external" to an event is a crucial part of the semantic representation of a sentence, and one that plays an central role in the grammar. A phrase whose denotation plays an internal role in the event expressed in a sentence is part of the internal structure, and a phrase that contributes only external information about the event is outside of this structure. We have hypothesized further that this internal structure encompasses thematic structure. This semantic distinction correlates with a syntactic one – roughly, the argument/adjunct distinction; we have seen syntactic evidence for maintaining a (modified) argument/adjunct distinction in Chapters 2, 3 and 4.

This section will further explore the semantic internal/external distinction and its consequences. We will consider each type of locative and temporal phrase that we have seen above, and try to determine the way each type of internal element may be said to contribute "aspectual" information about an event. There are many types of internal elements, and many components or characteristics that are part of the structure of the event, and so there are many ways in which an element can be part of that structure.

By the "internal structure" of an event we will mean physical, spatial, temporal and abstract characteristics which are important to its conceptualization. These characteristics influence each other; that is, the specification of one type of property may imply information about another. For instance, the existence of a definite physical or spatial progression to an event will probably imply a temporal duration, and the presence of a

---

8An event's temporal characteristics are sometimes discussed under the heading of "aspect" and "aktionsart", which include properties of the event such as duration, delimitedness, completness, and so on. The aktionsart is primarily the temporal contribution of the verb and its complements to the event structure, while aspect is the contribution of aspectual morphemes.
temporal ending point will indicate a physical or spatial bound as well. We may regard these structural characteristics as exerting mutual influence on each other; or instead, we might see all of the particular characteristics as combining to form an abstract structural characterization of the event, with no particular type being dominant over the others, and with the abstraction itself possessing no real spatial, temporal, physical, or any other relatively concrete properties. Instead, the abstraction would include ideas such as measure, delimitedness and progression, which are common to space, time and physical entities\(^7\).

The external structure of an event, then, includes the properties which are not internal; these are its relations to the spatial and temporal context, and to other events. From the point of view of its external structure, the event is viewed as an undifferentiated whole; its structure is no longer visible.

External elements do not provide information about the internal structure of the event; their presence cannot change the argument structure or the aktionsart. There are several ways an element may be external. It may "frame" the event, that is, provide information about the external relation of the event to an area in space or time. There are also other kinds of elements that must be considered external; among these are purpose and absolutive clauses which may perhaps also framing elements, and subject-oriented depictives. This study concentrates, of course, on the frame locatives and temporals. However, we will attempt to characterize depictives enough to distinguish them from framing elements; this is important because there do exist depictives which are locative.

\(^7\)Some theories take the temporal system as basic, with other systems reducible to it; this is the view that Tenny (1987) seems to take. Jackendoff (1983), following Gruber, treats the spatial system as fundamental. I believe that the correct view is that there is a totally abstract level of structure; this is the view that seems to emerge from studies like Hale's "Notes on World View and Semantic Categories: Some Warlpiri Examples."
and temporal predicates, but they are secondary predicates of the subject, and not of the main event of the sentence.

5.2.1 Event Structure, Delimitedness and the Aspectual Interface Hypothesis

At least one theory has attempted to connect aspectual interpretation with argument structure in a way relevant to syntactic theory: Tenny (1987)'s Aspectual Interface Hypothesis (AIH). Her formulation of the AIH is as follows:

**Aspectual Interface Hypothesis:** "The mapping between cognitive (thematic) structure and syntactic argument structure is governed by aspectual properties. The aspectual properties associated with internal (direct), external and oblique (internal indirect) arguments constrain the kinds of event participants that can occupy these positions. Only the aspectual part of cognitive or thematic structure is visible to the syntax." (ref.)

Tenny argues that an argument's projection as the direct object of a verb depends on the argument's ability to determine a property in terms of which the event is measured out, and sometimes delimited. Syntactic structure, and in particular, the syntactic properties of arguments, is determined by the argument's role in aspectual interpretation. Thus, this hypothesis proposes a very tight correlation between an element's involvement in aspectual interpretation and its syntactic behavior.

The AIH requires that if an element is to be part of the argument structure of a predicate, then it must measure out and (possibly) delimit the event. The idea that delimitedness is the central aspectual property to be considered works well for the internal

139
arguments of verbs of the type discussed by Tenny (1987), but it does not extend fully to
the types of predicates and complements we are considering here. We will first review
Tenny’s proposals, and then propose an extension of the theory to cover a larger range
of data. Our revised statement of the AIH will be:

Extended AIH: An element can be interpreted as part of the argument/event
structure of a predicate only if it contributes to the aspectual structure of the
event denoted by the predicate.

Delimitedness is defined by Tenny (1987), following Dowty (1979), Vendler (1967)
and many others, as “the temporal boundedness of an event”. That is, an event which
has a definite final endpoint is said to be delimited. For example, the VP eat an apple
is delimited, because it has a definite bound at the point when the apple is actually
consumed, whereas the VP walk along the river is non-delimited, for it has no such
definite stopping point. There are many tests for delimitedness: one is the “in an hour”
test – delimited VPs are able to combine with temporal phrases like “in an hour” while
non-delimited VPs cannot – as in:

\[(226)\]

\[
\begin{align*}
\text{John ate an apple in an hour.} \\
\text{*John walked along the river in an hour.}
\end{align*}
\]

In VPs with direct arguments, Tenny argues, delimitedness is dependent on properties
of the direct argument. An event is “measured out” by some property of the object

---

8 Jane Grimshaw (p.c.) argues that the AIH is wrong about certain classes of transitive verbs, in
particular the hit-class, the see-class and many stative verbs, whose internal arguments are not delimiting.
We will not discuss these verbs here; however, though these verbs are certainly problematic for the AIH,
we see no reason that it could not be stated in a way to make the correct predictions for these verbs
(once their aspectual properties are better understood), in keeping with the spirit of the enterprise.

9 These tests are among those given by Dowty (1979).

10 Tenny (1987) points out that delimitedness with transitive verbs is not always dependent on the
direct object – it is sometimes introduced by the verb itself, as in win a race.
referred to by the direct argument, so that this object in effect provides a scale for the progress of an event. The direct argument of the verb, and the scale that it projects, often define a bound for the event, and thus bring about a delimited interpretation.

With verbs like *eat*, the internal argument measures out and delimits the event, for the event progresses as the object is consumed, and ends when it is totally consumed. Similarly, with verbs of creation, such as *draw* and *build*, and verb of performance, like *read* and *perform*, the internal argument measures out and delimits the event, for the event is completed when the object is fully created, or performed.

With all of these verbs, the event is tied directly to the existence or non-existence of the object or other entity, (or an instantiation of type of entity, in the case of performance verbs). However, there are many other verbs that denote events in which a property of the theme is important to measuring out the event, although that property is not existence. Among these are verbs of change of state, and motion verbs, both also discussed by Tenny. With the change of state verbs, like *redden*, *cool* or *freeze*, the property by which the event is measured out may or may not have a natural terminus; so, with *freeze*, there is a natural endpoint, the state of being frozen, but with *cool*, there is no such endpoint, at least on the most salient reading.

### 5.2.2 Motion verbs, locatives and the internal/external distinction

With verbs of motion, the property through which the event is measured out is the location of the object. Since objects do not have any inherent property which limits their motion, the internal argument by itself will in general not delimit a motion verb, but will
measure it out (by the parameter of its location). A limit on the motion, and hence a
definite endpoint for the event, can be imposed by a goal locative. In this way, a goal
can "indirectly delimit" the event, in Tenny's terminology; while the internal argument
is still the object whose property is used to measure out the event.

Goal phrases can be subsumed as part of argument structure under the extended AIH,
since they contribute to aspectual interpretation by delimiting the event. For instance,
goal phrases in general cause a delimited interpretation, for they provide a definite final
endpoint to an event. The following sentences are delimited in this way:

(227)

  a. I pushed the cart to the corner.
  b. Mary walked to the store.
  c. Jane put the wallet on the table.

In (227a), the event is delimited by the locative phrase, through a property of the direct
argument – its distance along the path of pushing. In this case the direct argument by
itself does not delimit the event, although it does measure it out; however, since the goal
phrase provides a bound for the cart's movement, it in turn serves as a bound for the
entire event. In ((227b), there is no direct argument, but the goal phrase still provides a
bound for the walking\textsuperscript{11}.

The property of delimitedness clearly is part of the internal structure of events. How-
ever, delimitedness is not the only distinction that applies within the internal semantic
structure of an event. The distinction that separates frame and participant locatives
is just the difference between being involved in the internal structure or only in the
external structure of the event in which they participate; only some cause a delimited
interpretation of that event.

Internal Participant locatives need not be delimiting; sources, directions and paths crucially do not delimit an event. To illustrate this point, consider the following sentences, which contain two different types of participant locatives:

(228)

a. Bill walked to the store.
b. Bill walked towards the store.

Both locative phrases in these sentences signify a location that is involved in the event, that participates in its structure. However, sentence (a) is delimited, while (b) is not, as shown by their different behavior in the “in an hour” and “for an hour” tests:

(229)

a. Bill walked to the store \( \text{in an hour} \) 
   \( \{ \text{for an hour} \) 
   b. Bill walked towards the store \( \text{in an hour} \) 
   \( \{ \text{for an hour} \) 

The following generalization can be made about participant locatives: goal phrases cause a delimited reading, while path, direction and place phrases generally do not\(^\text{12}\).

Sources, of course, contribute to the internal, aspectual structure of the event by providing its beginning point. However, specifying the beginning point of the event does not seem to “count” as delimiting it (unless the event is then interpreted as inceptive); so, in sentences like:

(230)

John walked from the store.
John threw the ball from the window.

the locative “participates” in the event, but does not delimit it.

What we have called “posture” phrases do not in general occur with eventive predicates at all, but with verbs like sit and live, which do not involve a change of state and

\(^{12}\text{Source phrases are often ambiguous, producing a delimited interpretation on one reading, and a non-delimited one on the other.}\)
are therefore usually considered to be statives\(^{13}\). Since these are not motion predicates, the locative here cannot delimit the event. However, we will see that these have an interpretation that could be viewed as aspectual. We will see also that the relationship between these elements and the locational state is similar to that between a Path phrase and a motion event\(^{14}\).

Direction is a characteristic that is inherent (and internal) to certain types of events, including motion events. This does not seem at first glance to be a characteristic that has a temporal correlate, and so is harder to relate to aspect. Yet, note that many particles whose literal interpretation is directional are used as aspectual markers:

(231)  
**eat up your food**  
**think over a matter**

This is also true in Chinese. Kipka (1990) explores such particles in Polish, and maintains that they are essentially aspectual.

Participant locatives are, of course, event-internal elements; there also exist locatives which are external elements, which we have called "frame" locatives. Frame locatives indicate the general area in which an event takes place, while participant locatives denote locations which are involved in a portion of the event. In other words, from the point of view of events, an event is spatially contained within the space frame provided by the frame locative. Conversely, an event is divided up by participant locations inherently involved in its occurrence. An event is viewed from a different perspective, depending on

\(^{13}\)Although they usually take the progressive —but I've argued in my reply to Kratzer that the progressive depends on the stage/individual level distinction (following Carlson and Dowty). Also, are these agentive? Could they be considered activities (on a par with keep?)

\(^{14}\)This is also argued by Jackendoff; in fact, it is one of his motivations for postulating the "Path" argument. Although we will criticize his implementation of this in a later section, we will try to capture the parallel that it allows between motion events and locational states.
the type of location referred to in the same proposition: when a frame locative provides
a general location, the event is treated as a point in space/time; however, relative to
a participant locative, the event is viewed as an area in space/time, with the location
denoted by the locative playing a role in the event.

Next, we will consider each of the non-delimiting locatives in turn, and then turn to
Frame locatives and temporals.

5.2.3 Paths, Statives and the notion of "Co-Extension"

To understand the manner in which Path phrases contribute to aspectual structure, and
also to account for Posture phrases under this rubric, we need to develop the theory of
aspect a step further. To do this, we will introduce the idea of "co-extension" of some
aspect of an event with a spatio-temporal structure. A form of this idea is present in
Tenny (198?); however, we will argue that to deal with predicates other than those that
clearly involve motion or change over time, we need to extend the ideas of measuring out
and delimitedness to non-temporal domains.

Path phrases such as the locative in walk along the river, as we have noted, seem to
contribute to the event by providing information about the intermediate portion. But,
unlike source and goal phrases, they do not provide information about only a small
portion of the event, but can indicate the location of almost the entire event\textsuperscript{15}. Because
of this, it is sometimes difficult to distinguish Path phrases from Frame locatives, and
even to maintain that a distinction can possibly exist. Yet, it is clear from the following

\textsuperscript{15}As such, our notion of Path seems similar to that of Jackendoff (1983), (1987), etc. Yet, there is
a crucial difference: Jackendoff assumes that other notions such as Goal, Source are part of the Path
component, and subordinate to it. We take each of these as separate concepts on an equal footing, for
they are expressed separately. They have very different effects on aspectual interpretation, and different
syntactic behavior.
examples that there is a difference in the relation of the locative to the event in each case:

(232)

a. Victoria walked along the Seine.
b. Victoria ate along the Seine.

In (b), the event of eating simply takes place at a location along the river; in (a), however, the trajectory of the walking follows the path of the river, so that the area defined by the phrase along the river is involved much more closely in the actual nature of the event.\footnote{16}

What is important here is that the path locative indicates a path that is co-extensive with the event in all its parts; the event begins at one point along this path, and continues along it, every segment of the event corresponding to a segment of the path. This idea of co-extension is really just another way of looking at Tenny's "measuring out" of an event\footnote{17}

The idea of co-extension can be used to elucidate the aspectual contribution of "Posture" phrases and similar phrases as well. First, though, we must note that in Tenny's system, the measuring-out parameter of the event must be co-extensive with a series of times; time is a primitive and essential part of the semantic description. Thus, in the case of motion along a path, each segment of the event, as we have said, corresponds to a segment of the path; however, Tenny would predict that this path measures out the event only in virtue of itself being co-extensive with a series of times, so that time is still the basic notion here, and the spatial Path is derivative\footnote{18}.

\footnote{16}{Note that there is a frame reading for this too – there is a regular systematic ambiguity. Also, some speakers only get the reading for (b) of "going along the river eating" – if this is true, then they must make eat into a motion \textit{V}, and does not get the Frame interpretation for along. Also – both are "central coincidence", in the terms of Hale (19??).}

\footnote{17}{In fact, in a recent paper she proposes exactly this sort of matching up between some parameter \textit{d} of the event (usually tied to the direct object) and the time \textit{t}.}

\footnote{18}{Note that Gruber and Jackendoff (1983) take space as the primitive notion.}
We will take a different tack, however, in hopes of encompassing the statives. Instead of subsuming spatial extension under temporal extension, I propose that both (or neither) of them need to be seen as basic to the system. In this way, some parameter of an event or situation will be measured relative to an abstract spatio-temporal scale. It may be that either the spatial or temporal part is irrelevant to a particular event; for example, in eating an apple, there is no real spatial parameter. Still, the aspectual structure underlying an event will in the general case subsume both of these scales.\(^{19}\)

With the assumption that events are associated with this abstract scale, we are in a position to extend the idea of coextension to account for Posture phrases. For a predicate like *sit on a chair* (in the stative sense), as we have noted before, the chair has some sort of intimate relation with the posture of sitting. This is not primarily a temporal relation, for there is no change over time in this situation, and there is no way that the chair interacts temporally with the sitter or the sitting.\(^{20}\) However, the chair is *spatially* co-extensive with the situation of sitting, for it defines the spatial extent of the sitting. In this way, it participates in the situation of sitting in the way that the locatives in *sit in the living room* or *sit on the mountain* do not. Thus, we are able to account for the requirement that the posture phrase be roughly the same “size” as the posturing situation, or as the “theme”; it must be able to be spatially coextensive with it.\(^{21}\)\(^{22}\)

---

\(^{19}\) And also a property like red, and all properties which can be seen in terms of a scale, and participate in comparatives. See Gruber, Jackendoff, Plat Zack. Dowty? Kipka (1990) takes a similar view of the abstractness of the scale. Maybe “aspect” is no longer the right term for this?

\(^{20}\) Although the maintaining of the posture and the being on the chair are coextensive in time.

\(^{21}\) We might also use spatial coextension to account for the locatives in the following cases:

This road goes to N.Y.
New Orleans lies at the mouth of the Mississippi.

However, we must do this in such a way that the stative uses of motion verbs are not predicted to be universal across languages, for Chinese lacks this usage. There is much to be explored here.

\(^{22}\) I haven’t said anything about verbs like *live*. *Live in a house* might fall under coextension – but *live*
5.2.4 Directions

Direction phrases specify information about the trajectory of an event, and thus provide another type of information about the internal structure of events. They may only occur with verbs that have an inherent trajectory (at least in their literal meaning); these are verbs of linear (directed) motion, verbs of pointing and verbs of orientation:

(233)  
  a. Edwidge went towards the lamppost.  
  b. John ran up the mountain.

(234)  
  a. John aimed the gun at the target.  
  b. Edwidge pointed towards the Woolly Mammoth.  
  c. The sign pointed across the river.

Direction can be, and often is, indicated by only a directional particle, which need not be followed by an NP:

(235)  
  a. Edwidge went out.  
  b. The sign points up.

Many of these particles "double" as prepositions, and so take an NP when used this way (as in (1b) above); these include up, down, away, in, out, etc. Toward, and the directional use of at, differ in that they must take an NP argument23.24.

In Chinese, direction phrases are expressed as coverb + NP (or locP), and are pre-verbal:

(236)  
  Ta wang xuexiao zou.

---

23I haven’t considered directional particles in the division of prepositions into locative particle (nominal) and predicative (coverb?) types. Perhaps the latter are directional (I sometimes call them directional...). Need to include. Note that directional particles are somewhat indexical – the direction indicated sometimes depends on the location of the speaker.

24Perhaps it is wrong to assimilate towards-phrases and directional particles? What about (c) above, in which an NP occurs in between directional particles?
Directional particles exist, but they are postverbal. They are formed from elements which are essentially verbal, and may be verbs on their own:

(237)

a. Zhan qi lai.
   stand up come
   Stand up.

   sit down go
   Sit down.

c. Ta pao shang shan qu le.
   he run up/on mountain go CM
   He ran up the mountain.

Note that there is a separate morpheme which is indexical – it indicates direction relative to the speaker. These indexical morphemes are just the verbs for *come* and *go*.

So what can we say about the contribution of directional elements to the internal structure of the event? They seem to add information about the trajectory of an event that has an inherent direction. That is, they can specify the direction of an event, provided that that event already has an implicit direction. This kind of information is not like that we have seen for other phrases; it does not provide an endpoint, and so does not make the event telic, and it does not an area in space or time which is “co-extensive” with the event. However, if we think of an event as being associated with a scale, a direction phrase does indicate the direction that the event is “going” on the scale. In the case of linear motion, the scale is that of progress along a path in space. Even though the direction is not aspectual in a temporal sense, it fits in under our abstracted view of aspect.

Note that in the case of a stative orientation verb, the direction seems to be predicated of the “theme” which must itself have inherent directionality – i.e., it must be long and
thin, or at least longer than it is wide. Thus, this may be a case where a directional element is in fact predicated of an NP argument of the verb, rather than of an implicit directional parameter of the verb.

There is, however, an aspectual use of many of these phrases and particles, as we have discussed above. Directional particles, in particular, are used with many non-motion verbs to convey some sort of aspectual notion, as illustrated here:

(238)

a. Eat up your food.
b. We worked away at the problem.
c. We worked towards resolution of the problem.
d. The car slowed down.
e. Calm down.
f. Chill out. (= e)

This use of directional particles is somewhat idiomatic, and the possible combinations must be listed in the lexicon. However, as example (f) (a fairly recent coinage) indicates, the process of forming these uses is still productive in the language. Moreover, the same types of particles have this sort of use in Chinese\textsuperscript{25}:

(239)

\begin{tabular}{l}
\texttt{kan xia qu} \\
read down go \\
"continue reading"
\end{tabular}

When used in this way, directional particles seem to modify the temporal scale of the event, and so are aspectual in the strict sense. If there is no literal, spatial scale available for the directional particle to modify, it seems to to find some other parameter to modify in order to be interpreted; though since the interpretations can be idiomatic, this extension of meaning cannot be a totally regular linguistic process.

\textsuperscript{25}Also cf. Kipka (1990) for examples in Slavic. Kipka argues that the basic meaning of prepositions is aspectual, rather than spatial.
Path phrases also have a semantic contribution that has to do with the notion of “trajectory”. The difference between path and direction phrases seems to lie in the fact that path phrases (such as along the river) refer to and object or spatial area which defines the trajectory, while direction phrases do not have any associated area. (Note that towards-phrases, even though they require a location, do not take that location as defining the path). Thus, we can distinguish the two types of phrases. We will treat path phrases as indicating trajectory + “co-extension” of the event (discussed in the previous section).

Combinations of Direction, Path and Goal

Prepositions such as across, through, and around seem to combine path, direction, and sometimes goal. In the most salient interpretation of the following sentences, the PP provides a goal, and the sentences are telic, as indicated by the possible addition of the in an hour phrase:

(240)

John walked across town (in an hour)
through the tunnel (in an hour)
around the park (in an hour)

However, an atelic reading is also possible:

(241)

John walked across town for three hours (without getting to the other side).

Is this ambiguity structural, or is it an ambiguity in the prepositions? First, note that on both readings, the PPs are internal – they do not frame the event. Thus, the

\[26\text{Note that this kind of ambiguity also exists with verbs like traverse; although a verb like cross seems to have to be telic.}
\[27\text{Although there is another reading of around which allows a frame interpretation, as in Victoria walked around (in) the garden.}

151
ambiguity does not arise from different attachment sites for the PP. Yet, we can capture the ambiguity in a way that it is not stipulated to arise from inherent ambiguity in the preposition. Recall that we have said (or will say, in the section on composition of V + Goal) that goal phrases are predicated of the theme argument. Directions, on the other hand, are not predicated of any NP argument, but are predicated of a directional component inherent in the verb. The possibility is open that a particular PP might be predicated of either a real argument or an attribute of the V; we propose that both options are available in the cases above. That is, in the telic reading of a PP like across the river, the PP is predicated of the theme; in the atelic reading, it is predicated of the directional component of the V, and thus the two readings arise. Note that in both cases, the presence of the PP within the VP is licensed by the AIH.

5.2.5 Sources

The class of phrases called Sources all have in common that they indicate a location where an event begins, and then moves away from. Yet, there are sometimes differences in the ways in which they can be interpreted, and these differences affect the way that the PP is involved in the event.

Different kinds of Sources are illustrated here:

(242)

a. Veronica walked from the Gare du Nord.
b. Veronica walked away from the Gare du Nord.
c. Veronica left Boston.
d. Veronica left (Boston) from North Station.

In sentence (242a), the source phrase seems to give a true beginning point for the walking, while in (242b) it is directional – in fact, in this case, it is possible that Veronica was never really at the Gare du Nord. In (242c), the event of leaving itself is really instantaneous,

152
so that although the beginning of a trip is implied, the event actually indicated by the sentence can have no beginning or end. The “source” location in this case, however, is actually the internal argument of the event; it is the thing that is “left” (it is hard to say whether it is “affected” or not). In (242d), the from-phrase indicates the location of the instantaneous event of leaving; that is, it is not really a source at all, but a frame locative.

Thus, examples (242b)-(242d) above appear to be spurious instances of source phrases, or at least, it is not correct to say that they provide the initial point for an event. (242b) can be analysed as a direction phrase, (242c) as a direct object, and (242d) as a frame locative. (242a) remains as the only real case of a source phrase.

It is unclear whether even this case can be argued to be internal. VP-constituency tests with these are marginal:

(243) ?? John walked from the library and Mary did so from the auditorium.

Note that if a goal-phrase is present, the from phrase seems to become external:

(244) John walked to class from the library and Mary did so from the auditorium.

If there really are internal source phrases, we can say that they modify the source component of an event that has an implicit spatial beginning (such as a walking event); this is parallel to the account of directions.

---

28 That cases like these really involve external locatives is further supported by the fact that they behave like syntactic adjuncts in VP-constituency tests:
Veronica left Boston from South Station and Edwidge did so from North Station.
This kind of frame locative can occur with goals as well, as in:
John arrived in Germany in Frankfurt.
I don’t have an explanation for why from is used for frame locatives with leave; but note that *Veronica left Boston at South Station is impossible.
5.2.6 Internal and External Temporal Phrases

In previous chapters it has been proposed that temporals, as well as locatives, can be either internal or external to an event. The temporal phrases that we have proposed to be internal, durative, iterative and until-phrases, make a quite straightforward aspectual contribution to the event structure.

Duratives, as in work for 3 hours, indicate an internal property of the event: the length of time it lasts. They can occur with non-telic events, and do not change the aktionsart. Until-phrases provide a temporal endpoint for the event, and actually change the aktionsart, taking a non-telic event and making it telic. Iterative phrases change the aktionsart of an event by making it a series of subevents of the same type; it requires a telic event, and since the number of iterations is specified by the iterative, it yields a complex event which is also telic.

The clearest syntactic evidence that these are different from frame temporals, and are VP-internal, comes from Chinese. Examples of each are repeated here:

---

29 In 3 hours-type phrases are also durative, though they take telic events. In English, it seems plausible to treat them parallel to the for three hour phrases. It is interesting to note that Chinese has no direct correlate of this type of phrase (though it does for the for-duratives); the meaning can be captured in an adverbial with a structure like a before-phrase, meaning roughly within 3 hours:
San ge xiaoshi zhi nei, ....
3 MW hour ? inside
Within 3 hours,....

30 It is very much like a numeral, which requires a bounded object.
(245) a. Zhangsan kan dianshi kan san ge xiaoshi.
Z. watch TV watch 3 M hour
Z. watched TV for 3 hours.

c. Women tan dao san dianzhong.
we talk arrive 3 o’clock
We talked until 3 o’clock.

Recall that these phrases can not even occur in the same positions as Frame adverbials; Frame adverbials must be pre-verbal or sentence-initial, while these phrases can only appear postverbally. Moreover, this post-verbal position is restricted to elements that are part of the VP.

In English, the syntactic tests we saw in Chapter 2 actually suggest that these elements are external; for instance, VP-constituency tests seem to indicate this:

(246) Bill chopped onions for 3 hours and Bob did so for 4.
Bill chopped onions until the cows came home and Bob did so until the sheep came home.
Bill rang the bell 3 times and Bob did so 4 times.

However, there is also evidence, at least for iteratives, that there is an internal and an external position, with correspondingly different interpretation (though they are sometimes difficult to distinguish). Recall that it is possible to have two iteratives in the same clause31:

(247) 5 times, the light flashed 4 times.
The light flashed 4 times 5 times.

31 It is impossible to have this in Chinese – there may be only one iterative, and it must be post-verbal. It is possible to say something like on 5 different occasions, the light flashed 4 times, though, but only with a word corresponding to “occasion”.

155
In these cases, the external iterative is interpreted as on 5 separate occasions, indicating 5 separate events, so that the whole sentence might be interpreted as "there were 5 events of a light flashing 4 times." The fact that iteratives appear to be external in VP-constituency tests can then be explained by saying that it is this external, multiple-event iterative position that occurs with a do so construction (or other constituency test); we can still maintain the position that the internal iterative phrase is a complement of VP.

For- and until-phrases in English constitute a problem for our hypothesis, because they really appear to be syntactically external; at least, there is no argument available such as the one just given for iteratives. I have no good account for this at the moment. Note, though, that semantically durative phrases can appear in direct object position, and these must be internal:

(248) I worked 10 hours today.

Perhaps it is too strong to take the extended AIH to require that all elements which contribute aspeclual information must be internal. Instead, the requirement could be a conditional going the other way: if an element is internal, then it must contribute to the aspeclual structure of the event (in fact, this is the way I have formulated it as above – it is not a biconditional). Which elements can only be realized as internal may vary from language to language.

5.2.7 External Elements and the Framing Relation

Contrasting with all of these various sorts of elements that supply aspeclual information about an event are elements which are external to the event, and tell us nothing about its internal constitution. These elements may still provide information about the event,
however; they may indicate how it is related to its external context, i.e., how it is related to other events, and to space and time. We call these elements "Framing" elements; we have already seen many examples of Frame locatives and temporals.

We take Framing elements to be true predicates of events, following Davidson (1967)\textsuperscript{32}. Note that we have not treated any internal arguments or modifiers as predicates of events\textsuperscript{33}; this then is a crucial difference between internal and external elements.

The Framing relation has some special properties, which affect the interpretation of the combination of Frame element and event. From the point of view of the external, framing, context, the event is viewed as an unanalyzable whole; from this follows that when the event is predicated of by a a frame locative or temporal, i.e. when it is located in space and time, the event is not interpreted as filling the entire space or time, but only as being somewhere within that space or time frame. For example, consider the following:

\begin{enumerate}
\item[249] a. Jane knit a sweater in the cathedral.
\item[249] b. Tom saw the Pope today.
\end{enumerate}

In (a), the event of knitting the sweater does not occupy the entire cathedral, but could (and most likely does) occur in only one little corner of it. Similarly, (b) does not entail that Tom saw the Pope for the entire day; rather, it only requires that this state of affairs obtained somewhere within the event frame given. On the other hand, the framing relation does not entail that the event cannot occupy the entire spatial or temporal frame, or even extend beyond it; for instance, in (a), the state could well last the whole day,

\textsuperscript{32}I don’t know of this commits us to the presence of the event argument e in the argument structure of verbs. We could say that these things are predicated directly of the VP, or IP; but then we would not be able to explain why they are not the head of the clause.

\textsuperscript{33}Contra Parsons (forthcoming); we have comments on his framework in section 5.
and in (b), the event surely extends beyond the moment at which it is said to occur:

(250)
   a. Edwidge was sick last Tuesday.
   b. John saw the Pope at noon.

Since a Framing element has no access to the internal structure of the event, there is no information at all provided about the relative "size" of the event and the frame.

Since the entire event is located in space or time by the Framing element, it should follow that all subparts and participants of the event must be located at this space or time. This is true for many situations; consider:

(251)
   a. John threw the ball in the park.
   b. Edwidge ate her tuna sandwich on the bus.
   c. Bobby saw a Woolly Mammoth last Tuesday.

(251a) (on the frame reading of the PP) entails that both John and the ball were in the park, at least at the time of throwing. (251b) entails that both Edwidge and her tuna sandwich were on the bus; (251c) entails that both Bobby and a Woolly Mammoth existed last Tuesday (though not necessarily that the Woolly Mammoth was alive). However, Sondheimer (19??) points out that this kind of entailment depends on the lexical semantics of the verb, and there are some verbs for which it does not hold. Consider:

(252)
   a. Edwidge thought of John on the bus.
   b. Edwidge thought of a Woolly Mammoth last Tuesday.

(252a) does not entail that John was on the bus, nor does (252b) entail that a Woolly Mammoth existed (live or dead) last Tuesday. Sondheimer proposes that every verb is associated with a meaning postulate that explicitly tells whether or not each participant is located where the event is located. Though it is true that semantic information must be specified for each lexical item, and that the factivity for a complemntn clause (among many
other things) depends on the verb which selects it, we do not find this an explanatory
solution. Though we must leave open the question of how to represent this fact, it is to
be hoped that generalizations can be made across semantic classes of verbs as to this sort
of information. (Note that the LCS of *think* or any other propositional attitude verb is
not at all obvious, both in the way the relationship between the verbs and its arguments
should be characterized, and in what its aspectual structure looks like.)

Semantically external elements have a syntactically external correlate; they are syn-
tactic adjuncts, either of the VP or of some higher node. Thus, they are outside of the
constituent that has been proposed to be the domain of the internal structure of the
event, the lowest projection of the (main) VP of a clause. We concluded in chapter 2
that Frame temporals and locatives can be outside of this projection. Traditional VP-
constituency tests indicate that they are VP-adjuncts; it is possible that they might also
be generated in a position adjoined to a projection of I or C.

We will assume that adjuncts in general, and Framing elements in particular, are
subject to strict locality conditions; they must be adjoined to the VP (or IP) that they
are predicated of. We might also say that the Framing predication does not merely
arise from the adjunct predicate itself, but "comes along" with the structural relation of
adjunction to VP or IP.

In Chapter 2, we argued that Framing elements are not really iterable, but can only
iterate if they are nested (with a preferred order). This nesting (though not the ordering
constraint) follows from the fact that they are all frames of the same unique event which
can only have one location in time and space. The one-VP one-event requirement does
explain the fact noted by Fodor (19??) that there can only be one time specified per
verb, even if the verb is paraphrasable by a structure with two verbs, in which each can
be associated with a separate time:

(253)  
a. John killed Bill.  
b. John caused Bill to die.  
c. *On Monday, John killed Bill on Tuesday.  
d. On Monday, John caused Bill to die on Tuesday.

Note that the verbs in (b) and (d) do not form a complex; *cause* takes an IP (or CP) and not a VP, as evidenced by the infinitival morphology. Here, we must assume that an event cannot take place at two different times, or two different places, and this requirement is enforced by the grammar — i.e. (c) is grammatically ill-formed, and not just nonsensical.

There are other types of adjuncts which should probably considered to be framing elements. Among these are purpose clauses, *because*-clauses, and absolutive clauses, exemplified here:

(254)  
John killed Bill in order to please Mary.  
Edwidge ate her tuna sandwich because her mother said it was good for her.  
Bill took the poison without flinching.

We have said that an element is a frame if it relates the event of the VP to its external context, including other events. These types of phrases all seem to indicate an event's relation to another event, which is semantically (and syntactically) regarded as a separate event. Also, these types of phrases pattern syntactically with frame temporals in the tests we discussed in Chapter 2; we will not go through the evidence here, but the reader can verify this\(^{34}\).

There exists at least one class of external adjuncts which we will not take to be Frame adverbials, since they do not supply a frame for the event; these are subject-oriented depictive predicates, illustrated here:

\(^{34}\)Also see Andrews (1982), Reinhart (1983) for discussion of these.
(255)  
  a. John ate dinner nude.  
  b. Edwidge cut her tuna sandwich blindfolded.  
These seem to be predicated directly of the subject, and are certainly not predicates of the event. Ike-Uchi (1990) provides evidence that they are syntactically adjuncts to VP (IP?), and in any case outside of the VP. We will assume that like Framing elements, there is a syntactic locality requirement between depictives and the constituent they are predicated of; perhaps they must be outside of the VP in order to be "close enough" to the subject. However, we leave open the question of how to characterize them further, and what similarities there are between them and Framing elements.  
  Note that object-oriented depictives, also exist:  

(256)  
  Edwidge ate her tuna sandwich raw.  
Ike-Uchi argues that these are VP-internal. This is compatible with the hypothesis of strict locality for predicative relations, for they must be VP-internal to be close enough to the direct object; however, it is a potential problem for our hypothesis that all VP-internal elements must contribute to aspectual interpretation. However, if we take our hypothesis, the extended AIH, as a licensing condition, we can simply say that depictives are permitted by a different licensing condition. Different licensing conditions have different semantic requirements; that for depictives is just one of Predication (in the sense of Williams (1980)).  

35 Although they do seem to have to be co-temporaneous with the event.
5.3 The Composition of VPs and Events

We now turn to details of the composition of thematic/event structure, and the ways that internal locatives and temporals are part of this structure. From our extension of the AIH (the hypothesis that thematic elements are elements that contribute to event structure), it follows that the argument structure and aktionsart should be formed in parallel\textsuperscript{36}. Further, since we are trying to maintain a close syntax-semantics correspondence, it follows that the compositional structure of the syntax should mirror that of the semantics. In addition, we are taking the event, with all of its internal structure and participants, as a grammatically-relevant semantic entity, and it should thus have a counterpart in syntactic representation. We will assume that this counterpart is the D-structure projection of the main VP of a clause\textsuperscript{37}, including all of its arguments and complements (but not including VP-adjuncts, which will be external modifiers of the event).

We will maintain that not only arguments, but also other types of complements, may be licensed within the VP. Arguments are licensed by theta-marking, which we take to be the syntactic reflex of semantic selection (or requirement) by the verb. However, we will not assume that other VP complements are theta-marked, so we will need some other form of licensing to account for them. This licensing follows from the extended AIH: VP-complements are allowed if they contribute information about the internal structure of the event. Just as the notion of semantic selection implies that there are selectional restrictions between a head and its arguments, so there are selectional restrictions between

\textsuperscript{36}Note that decompositional theories like that of Dowty (1977) and Jackendoff do this implicitly (or maybe explicitly). Thus, the approach we take here has a long tradition, but will differ in certain specifics and in the correspondence assumed to syntax.

\textsuperscript{37}I say main VP of a clause, because we will allow a V to take subordinated VP-complements, which only correspond to part of the VP of a clause.
a head and its complements; we will refer to this as semantic compatibility between a head and complement. Licensing of complements will thus be further subject to the requirement of compatibility. Note also that, following from Tenny's original idea, licensing of arguments is also subject to the AIH; that is, arguments must contribute to the internal event structure. It is possible that they are subject to additional requirements also; such as whatever it is that often forces them to be realized in syntax.

There are many ways that an element may be internal. The most obvious way is for the element to be the main predicate of the clause; so verbs like run, build, see, and any other verbs, will contribute the core of the event in a clause:

(257)

Jane is running.
Edwidge built a sand-castle.
John saw the Woolly Mammoth.

The lexical semantics of a verb provides information about the both aktionsart and the participants involved in the event denoted. A verb like run is inherently a process, and it has at least a Theme (a moving, or changing, object), and implicit locative properties. Build also takes a theme (changing object); aspectually, it is notoriously mixed, as it may indicate a process or an "accomplishment" (a telic event composed of a process and a final change of state); the full aktionsart of a clause with build as the main predicate depends as well on properties of the direct object, which is optional, but implicit.

However, the main predicate of a clause does not in general suffice to determine the aktionsart of the clause or even the argument structure. Other constituents of the

---

38Any linguistic requirement of selectional restrictions and semantic compatibility raises the question of where the line should be drawn between grammatically-relevant and pragmatic (world knowledge, non-grammatically-relevant) semantic content. We take this to be an empirical question, but one which we will not be able to delve into here. But note that pragmatic information may help to determine which syntactic structure a V + PP combination may take on [Ex: read to the 3rd line, OK/* read to the store].
VP combine to determine the full event/argument structure. Subsidiary predicates may combine with the main predicate, and alter the aktionsart and argument structure in so doing; properties of the arguments themselves may influence the aktionsart, as in the case of build; or internal modifiers (if these are not predicates) may contribute to or alter the aktionsart. Prepositional phrases may fall under any of these types; we will explore each in turn.

5.3.1 Complex Predicates

Goal phrases with TO

A predicate which is not the main predicate of a clause may contribute to the internal structure of the event associated with the clause by combining with the main predicate, to form a "complex predicate". One typical example of a complex predicate, in English, is that formed when there is a resultative secondary predicate, as in:

(258) Gertrude hammered the metal flat.

This type of resultative is possible in Chinese as well:

(259) Ta za ping le yi kuai jinzi.  
      he hammer flat CM 1 piece gold
      He hammered a piece of gold flat.

In this type of combination, the argument structures of the main and secondary predicates combine; in the example above, the NP the metal is an argument of both hammer and flat. We will treat this combination of arguments as an instance of Higginbotham (1985)'s theta-identification\(^{39}\); thematic positions in the theta-structures of each predicate are

\(^{39}\)This is similar to an analysis by Y. Li (1987); see also Hoekstra and Mulder (1990). Also, analyses of light verbs (cf. Kearns etc.) require combining of argument structures.
identified, and one argument is able to saturate the identified positions without causing a violation of the theta-criterion:

(260)

\[
\begin{array}{c}
\text{VP} <1, 2*> \\
\text{V} <1, 2> \quad \text{NP} \\
\quad \quad \quad \quad \text{the metal} \\
\text{V} <1, 2> \quad \text{Adj} <1>
\end{array}
\]

If there is no theta-identification, this structure is ill-formed (or possibly interpreted as a depictive).

Goal phrases, as in walk to the store, are semantically resultative; the result of the process indicated by the main predicate, walk, is that the theme comes to have the property expressed by the locative, that is, being at the store. The argument structures of the predicates combine in the same way that that of the V-Adj complexes combine; note that the (abstract) preposition TO takes an internal argument; also, which we represent as already saturated:

(261)

\[
\begin{array}{c}
\text{VP} <1> \\
\text{V} <1> \\
\quad \text{walk} \\
\text{PP} <1, 2*> \quad \text{TO( the store)}
\end{array}
\]

This way of combining the predicates accounts for the fact that both the V and the PP – the resultant state – are predicated of the moving object. However, we would also like it to capture the resulting aktionsart. As with verb-adjective resultatives, the addition of the resultative PP alters the aktionsart, so that the event is telic: it culminates with the change of state of the theme to having the (bounded) property expressed by the PP.
We will take *walk* denote a process, aspectually, with no inherent endpoint, as it does when it is used alone. The resulting VP has the meaning “*x undergoes process (of walking) resulting in *x coming to be at the store*”. We will represent this as follows\(^{40}\) \(^{41}\):

\[(262)\]

\[
\text{(PROCESS(x)) RESULTS-IN (BECOME (x, STATE ))} \\
\text{walk} \\
\text{BE-AT (the store)}
\]

The question now is, what is the semantic contribution of *to*? It seems reasonable to suppose that it has at least the meaning of BE-AT, which means that it is a dyadic predicate (as we assumed for its argument structure above). Since *to* is not synonymous with *at*, we will assume that the inchoative part, *BECOME*, is also part of the semantic representation of *to*; note that this is even more plausible for the Chinese counterpart of *to*, *dao*, which can be used as the verb “arrive”\(^{42}\).

What about the causative part of the interpretation? Note that the causative interpretation also arises in V-Adj resultatives, like *hammer-flat*, which we will represent as:

\[(263)\]

\[
\text{(PROCESS(x,y)) RESULTS-IN (BECOME (STATE (y))))} \\
\text{hammer} \\
\text{flat}
\]

\(^{40}\)I chose to use RESULTS-IN here, following Talmy (1972), rather than CAUSE, but they are probably the same predicate. I do not claim that all, or any, of these abstract predicates are the right ones; however, the ones here are traditional (except for PROCESS) and are used here for concreteness.

\(^{41}\)The question of whether the argument of *walk* and many V's of manner of motion should be taken to be a theme or an agent, and thus whether it is projected as an internal or external argument (and so whether *walk* is an unergative or unaccusative verb) is difficult; the evidence is mixed.

\(^{42}\)To cannot be used as a verb, of course. This must be due to some parametric difference between English and Chinese. (But can it be used as a predicate?: *I was to the store, but OK I have been to the store.*
One possibility is to assume that process verbs like *walk* and *hammer* have a variant which includes the causative\(^{43}\) meaning. Another, more interesting, is to attribute this additional meaning to the structure itself; the combination of these two types of predicates introduces this part of the event structure. To do this, we might assume that a combination of PROCESS + STATE (or instantaneous change) predicates introduces an abstract causative predicate into the semantic representation. Or, we might derive this result indirectly. By the extended AIH, we know that two verbs in this type of combination must provide information about the same event. In the case of a Process + State, the two subevents cannot hold at the same time, because they are aspectually incompatible; so there must be a temporal ordering. This ordering follows the linear order of the predicates, so that the Process precedes the state, and this temporal order, along with the requirement that these two parts form the same event, forces a causative interpretation\(^{44}\).

A locational resultant state is not possible with all predicates; it is impossible with verbs that do not have an inherent spatial component\(^{45}\):

\[(264)\]

* sing to the store (with resultative reading) *

It is possible with certain verbs that are not strictly speaking motion verbs, but only when the semantic nature of the PP is of the same nature as the verb\(^{46}\):

---

\(^{43}\) What about the inchoative meaning here?

\(^{44}\) This is essentially what was suggested in Li (1987).

\(^{45}\) "Subway" reading exists: sing, read, anything else, becomes a motion V, if context already has implicit motion.

\(^{46}\) Read to the store is possible if a text is written along the road that the store is on; this is an example of the way that a change in context can allow a PP to be interpreted with a syntacto-semantic relation to the verb that is normally not allowed.
Thus, we are supposing that there may be selectional restrictions imposed on the combination of two predicates. This is where the requirement of semantic compatibility becomes important. A predicate which describes a process can combine with another predicate which supplies an endpoint for the process, but only if the two are semantically compatible; i.e., if the event supplied by the second predicate is of the right type to serve as an endpoint for the process supplied by the first. The process of walking may be delimited by the state of being at the store, because this state supplies a point on the line along which the walking motion is progressing. However, in the case of read, although this predicate involves some sort of linear motion (or motion in two directions - horizontal and vertical), the state of being at the store does not supply a point along this scale, though the state of being at the fifth line of a page does.

**PUT-class verbs**

Verbs like put take a complement that is semantically a goal phrase, in that it provides the location of the end of the event, and this final location is predicated of the theme argument:

(266)  
*Edwidge put the pencil in the vase.*  
*Edwidge lay the book on the table.*  
*Edwidge hung the picture on the wall.*

---

47This might be viewed as a “merely” pragmatic requirement, even after formalization; but see section on selectional restrictions.  
48Leaving aside for now the issue of what is actually located at the fifth line.  
49This all presupposes that the lexical entries of the predicates involved supply the needed information; that walk denotes a process of linear motion, that to decomposes properly (into something like BECOME-AT). See sections on lexicon, prepositional meaning.
However, these verbs are unlike walk, etc. in that they cannot take PPs with to\(^{50}\):

\[(267)\]

*Edwidge put the pencil to the vase.
*Edwidge lay the book to the table.
*Edwidge hung the picture to the wall.

At least some of these verbs require the locative, unlike walk-type verbs; with put and lay, the locative, or at least a directional particle, is obligatory\(^{51}\):

\[(268)\]

\[
\begin{array}{c}
\text{Edwidge put the book} \\
\text{on the table.}
\end{array}
\]

\[
\text{Edwidge hung the picture} \\
\text{down.}
\]

Other examples of this type of verb do not seem to require a locative:

\[(269)\]

John hung the picture.
John loaded the hay.

For now, we will assume that these are alternant forms of these verbs, possibly with implicit locative arguments (like that of eat) with rich enough semantics not to require a locative absolutely.

Note that these verbs have other alternants as well, which may require a locative, but are not semantically verbs of putting:

\(^{50}\)It is possible to say put your ear to the ground; but notice that this case is unusual, in that it is also possible to say his ear is to the ground, where the to-phrase is directly predicated of ear. Thus, this case is not a counterexample, but only an instance of an unusual use of to.

Also note that to can be used with put in the following: I put the question to John.

\(^{51}\)In Chinese, and Italian and French, the verb corresponding to put also requires a locative. However, there are differences in this requirement in elliptical constructions; in the context where a pot of water is boiling on the stove, one can say in Italian:

\begin{itemize}
  \item put the noodles
  \item without any locative. However, the corresponding English sentence is impossible – a directional particle is still required:
  \begin{itemize}
    \item Put the noodles.
    \item Put in the noodles.
  \end{itemize}
\end{itemize}

This suggests that it is the direction in English that is required, or perhaps both the direction and the location (in non-elliptical sentences), and that it is only the location that is required in Romance. I do not know how to express this difference at this point. cf. Klipple (in prep.)
(270)  
   a. The picture hung on the wall.
   b. John loaded the truck (with hay).

The alternate of hang in (a) is a stative verb, semantically like sit; (b) is an alternate common to the spray/load class; note that the locative here is the direct argument.

In addition, note that the location of put verbs is predicated directly of the theme:

(271)  
   John put the book on the table => the book is on the table

Since to phrases are not permitted, and since the requirement for the locative is much stronger, we will postulate that, unlike walk, put-verbs include the inchoative meaning as part of their lexical semantics. These verbs are then incompatible with to-PPs because to also provides an inchoative, and the combination would form:\(^{52}\):

(272)  
   BECOME (BECOME (STATE))

We take this to be semantically bizarre, if not ill-formed.

We propose, then, that the LCS of put is:

(273)  
   put: CAUSE (BECOME y, z)
   | state

This is unlike walk, which we take not to be inherently inchoative. Since BECOME is an abstract predicate which requires a state as one of its arguments, we can explain the strong requirement that there be a PP complement with this class of verbs. But this is still not enough to explain the obligatoriness of the locative with put; the problem is that it is not obligatory with load, etc.

\(^{52}\) [Problem: put onto, load onto, jump onto but: *lay onto, *hang onto]
Stative complex predicates

There are other V + locative PP combinations that are potentially complex predicates. The first of these that we will consider are the ones involving stative "verbs of posture" such as sit, stand and lie. We have seen above that in VPs such as sit on the chair, the locative behaves as if it is internal, and part of the thematic structure. Thus, we expect it to be semantically internal. Moreover, in Chinese, a language in which adverbials and PPs are more obviously restricted in their syntactic positions, these VPs pattern with VPs containing goal locatives. Movement to a Goal is expressed by (motion) V + Dao ("arrive") + NP, and maintaining a posture is expressed by (posture) V + Zai ("(be) at") + NP:

(274)

pao dao  gongyuan
run arrive park

zuo zai yizi shang
sit at chair on

Furthermore, both the V + Dao and V + Zai combinations behave like V-V compounds53, as evidenced by the placement of aspect. Thus, the evidence suggests that we treat these "posture" VPs in the same manner as VPs containing Goals; that is, as involving complex predicates formed of V + Preposition.

We will take the arguments of the two predicates to be identified by theta-identification, as before54:

53See Li's (1990).
54Hoekstra and Mulder (1989) treat these VPs as containing "copular verb," the verb sit in this case. Their analysis appears to capture many of the same properties as the one presented here.
Yet, these complexes differ semantically from the \( V + P \) combinations above. They are stative, and thus are in no way telic; and they are not inchoative, since they involve no change. They seem to involve two stative predicators; in \textit{John sat on the chair}, the state (or activity) of sitting and the state of being on the chair are predicated of John. There is no temporal precedence between the two predicators either, and no causal connection. Rather, the states are co-existent, in fact totally co-temporaneous. As we have argued above, they are also spatially coextensive.

For the process + resultant state combinations, we saw above that we can treat the causal relation between the two subevents as derivative from the extended AIH, with the further supposition that the subevents cannot be interpreted as co-temporaneous, because of their incompatibility. However, with two states, this interpretation becomes natural. We will then suppose that for the composition of two states in one event structure, the default interpretation is that of co-extension. The aspectual structure of \textit{sit on the chair} will be:

\[
\text{(276) } \quad \text{STATE COEXTENSIVE-WITH STATE} \\
\text{sit BE-AT(on (the chair))}
\]

Verbs like \textit{live}, \textit{reside} and the like take locative PPs which are similar to the "Posture" phrases. The verbs are plausibly understood as copular (although without the requirement of being the \textit{immediate} location of the theme), and the situation and the location have another sort of coextensive relationship. We will expect that these can be analysed
in a manner parallel to the Posture verbs.

### 5.3.2 Other VP-internal PPs

There are many other types of VP-internal PPs, locative and temporal, which are internal to the event. It is not clear, however, whether they should be thought of as predicative, as arguments, or perhaps as combining in some other way with the core of the event. Among these are path, direction and source phrases, and durative and iterative phrases. These, in general, are not semantically resultative, nor are they clearly attributive of the theme or some other argument. But they do serve to add structure to the event.

How can we capture the composition of V + Path, and V + Direction? First, note that in most cases, the path or direction is not predicated of any participant of the event, but is just an attribute of the event itself. A possible exception is verbs of orientation, where the internal argument does take on the attribute expressed by the path or direction PP:

\[(277)\]

\[
\text{Jane pointed the gun } \underset{\text{towards the tree.}}{\text{\text{\downarrow}}} \text{ up (in the air).}
\]

Thus, except in these cases, the addition of a path or direction complement does not combine with or alter the theta-structure of the VP.

For Paths, we argued that there is an aspectual relation of co-extension (in some parameter) between the event and the path. This suggests that we treat these cases as we did combinations of posture verbs and "posture" phrases, which we argued were also cases of co-extension:

\[(278)\]

\[
\text{PROCESS} \quad \text{CO-EXTENSIVE-WITH} \quad \text{Along(NP)}
\]

\[
\text{walk}
\]

173
For Directions (and maybe for Paths as well, if they include direction as part of their meaning), we said that the directional phrase or particle specifies the trajectory of an inherently directional event. This implies that the lexical semantics of the verb must provide the information that a directional component is available; the direction phrase is then predicated of (or modifies in some other way) this component. We can represent this by postulating a function $d$ (for direction); $d(e)$ is then the direction of event $e$. A particular direction phrase is then predicated of this entity (and not of the entire event). We must say that $d(e)$ is only defined for events with directional meaning (or else that it is interpreted non-spatially if the event does not involve spatial direction).

This approach implies that PPs like towards the library and even directional particles like away are predicates, with an external argument. However, this argument is not (in general) one of the objects participating in the event, it is the trajectory that comes with the lexical semantics of the main predicate. Saturation of this argument may seem bizarre, when contrasted to "normal" theta-marking, for the verb here supplies the argument of the PP predicate. One way to think of this parameter is as somewhat like the $e$-place of Higginbotham (1985), except that it refers to an attribute or parameter of the event and not to the entire event itself.

Although it is not clear how to represent the modification of the directional component of the verb by a directional PP or particle, other aspects of this analysis are straightforward. The presence of the PP within the VP is licensed by the AIH, since the PP contributes information about the internal structure of the event. The semantics resulting from the modification of the direction component is intuitively correct. Furthermore, the fact that the theta-structure of the PP is separate from that of the VP is captured.
This directional component serves a purpose similar to that of Jackendoff’s Path argument, which also occurs with verbs of motion and orientation. However, it differs in that it is not strictly speaking an argument, or at least not an argument on a par with other arguments of the verb. Moreover, it does not subsume all types of locative phrases; goals and “posture” phrases, in particular, receive a quite different treatment in the present system. This is in keeping with the fact that their semantic contribution is quite different, as is their syntactic behavior. (see section on Jackendoff’s theory below).

Duratives

The semantic contribution of a duration phrase can be captured in a similar manner to direction phrases. Again, there is no involvement in the theta-structure of the VP; again, the presence of the durative within the VP is licensed by the AIH. Also, parallel to what we have said about directions, we will take duratives to modify the duration of an event that has implicit duration. This is a much larger group of events, however, than those that are inherently directed. It includes all non-telic eventualities, i.e., processes and states.

Measures

Measure phrase, such as in run a mile, can also be treated as this sort of modifier. In this case, the verb must have an inherent parameter which can be measured. Many such parameters are imagineable; there must be further restrictions to make sure that the semantic type of the modifier is compatible with the semantic type of the predicate.
Iteratives

Iterative phrases make a semantic contribution to the event different from that of the phrases we have just discussed. That is, it does not seem right to say that a verb has an implicit iterative component in its lexical semantic representation; for this would mean that the verb should always be interpreted as repetitive. Instead, an iterative phrase such as 5 times, seems to be like a numeral that is a specifier of a VP, and not an NP. Moreover, the VP must be a "count" VP, and not a “mass” VP; that is, it must be telic. Thus, we will take iterative phrases to be semantically and syntactically like numerals.

Yet, we do still want to take iteratives to be internal elements, and not external. The semantic motivation for this is that a V + iterative combination like flash 4 times is not interpreted as four separate events, but of one complex event composed of 4 parts. Syntactically, as we have seen, there is also evidence that they are internal (though this is problematic in English). We will, then, take them to be licensed within the VP by the A1H, as are all other internal elements. How to represent the relation between the iterative and the event/VP will have to remain unresolved at this point.

---

55 Actually, perhaps we do want to say something like this for verbs like walk, or any process verbs. For, as noted by many authors, processes are really ongoing repetitions of some very short event (such as taking a step). However, these verbs do not take iterative complements; they are not of the right aspectual type.

56 Does this imply that they are determiners, or quantifiers, and that they are in the Spec of VP? The analysis of these things raise a lot of questions that are beyond the scope of the present study. There is a formal semantics literature on this topic. I don’t know of any syntactic proposals about iteratives.

There is one interesting point to note, though, about the syntax of iteratives in Chinese: the word ci, "time", is usually said to be a measure word, and not an N, so that a phrase like san ci “3 times” is not an NP but some sort of determiner (Chinese doesn’t have any determiners like English articles, so it is difficult to say what this is). This contrasts with durative phrases like san ge ziaoshi (lit. 3 MW hour), which are NPs.
5.3.3 Summary

In this section, we have tried to develop a system where argument structure and aspectual structure are composed at same time. This system accounts for the intuition that there is predication of the theme by some internal locatives, and captures there are a variety of ways to be internal to event structure; that is, it does not say all internal elements function the same way, but provides principle for licensing all sorts of VP-internal complements. The requirement that all VP modifiers are part of the "Same event" derived from our extension of the AIH.

It creates a hierarchical aspectual structure, similar to that Pustejovsky, in which aktionsart is determined compositionally. "Aspectual class" (a la Vendler) is understood as a property of the VP and not the V.

Most of the PPs we have discussed are not real "arguments", but are complements of VP. Yet, there are selectional restrictions nonetheless, because of the requirement of compatibility put on the extended AIH.

5.4 Other approaches

In this section we contrast our treatment of the varieties locative and temporal phrases with two different approaches which have implications for these phrases. We first consider the Gruber/Jackendoff approach, and then turn to an implementation of the framework of Davidson (1967) by Parsons (1990).
5.4.1 Jackendoff

Jackendoff (1983) proposes a system in which the various types of locative PPs are interpreted as part of a "Path" or "Place" component. He says that locative PPs “can function referentially, being used to pick out places and paths in the projected world” (1983, p. 161). These places and paths then may occur as arguments in lexical semantic representations. As noted before, he analyses prepositions as providing a "Place-function" and/or a "Path-function" to the semantic representation; we are adopting a very similar view. He gives the following expansion rules for Places and Paths; this is intended to express the possibilities for the “functional composition of a conceptual structure”:

(279)

\[ [\text{place } x ] \rightarrow [\text{place PLACE-FUNCTION ( [thing y])}] \]

\[ [\text{path } x ] \rightarrow [\text{path PATH-FUNCTION ( [thing y] )} ]
\]
\[ \quad ( [\text{place } y ] ) \]

Recall that Place-functions are elements such as on, under, etc. We have called them “spatial relations”, and in Chinese they are called “locative particles” by Li and Thompson. Path functions are expressed by prepositions such as to, towards, from; we have called these “predicative” (directional) relations, and they correspond to “coverbs” in Li and Thompson.

Jackendoff also takes the semantic representation of verbs of location and motion to always be one of the following types (notated again in terms of expansion rules):

(280)

\[ [\text{EVENT}] \rightarrow [\text{event GO ( [thing x], [path y]) } ] \]
\[ [\text{event STAY ( [thing x], [place y]) } ] \]
\[ [\text{STATE}] \rightarrow [\text{event BE ( [thing x], [place y]) } ] \]
\[ [\text{event ORIENT ( [thing x], [path y]) } ] \]
\[ [\text{event GOext ( [thing x], [path y]) } ] \]

178
That is, these verbs denote either states or events; and there are various types of conceptual relations that they may serve — GO, which is essentially denotes change (sudden or gradual) in an object x, etc. These abstract predicates take as arguments a theme, and also either a path or place, depending on the relation. The semantic interpretation of the VP then follows from substitution of arguments into the variable places in the semantic representation of the verbs.

There are several assumptions implicit in these lexical semantic representations of Jackendoff's with which the account we gave in the preceding sections disagrees. First, Jackendoff treats goal, source, direction and path phrases all on a par: they are instances of a "path" entity. We have given different treatments for these kinds of phrases. Different treatments are motivated by the different kind of semantic contribution each makes. For instance, goals are semantically resultative, alter the aktionsart of the event by making it telic, and are predicated directly of the theme of the event. Directions, on the other hand, have none of these properties. Further motivation comes from the different syntactic properties of these types of elements, which are especially apparent when we consider a language like Chinese.

Second, whereas Jackendoff treats these PPs as arguments, the present analysis treats them as predicates which combine with a main verb, in one of several ways. Thus, with a verb like walk, the PP is not an argument, is not selected by the verb (although it is compatible with it), and it adds to both the theta-structure and the event structure of the VP. Note that with a verb like put, on our analysis, the PP (denoting a state) is in some sense an argument of the inchoative predicate (BECOME) that is part of the verb's lexical meaning — that is, BECOME selects a state as one of its arguments. The difference in lexical representation between put and walk thus goes at least part way in
explaining why a locative PP is obligatory with put, but not with walk.\textsuperscript{57} Sources are also not arguments, except when they are expressed as the direct object, and neither are paths and directions.

Third, Jackendoff’s proposal has no direct way to account for selectional restrictions between location and motion verbs and various types of Participant locatives. Recall that whereas walk and run can take almost any kind of locative, put can only take a goal. The present analysis captures selectional restrictions by the notion of semantic compatibility, by a requirement that the aktionsart of the combined elements must yield a possible aktionsart – so that, for instance, a stative verb can’t take a goal; and by the requirement that elements with a directional component modify only verbs that are semantically directional.

Fourth, the type of lexical semantic representation that Jackendoff gives for a verb does not indicate whether or not an argument will be syntactically realized. To get the right results for obligatory and optional elements Jackendoff (in recent papers) uses syntactic subcategorization frames, and coindexes elements in the subcategorization frame with arguments in the LCS. While we agree that obligatoriness is not THE criterion for argumenthood, Jackendoff’s approach seems to be excluding the possibility of a more principled account, both of obligatoriness, and of the mapping between LCS and D-structure.

Since most locative and temporal phrases are not arguments of any kind in the present system, we can account for the fact that they are in general optional. (An exception is verbs like put; however, in this case, the locational state may actually be an argument of the inchoative predicate present in the LCS of the verb). They are not present because

\textsuperscript{57}Although other verbs of putting don’t require a locative, so there is more to say here.
of semantic selection, but are allowed by the AIH, and subject to the looser requirement of semantic compatibility. While we still have no account of the optionality of direct objects with verbs like eat, we do provide a more principled account of locatives.

There are a couple of other comments to make about Jackendoff’s system. It is not clear if the internal/external distinction is represented in the system (whether framing elements are possible); if it is not, then we take this to be a deficiency. Also, Jackendoff accounts for “extended” uses of motion predicates with his GOext predicate; these are uses such as the following

(281)
This telephone wire goes into the next room.

If his semantic system is proposed to be universal, then we would expect this kind of extension to be attested in all languages. However, according to Lisa Cheng (p.c.), there is no direct way to translate the above sentence into Chinese. This poses a problem not so much for the specific system Jackendoff proposed for English, but for the larger cross-linguistic investigation of what may be represented in LCS, and what sorts of verbal alternations may occur. This, of course, is an area which needs much more investigation.\footnote{Talmy (1985) has a cross-linguistic study of some alternations involving conflations of verb + locative and verb + manner; but work of this type is rare.}

In summary, on a number of counts, the present analysis gives a more principled account of the facts concerning locatives, and one that is more consistent with their semantic and syntactic diversity.

\textbf{5.4.2 Davidsonian Approaches}

Many of the points that we have argued for in this study have parallels in the framework of Davidson (1967) and theories that stem from this tradition (including Parsons (1990),
Higginbotham (1986), Sondheimer (1977)). The notion of event is taken as central to
the semantics of a sentence, and the idea that argument structure and event structure
are closely related is captured, at least in some versions of the approach. Locative and
temporal phrases, as well as other similar PPs which fall on the oblique argument /
adverbial border, are given a treatment which makes explicit their relation to the event:
they are predicated of it. The obligatoriness or optionality of an element is not the factor
which determines whether or not it is considered to contribute to the representation of
the event. However, Davidsonian theories (usually) fail to make the distinction between
the internal structure of an event and its external structure, which we have argued to
be so crucial to the thematic/cognitive relation of an element to the representation of
the event, and to its expression in syntax. In this section, we will clarify our points of
departure from the Davidsonian tradition, and the modifications we feel to be needed.

Davidson observed that a sentence containing adverbial phrases, such as (282a), has
certain entailments that cannot be explained under ordinary predicate logic, if the ad-
verbials are taken to be arguments, as might be represented in (282b).

(282)
a. Jones buttered the bread with a knife in the bathroom at midnight.
b. butter(Jones, bread, with-a-knife, in-the-bathroom, at-midnight)
c. at-midnight(in-the-bathroom (with-a-knife (butter (Jones, bread)))))

For instance, the straightforward entailment of (282a) that Jones buttered the bread
cannot be captured, for the predicate butter which takes five arguments cannot be the
same as a predicate butter which takes only two. Nor can these entailments be captured
if each modifier is predicated of successively larger units, as represented informally in
(282c). To solve this deficiency, Davidson proposed that predicates have a position in
their argument structure/list for an event, and that all adverbial modifiers are predicated
of this event. That is, a sentence like (282a) should have a logical form something like:

(283)

\[ Ee[buttering(Jones, bread, e) \& with(knife, e) \& in(bathroom, e) \& at(midnight, e)] \]

This may be read as “there was a buttering of the bread by Jones, and it was with a knife, and it was in the bathroom, and it was at midnight.”

Many linguists have pursued this line of reasoning in recent years, and various versions of Davidsonian theories have emerged. Within these versions there are several ways that a sentence like John walked to the store might be spelled out in a Davidsonian-type theory:

(284)

a. \[ Ee[walk(J, TO(store), e) \& IN(Cambridge, e)] \]

b. \[ Ee[walk(J, e) \& TO(store, e) \& IN(Cambridge, e)] \]

c. \[ Ee[walk(e) \& AGENT(J, e) \& TO(store, e) \& IN(Cambridge, e)] \]

In (284a), the arguments of the verb walk are represented in the argument structure of the corresponding function walk', and the PP in Cambridge is represented as a predicate IN taking two arguments, the argument of the preposition and the event argument e. In (284b), the goal argument is treated in the same way as the frame PP, and is thus not an argument of the verb. In (284c), the type of logical form proposed by Parsons (1990), even the arguments such as the agent are represented as separate conjuncts, with an abstract predicate indicating the thematic role predicated of the NP John and the e variable, thus linking the verb and its “argument”.

Consider how the locative to the store is represented in each case. In the logical form in (284a), traditional arguments are included in the argument structure of the predicate, and the participant locative is included as one of these. The drawback of this representation is that it allows no way for this locative to be optional, for, under a
Fregean approach to functions and arguments, it is assumed that a predicate has a rigid argument structure\textsuperscript{59}.

In the representation in (284c), the verb has only the argument $e$, and all traditional arguments of the verb are treated as modifiers. In the intermediate representation (284b) also, the participant locative is treated as a modifier, though the agent is not. Under both of these representations, there is no obvious way to distinguish Participant locatives from Frame locatives, for the two phrases are treated in an exactly parallel manner. The difference between these phrases, in this representation, would have to boil down to the difference between the predicates $IN$ and $TO$; a Frame/Participant distinction might be able to be maintained in this way, but the effect would be to place the distinction in the lexicon, and not in a syntactic difference between arguments and non-arguments.

Moreover, in none of these representations is there a way to capture the fact that Participant locatives provide information about only part of the event, and do not locate the entire event in space. In (284 b and c), this is true since the Participant locative is predicated directly of the entire event. In (284a), this is true because the function and its arguments form an unanalysed unit, with no internal relations represented\textsuperscript{60}.

A version of the Davidsonian approach that takes aktionsart into account has been proposed by Parsons (1990). Parsons takes essentially the approach exemplified in (284c), where bothe arguments and VP modifiers are represented as conjuncts; he adds to the the predicates $Cul$, or $Hold$, indicating that the event culminates at a point $t$, or holds over and interval $I$, respectively. Which predicate is present depends partly on the verb,

\textsuperscript{59}In fact, the problem of multiple polyadicity is a strong challenge to a Fregean approach to natural language predicates.

\textsuperscript{60}Parsons in fact suggests that the Davidsonian representation is a spellout of the function-argument complex. But does he deal with optionality or with subparts?

184
and partly on other factors. Theta-roles, including Goal and Source, are indicated by abstract predicates like AGENT, THEME, GOAL, etc.; thus theta-roles are taken as primitives, at least at this level of representation.

As the reader may expect, given the framework assumed at the beginning of this thesis, we disagree with Parsons on many points. First, we do not take theta-roles as primitive predicates, but take as basic the semantic relations that are provided by the verb and other subsidiary predicates. That is, we prefer a decompositional approach like that of Gruber (1965), Jackendoff (all), or Dowty (1979), in which arguments and the hierarchical relationships between them arise naturally in the combination of basic predicates. In such structures, hierarchical relations between predicates are also represented Parsons actually does represent such relations for the case of causative/inchoative verbs; however, he does not make this the general case, and does not represent PPs as predicational.

Second, taking theta-roles and event-internal modifiers (in our terminology) as predicates of the entire event, represented by the event variable e, is intuitively bizarre. Consider possible representations of some notions in the Parsons framework:

\[(285)\]

walk to the store: E[e walk(e) & T0(e, the store)]

flash 3 times: E[e flash(e)]

In (285a), what can it mean that an entire event is “to the store”? Perhaps the path of the event is “to the store”, but this is not represented here. In (285b), what is the right

\[\text{61}\]

Of course, the following criticisms can be made of many Davidsonian theories, and others besides. We choose Parsons as a well-articulated version of approach, that asks many of the questions we do and thus is easier to compare with.

\[\text{62}\]

A drawback to these representations, and those of Pustejovský (1989), which are largely based on Dowty, is that it is not clear how they are composed. I looked at this question in the last section, and gave a few proposals for specific cases.
way to involve the numeral 3 in the logical form? The representation given here says that there were three events, but this is not the interpretation we intend (though it is one of the possible interpretations). What is needed is to say that there is one event of three flashings. This requires making reference to subevents of e, which Parsons does not do.

Third, there is no direct correlation postulated between the semantic representation and the syntactic form. This is particularly evident in the way that the presence of the predicates Cul and Hold is determined; they do not correspond to any constituent, but are determined from other factors. We have argued that it is at least methodologically more interesting to try to keep a correlation with the syntax, in order to test the relations as far as possible. Moreover, the way that direct objects may influence the aktionsart is not determined in any direct way.

Yet, though some versions of the Davidsonian approach (notably Sondheimer) fail to capture the internal/external distinction, Parsons' theory can represent it. In chapter 11, Parsons discusses temporal (and spatial) adverbials, and proposes that there are three types: Frame, time-limiting, and temporal event modifiers. Examples of each are:

(286)

a. During the war, Agatha ran every day in the afternoon.
b. Yesterday at noon, Brutus stabbed Caesar.
c. Did you ever run at noon?

This schema includes our Frame adverbials and internal spatial and temporal modifiers, and an intermediate class. Though, as just discussed, we do not believe it is correct to take internal modifiers as predicates of the whole event, perhaps we ought to allow more ways for temporal and spatial adverbials to be related externally to the event. Moreover, we have seen syntactic evidence in Chapter 4 that there is more than on VP-external

---

\footnote{This, especially, is a criticism of many formal semantic frameworks, and is not a problem particular to Parsons.}

186
level of attachment of these types of adverbials.

Parsons' understanding of Frame adverbials is very similar to ours: they set the event in a spatio-temporal context. Time (or space)-constraining adverbials work similarly to tenses; they add constraints to the time period associated with a sentence. Having two levels of "external" adverbials, in our terminology, allows us a way to recognize the syntactic differences among external modifiers that we saw in chapter 4, while maintaining that there is a syntax-semantics parallel. We might postulate that real Frame adverbials are the ones that do not have to "reconstruct" (IP adjuncts?); time (and space) limiting adverbials, however, must reconstruct, even though they are not thematically related to the verb. This would require that simple "Frame" (external) locatives must be difficult to construe as Frame adverbials in Parson's sense; while temporal adverbials, especially clausal ones, are typically Frame adverbials. This seems plausible, though it needs further exploration.

Temporal modifiers of events, which would correspond to our internal modifiers, he identifies more by "instinct" than by anything else; but I share his instinct that in examples like (286c), these phrases are somehow more central to the event. At this point, there is no clear way to incorporate this type of modifier under the AIH, but perhaps there is a way to say they are part of a broader view of event structure.

---

64 Parsons associates every sentence with a quantifier that contribute a period of time to the semantic representation.
65 However, the difference between Frame and time-limiting adverbials in Parsons' sense is not the same as our distinction between frame adverbials and adverbials which restrict quantification over cases, discussed in chapter 4.


Brody and Manzini () “On Implicit Arguments”, ms.

Carrier and Randall (1989) “From Conceptual Structure to Syntax: Projecting from Resolutes,”


Haik, Isabelle () “Bound VPs that need to be”
Hale, K. (19??)“Notes on World View and Semantic Categories: Some Warlpiri Examples.”
Hale, K. and J. Keyser (1987) “A View from the Middle”, ms., MIT.
Ike-Uchi, Yuki (1990) “Secondary Predicates in English”, ms., MIT.

190
Jackendoff, R. (1990) "Parts and Boundaries", ms. Brandeis University
Kimenyi, A. () A relational grammar of Kinyarwanda
Kipple, Peter (1990) Slavic Aspect and its Implications, PhD. diss., MIT.
Krifka, Manfred (1989) "Four Thousand Ships Passed Through the Lock: Object-Induced Measure Functions on Events", Linguistics and Philosophy.
Lakoff, G. and J. Ross () "Why you can't do so into the sink",
*Linguistic Inquiry* 15.2, 235-89.

Lasnik, Howard and Tim Stowell () “Weakest Crossover”


Manzini, (1986) “Phrase Structure, Extraction and Binding”


Perlmutter, David and Paul Postal () *The 1AEX*

Pinker, S. (1990)


193


Talmy, Leonard (197) “Semantics and Syntax of Motion”, Syntax and Semantics 4

Talmy, Leonard (1978) “Figure and Ground in Complex Sentences” Greenberg, Universals of Human Language.


Tenny, Carol (1990) “Event-argument Structure and Aspectual Roles”, ms. MIT.


Van Riemsdijk and Williams () “NP Structure”, Linguistic Review, 1.


Wyner, Adam (1989) "Adverbs and Argument Structure", paper presented at LCJL.