The Argument/Adjunct Distinction and the Structure of Prepositional Phrases

by

Andrew Ryan McInnerney

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Doctoral Committee:

Professor Acrisio Pires, Chair
Professor Ezra Keshet
Dr. Lisa Levinson
Professor Richard L. Lewis
Professor T. Daniel Seely, Eastern Michigan University

Andrew Ryan McInnerney

amcin@umich.edu

ORCID iD: 0000-0003-3602-1551

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ABSTRACT

This dissertation examines the traditional evidence for the Argument/Adjunct Distinction (A/AD). I begin by drawing a distinction between the *semantic* sense of the A/AD and the *syntactic* sense of the A/AD. The semantic A/AD concerns lexical encoding of thematic information; arguments are taken to be semantically encoded in the lexical representation of predicates, while adjuncts are not. I argue instead that lexical encoding of thematic information is a property in its own right; the standard evidence does motivate an understanding of the A/AD in these terms. The syntactic A/AD has to do with the external syntax of constituents. I consider nine canonical syntactic diagnostics for argumenthood (e.g. omissibility, VP-anaphora, islandhood, etc.), using prepositional phrases in the verbal domain in English as a test case, and I find that these diagnostics do not provide adequate evidence for the syntactic A/AD. Instead, the properties identified by the canonical argumenthood diagnostics are independent of one another; they should not be taken to as properties of a single larger distinction.

After carefully examining the evidence for the A/AD, I consider certain consequences of eliminating the distinction. I focus specifically on consequences for the syntax of prepositional phrases, including (i) the configuration of PPs in the verbal domain, (ii) licensing of pronouns within PPs, and (iii) pseudopassives (p-passives). The A/AD has been argued to play an important role in each of these domains, and so if the distinction is to be eliminated, it is important to explore how analyses in these domains are affected. On the structure of VP-internal PPs, I pursue the hypothesis that PPs could be attached as sisters to functional heads in the verbal domain, potentially forming multiple *n*-ary-branching layers. On pronoun-licensing in PP, I defend the hypothesis that PP is split into two layers, and I argue that the lower of the two layers is a phase; assuming that Condition B is sensitive to phase domains, this enables an account of a range of relevant data. Finally, on p-passives, I consider the conditions under which p-passivization is blocked, arguing that argumenthood is not a relevant factor.

CHAPTER 1

Introduction

1. Introduction

Every language-using human being possesses an intricate system of knowledge enabling them to encode their thoughts into external signals, decipherable in real-time by others with approximately the same knowledge. This dissertation is about that cognitive system; it is meant to bear on the question "What do you know when you know a language?" My focus here is more specifically on the *syntactic* component of that question, on the system of principles and operations that underlie human beings' knowledge of *syntax*.

I understand "syntax" in the context of natural language to refer, in one sense, to the cognitive system which maps between (while remaining autonomous from) linguistic form and linguistic meaning, or to a scientific theory of that system; and, in another sense, to the set of empirical phenomena described by such theories. Understood in this way, "syntax" is a massive topic. I cannot hope to even *approach* a complete answer to the question of the first paragraph here. Instead, I focus on just one potential component of the answer: the Argument/Adjunct Distinction (A/AD).

Roughly speaking, the A/AD refers to the idea that the dependents of a given head H can be partitioned into two classes.[1] One class consists of "core" elements, the *arguments* of H, and the other class consists of "peripheral" elements, the *adjuncts* of H.[2] This idea has traditionally served as part of the answer to the question at hand; it is often assumed that the A/AD is a component of human syntactic knowledge. My objective in this dissertation is to carefully and

[1] A *head* is, roughly, a word. Heads often have *dependents* (traditionally called "arguments" or "adjuncts"), i.e. phrases that depend in some way (e.g. semantically) on the head.
[2] I leave the meanings of "core" and "peripheral" intentionally vague at this stage.

critically examine the evidence for this claim, and to explore the consequences of rejecting it if it turns out the evidence is lacking.

In pursuit of these goals, I first identify two distinct (albeit potentially related) characterizations of the A/AD from prior literature, which I refer to as the *semantic* A/AD and the *syntactic* A/AD, and I engage with the argumentation in favor of each. This first part of the dissertation is comprised by chapters 2 and 3. I then turn to several different syntactic phenomena in whose analysis the A/AD has traditionally had some role to play, including (i) the configuration of PP dependents in the VP, (ii) Condition B effects within PPs, and (iii) the prepositional passive. In each area, I consider how an alternative, A/AD-free understanding could be developed. This second part of the dissertation is comprised by chapters 4-6. Chapter 7 concludes with general discussion of the A/AD given the arguments of the previous chapters.

In summary, I build a case that the A/AD is not part of human linguistic knowledge, and that discarding it opens the way for a range of productive reanalyses of syntactic phenomena, ultimately bringing us closer to an account of human knowledge of language.

The rest of this introduction provides further background and lays out the structure of the remaining chapters. Section 2 provides relevant background on the A/AD, drawing a distinction between what I call the *conventional A/AD*, which concerns the actual members of the categories *argument* and *adjunct* as typically presupposed in textbooks and research literature, and different theories' technical *implementations* of the A/AD (i.e. as either a syntactic or a semantic property). Section 3 introduces some assumptions of the theoretical orientation I adopt here. Section 4 then restates the goals of the dissertation in this context. Finally, section 5 offers an overview of the remaining chapters' content and structure.

2. The Argument/Adjunct Distinction

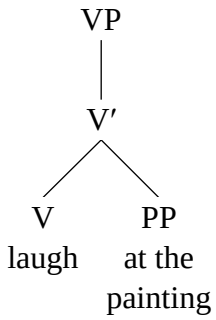
Theories of syntax can vary widely in their treatment of diverse phenomena. The theoretical apparatus involved in the description of even a simple transitive clause differs radically between major theories, like Minimalism (Chomsky 1995 et seq.), Head-driven Phrase Structure Grammar (Pollard & Sag 1994), Lexical Functional Grammar (Kaplan & Bresnan 1995), Categorial Grammar (Steedman 2000; Kubota & Levine 2020), and Construction Grammar (Goldberg 1995; Culicover & Jackendoff 2005). For even marginally more complex phenomena involving, e.g.

long-distance dependencies, binding, ellipsis, etc., the differences between frameworks only become more extreme.

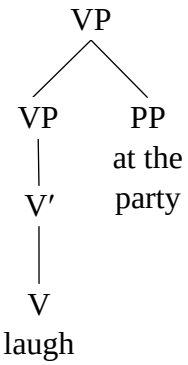
Different theories disagree on many things. Nevertheless, one domain in which approaches to syntax converge is in the distinction between arguments and adjuncts. Virtually all major theories assume this dichotomy in some form. Perhaps the best-known implementation comes from X-bar Theory, as in Government & Binding Theory (and earlier iterations). Example (1) illustrates the distinction between PP arguments and PP adjuncts: the former are attached in *complement* position (sister to X^0, daughter to X′), while the latter are *adjoined* to XP (sister to XP, daughter to XP). See Haegeman 1994, p104-105.

(1) The A/AD in X-bar Theory:

a. *Argument*:



b. *Adjunct*:



The successor to GB Theory, Minimalism, has different ways of implementing the distinction. Chomsky's (2004) proposal is Pair Merge, a special operation responsible for introducing adjuncts; arguments are instead introduced by the ordinary Merge operation (Set Merge).

(2) The A/AD in one version of Minimalism (Chomsky 2004):

a. *Argument*:
(Set-)Merge(*laugh*, *at-the-painting*) → {*laugh*, *at-the-painting*}

b. *Adjunct*:
Pair-Merge(*laugh*, *at-the-party*) → ⟨*laugh*, *at-the-party*⟩

The A/AD is not limited to theories of Mainstream Generative Grammar. Categorial Grammar also has an implementation for the distinction. In Kubota & Levine's (2020) Hybrid Type-Logical Categorial Grammar (HTLCG), for instance, argument PPs are taken as arguments of their associated VP (or NP, AP, etc.), while adjunct PPs are functors which themselves apply to their VP (or NP, AP, etc.). This is implemented by giving argument PPs a simplex category 'PP,' while adjunct PPs have a complex category 'VP\VP.' The difference is illustrated in (3).[3]

(3) The A/AD in Categorial Grammar

a. *Argument*:

look;	*at*◦*the*◦*painting*;
λ*x*λ*y*. **look**(*x*)(*y*)	**the painting**
VP/PP	PP
——————————————— /E	
look◦*at*◦*the*◦*painting*;	
λ*y*. **look**(**the-painting**)(*y*);	
VP	

b. *Adjunct*:

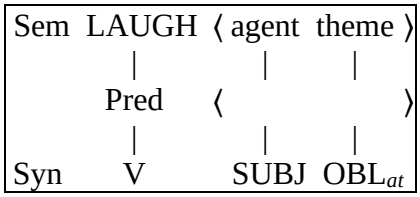
sing;	*at*◦*the*◦*party*;
λ*x*. **sing**(*x*)	λ$\mathcal{F}$λ*y*. **at-the-party**($\mathcal{F}$(*y*));
VP	VP\VP
——————————————— \E	
sing◦*at*◦*the*◦*party*;	
λ*y*. **at-the-party**(**sing**(*y*));	
VP	

Goldberg's (1995, 2006) Construction Grammar makes a distinction between arguments and adjuncts, too. An argument of a verb would be introduced as part of a predicative construction, while an adjunct to a verb would be introduced as part of a modification construction. For instance, the PP *at the painting*, if used as an argument of the verb *laugh*, would be part of a construction something along the lines of (4a). But the PP *at the party*, if used as an adjunct of the verb *sing*, would be part of a construction more like (4b).

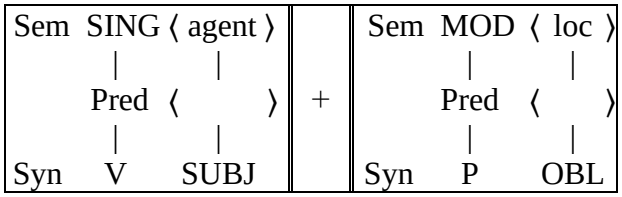
[3] 1In the notation of HTLCG, the category 'VP' is shorthand for 'NP\S.'

(4) The A/AD in Construction Grammar:

a. *Argument*:



b. *Adjunct*:



LFG and HPSG have their own mechanisms for the distinction.

Although the implementation of the A/AD is quite different in different theories, they all agree that there is a distinction to be captured. This means the term "argument/adjunct distinction" is unfortunately ambiguous. On one hand, it could refer to a particular implementation of the distinction. By "the A/AD," one might mean to refer to the distinct properties associated with complement vs. adjunct positions in Government & Binding Theory, or to the special properties of the Pair Merge operation in Minimalism, or to the difference in HTLCG between a prepositional phrase of category PP and one of category VP\VP.

In that respect, what's meant by "the A/AD" depends on the framework one adopts. On the other hand, "the A/AD" could refer to the shared conception, cutting across frameworks, that a distinction ought to be formally implemented in the first place. More specifically, what these different frameworks share is the idea that *specific kinds of constituents* count as adjuncts, and others as arguments, and that this has consequences for constituents' syntactic representation.

In this dissertation, I will refer to this shared conception of the A/AD as the *conventional A/AD*. I will treat the conventional A/AD as a pretheoretic classification of dependents defined by broad agreement among scholars with respect to which kinds of dependents count as arguments, and which count as adjuncts. Noun phrases, for instance, are almost always considered arguments,

while adverbs and adjectives are almost always considered adjuncts. Complete *that*-clauses are almost always considered arguments, while relative clauses are almost always considered adjuncts.

As I discuss in section 4 of this introduction, prepositional phrases play a crucial role in motivating the A/AD, because they straddle the argumenthood boundary. Some PPs are considered arguments, and some are considered adjuncts. By convention, the line between argument and adjunct PPs is determined by three factors. One factor involves omission. It is generally thought that syntactic non-omissibility is a characteristic feature of arguments, while adjuncts are always omissible. Hence, non-omissible PPs (e.g. *consist <u>of two things</u>*) are conventionally classed as arguments.[4]

A second factor is idiomaticity (or *L-selection*, to use a term of Pesetsky 1995). Many PPs, especially in English, form part of an idiom with their head. For instance, the preposition *on* in *depend on someone* is semantically vacuous; the sequence *depend on* forms an idiom with a non-compositional meaning. PPs with this property are conventionally classed as arguments.

The third factor has to do with the thematic classification of PPs: whether a PP is canonically considered an argument vs. an adjunct depends on the thematic role it contributes to the sentence. For instance, temporals and locatives are conventionally considered adjuncts, while goals and recipients are conventionally considered arguments. A partial list of dependent types organized by canonical argumenthood is given in (5). (Note that this list is not intended to be exhaustive.)

(5)

a. *canonical arguments*	b. *canonical adjuncts*
noun phrases	adverbs and adjectives
complete *that*-clauses	relative clauses
syntactically non-omissible PPs	TEMPORAL PPs (*sleep <u>at 10am</u>*)
L-selected PPs (*care <u>for something</u>*)	LOCATIVE PPs (*work <u>at home</u>*)
RECIPIENT PPs (*donate <u>to them</u>*)	INSTRUMENTAL PPs (*write <u>with a pen</u>*)
GOAL PPs (*walk <u>into a room</u>*)	BENEFACTIVE PPs (*cook <u>for someone</u>*)
ADDRESSEE PPs (*talk <u>to someone</u>*)	COMITATIVE PPs (*wait <u>with someone</u>*)
SUBJECT-MATTER PPs (*talk <u>about it</u>*)	REASON PPs (*fail <u>because of something</u>*)

[4] The classification only works in one direction. I.e., non-omissible PPs are almost always considered arguments, but omissible PPs are not always considered adjuncts. This is because most authors conventionally assume that non-omissibility is a sufficient condition for argumenthood but not a necessary one. See chapter 3 for detailed discussion.

These same classifications pop up again and again in textbooks and in research literature (e.g., see the classifications in Huddleston & Pullum 2002). Inevitably, there are sometimes debates about where the thematic boundary falls. For instance, a minority of authors assume that GOAL PPs are adjuncts instead of arguments (e.g. Dowty 2000). Similarly, a minority of authors have speculated that INSTRUMENTAL PPs might be arguments instead of adjuncts (see e.g. Schütze 1995, p124ff). But on the whole, authors share the presupposition that the boundary between arguments and adjuncts should fall somewhere close to what is depicted in (5).

As mentioned, I will refer to this conventional classification as the *conventional A/AD*. I will refer to the elements traditionally classified as arguments or adjuncts as *conventional arguments* and *conventional adjuncts* respectively.[5]

Authors largely share a conception of which kinds of elements may be called "arguments" and which may be called "adjuncts." But a shared intuition is not necessarily a good reason to postulate a distinction as part of a theory of syntax. One can imagine pretheoretically defining two categories of verbs, X-verbs and Y-verbs, with X-verbs being ditransitives (e.g. *give*) and verbs compatible with the *-ment* suffix (e.g. *enjoy*), and with Y-verbs being everything else. We could define such a distinction, but is there any reason to give it special status in a theory of syntax? In fact, traditional grammar offers us many such notions. Consider the concept of a "run-on sentence," for instance, which is a widely understood notion, but which has no place in formal syntax.

Syntactic theory is about an aspect of the human mind. From this point of view, theoretical postulates are legitimate only if they play a necessary role in capturing relevant data. We would reject the hypothetical X/Y-distinction for verbs, for example, because it evidently plays no role in describing or explaining any syntactic phenomenon. What about the A/AD? Is there reason to believe that something like the conventional A/AD (5) has special status in syntactic theory?

Most advocates of the A/AD (seemingly most syntacticians) assume the answer is yes. In particular, it is assumed that the A/AD is needed to explain the conspicuous clustering of various syntactic properties around the conventional A/AD categories. For example, the class of conventional arguments is thought to share the ability to be extracted from, and the ability to be

[5] I may also use the terms "canonical argument/adjunct" and "traditional argument/adjunct."

extracted from weak islands; the class of conventional adjuncts is thought to lack these properties. Similarly, the conventional adjuncts are thought to share the ability to be repeatedly iterated, to be stranded under pro-form substitution operations, and to be freely permuted; the conventional arguments are thought to lack these properties. There are also thought to be relevant semantic properties. Conventional arguments are supposed to be semantically obligatory when unexpressed, while conventional adjuncts are supposed to be compatible with just about any predicate.

These sets of properties, sometimes called *diagnostics for argumenthood* (e.g. Schütze 1995, Toivonen 2016), serve as the motivation for theoretical implementation of the A/AD. As discussed in detail in chapters 2 and 3 respectively, the diagnostics can be organized into two types, those thought to motivate a *semantic* characterization of the A/AD, and those thought to motivate a *syntactic* characterization of the A/AD.

- *The semantic A/AD* has to do with lexical encoding of thematic information: the arguments of a predicate are the dependents whose θ-role has its source on the lexical predicate (e.g. on a verb), while the adjuncts of a predicate are the dependents whose θ-role is contributed through modification of the predicate, rather than by the predicate itself.
- *The syntactic A/AD* concerns the syntactic relationship between a head and its dependents: a different syntactic relation holds between a head and its arguments than between a head and its adjuncts. The examples in (1)-(4) above show how this can be cached out differently in different frameworks.

This dissertation examines these potential implementations of the A/AD. I want to know to what extent they are motivated by evidence, and I want to explore the consequences of rejecting them. I discuss my approach to this in section 4 of this introduction. First, section 3 introduces relevant theoretical background.

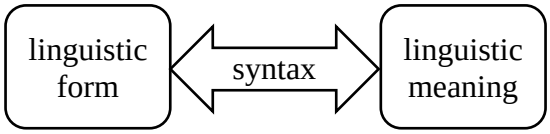
3. Theoretical background

For the purposes of this dissertation, a theory of syntax is understood as a network of hypotheses about the nature of the human cognitive apparatus which maps between linguistic form and linguistic meaning. In the typical course of ontogenetic development, the initial state of the syntactic system (at birth) is the same for all humans. After exposure to linguistic input in childhood, the system reaches a mature state, at which point an individual can be said to "know a

language."[6] Syntactic theories involve hypotheses about the syntactic component of both the initial state, sometimes called *Universal Grammar* (UG), and the mature state, sometimes called *i-language*.

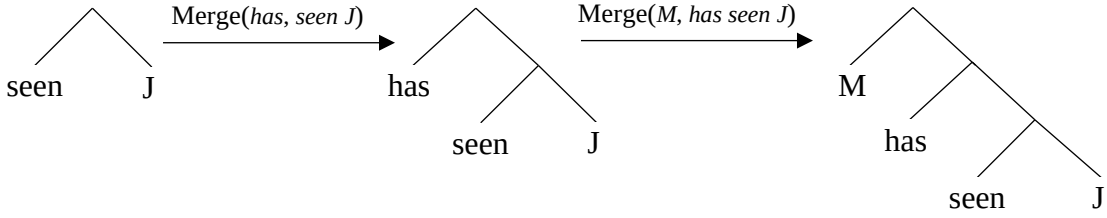
For the purposes of this dissertation, I will adopt the basic theoretical framework offered by the Minimalist Program (Chomsky 1995, 2000, 2001, and subsequent work). The mature syntactic system is a structure-building device, combining and recombining words into larger and larger constituents. The structure-building process interfaces with the systems of form (phonetics/phonology) and meaning (semantics/pragmatics), but is ultimately autonomous from them; syntax has its own operations and principles.[7]

(6)



Syntactic structure building involves at least two operations. One is the core Merge operation, responsible for generating constituent structure. Merge takes two or more syntactic objects (lexical items, or constituents built from lexical items) and combines them into a set. The resulting object can then serve as the input to another operation of Merge, yielding a hierarchically structured phrase. Larger and larger constituents are constructed in this way, all the way up to full sentences.[8]

(7)



Merge is also responsible for the phenomenon commonly called *movement*, *extraction*, or *displacement*. Suppose that Merge generates the phrase *seen J*. A complete sentence could be

[6] The everyday sense of "language" is to be understood as a practical idealization. No two speakers' i-languages are exactly the same, but often they are relatively similar, in which case we might talk about "a language." E.g., two speakers of (some variety of) "English" might be treated as having similar enough i-languages that it is practical to imagine that their i-languages are practically the same. This convention aids empirical study (assuming data from many different people to be more robust than data from just one person), but it should be recognized that "language" in this sense has no status in the theory.

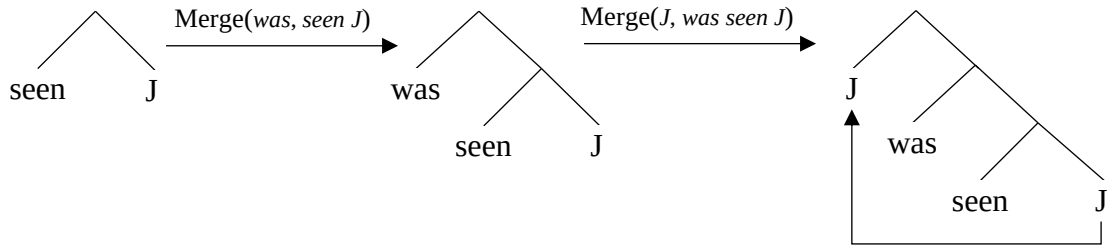
[7] This overall architecture is sometimes called the "Y-model"; the accompanying diagram often resembles a "Y."

[8] The tree diagrams shown at this stage in the introduction are simplified. Relevant additional details are introduced below and in later chapters.

derived by merging in the auxiliary *has*, and then a new NP to serve as the subject. This yields the sentence yielding the sentence *M has seen J*, as illustrated in (7).

However, an alternative way to build a sentence from *seen J* would be to merge in *was*, and then to *re*-merge *J* as the subject.

(8)



This yields two copies of *J*, one c-commanding the other. Under the assumption that only the higher of two copies is actually pronounced (Nunes 2004), this yields the passive sentence *J was seen*, as shown in (8).

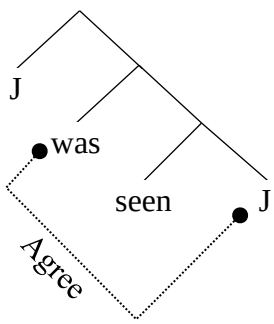
Merge can therefore be said to have two subtypes. Take Merge of two elements, *x* and *y*. In one case, *x* and *y* are totally distinct from one another. This is called External Merge. In the other case, *x* might be contained in *y* (or vice versa). This is called Internal Merge, yielding movement.

(9) a. *External Merge*:
Merge(x, y) $\rightarrow$ $\{x, y\}$

b. *Internal Merge*:
Merge(x, $\{ \ldots x \ldots \}$) $\rightarrow$ $\{x, \{\ldots x \ldots\}\}$

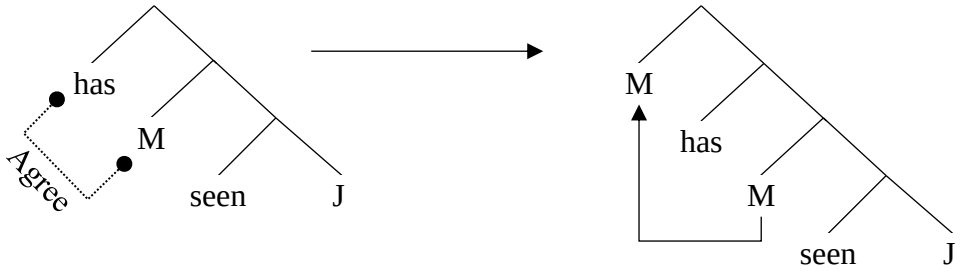
Another necessary operation is Agree, which establishes relations between constituents in Merge-generated structures. In the Minimalist tradition, Agree is most commonly understood as relating constituents under c-command. For instance, in the passive, it is assumed that the form of the auxiliary *be* is determined through Agree with an NP in its c-command domain. In the case of (8), *be* agrees with singular *J*, yielding the singular form *was*.

(10)



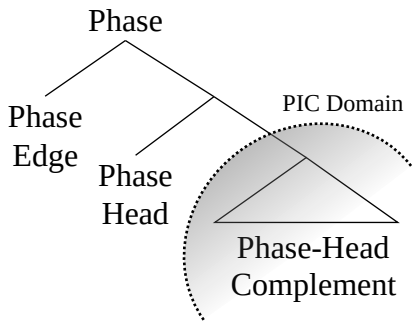
In an active (i.e. non-passive) sentence like "*M has seen J*," Agree also determines the form of the auxiliary (in this case, *have*). The assumption is that the subject NP originates in a position below the auxiliary. Agree takes place, relating the subject and the auxiliary, and then the subject raises over the auxiliary.

(11)



I will also assume that syntactic derivations are broken up into chunks, or *phases*. When a phase is built, the phase-head complement is interpreted by the interfaces, and the *Phase Impenetrability Condition* (PIC) then applies to that domain: the phase-head complement becomes inaccessible for further syntactic manipulation.

(12)

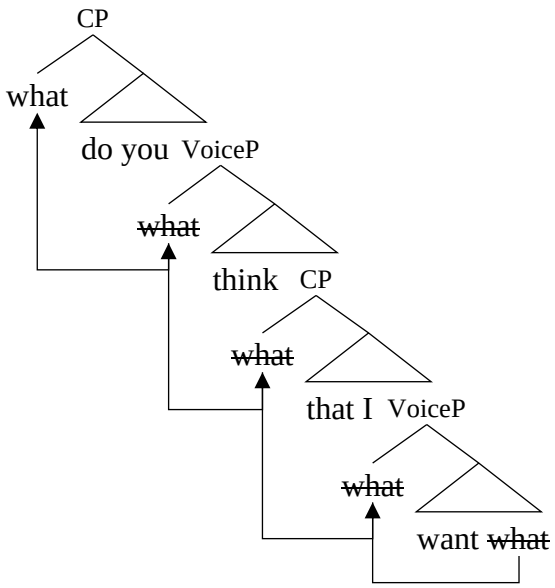


This means that, in order for a constituent X to undergo Internal Merge over a distance spanning more than one phase, X must move successive-cyclically to the edge of each phase between the extraction site and the landing site. Following Chomsky (2001) and much subsequent work, I

assume that phases include CP and VoiceP (analogous to Chomsky's *v*P; see chapter 2 for further discussion). In chapter 5 of this dissertation, I will argue that PP is (sometimes) as phase as well.

Given the Phase Impenetrability Condition, in order for a *wh*-phrase to move from embedded object position to matrix Spec-CP, in a sentence like "*What do you think I like*," the *wh*-phrase must stop off in the embedded Spec-VoiceP, at the embedded Spec-CP, and at the matrix Spec-VoiceP.

(13)



Beyond the key assumptions discussed in this section, I presuppose general familiarity with recent work in Minimalism. Additional relevant assumptions are introduced in later chapters.

4. Goals of the dissertation

Following Chomsky (2005), I assume that ontogenetic development from UG to i-language is conditioned by three factors. The first factor is the content of UG itself. The capacity for language is a biological property of the human species. As such, it is the product of evolution, and can be expected to follow a constrained developmental plan, at least to some degree. The second factor is linguistic input experienced in childhood. Children who are exposed to different linguistic input grow up to have different i-languages. Development from UG to an i-language is therefore conditioned by experience (see Epstein 2016 for relevant discussion). Finally, the poorly understood "third factor" includes everything else, from language-independent constraints to laws

of computation. Such principles likely have some role to play in i-language development, as repeatedly emphasized by Chomsky, though exactly what that role is is presently unclear (at least to me).

Conflicting conditions on the first factor and the second factor pose a problem for syntactic theory. On the second factor (linguistic experience), it has long been noted that the linguistic data available to children is relatively impoverished when compared to the richness of the i-languages they eventually develop (the so-called Poverty of Stimulus; Legate & Yang 2002, Lasnik & Lidz 2016, Yang et al. 2017, Pearl 2021). This would seem to imply that the second factor, though essential, plays a limited role in language development. At the same time, the first factor (UG) also must have a limited role to play. The content of UG is the product of evolution, yet language seems to have emerged relatively recently in the evolutionary record (Bolhuis et al. 2014, Berwick & Chomsky 2016). This presumably does not leave enough time for development of a rich UG.

Scientific theories are always subject to Occam's razor. But, as Chomsky (2021) points out, the conflicts just discussed give us special reason to strive for theoretical simplicity in syntactic theory. The set of principles and operations needed to describe i-language must be kept to a minimum in order to be plausible.

The A/AD is especially relevant from this perspective. As discussed in section 2, it is widely believed that the A/AD should be part of syntactic theory. But the implementations of this idea often involve stipulation of special mechanisms. Take Chomsky's Pair Merge proposal. To account for the alleged syntactic differences between arguments and adjuncts, Chomsky proposes that there are in fact *two* distinct structure-building operations, rather than just one. This proposed proliferation of theoretical postulates is problematic by Occam's razor alone, and even more so given the considerations mentioned in the preceding paragraphs. Ideally, syntactic theory would adopt the null hypothesis that there is only *one* structure-building operation. The same goes for other potential devices proposed to implement the A/AD (e.g. the distinction between argument positions and adjunct positions in Government & Binding Theory; ideally there would only be *one* position type, not two).

My goal in this dissertation, then, is to examine the evidence associated with the A/AD, and to determine whether the relevant data motivate a departure from the null hypothesis regarding

the postulates of syntactic theory: does the evidence really call for an implementation of the A/AD, i.e. for a duplication of principles and operations?

To approach this question, I focus my attention on one highly pertinent, narrow case study: prepositional phrases within the verb phrase in English. I have chosen to focus on PPs because, while the A/AD is thought to apply across categories, the essential motivation for it comes from the distinctions it draws *within* a category. Imagine, for example, that PPs as a category displayed behavior different from that of NPs as a category. We would not need to rely on the A/AD to explain these differences; we could instead just attribute the differences to the already needed difference in syntactic category. Hence, the most compelling evidence for the A/AD comes from the *intra*-categorial distinctions it predicts. PPs are appropriate as a test case, because no other category so radically straddles the argument/adjunct boundary.[9]

I focus on PPs within the VP for practical reasons. The A/AD reaches into many corners of syntactic theory, too many to be exhaustive here. I keep to the verbal domain as a well-defined case study. The verbal domain is particularly appropriate, given that verbal argument structure is central to the A/AD. My focus on English is also partly practical; English is the language for which robust data are most readily available to me. English is also the language for which the A/AD has been most extensively motivated. In the long list of diagnostics for argumenthood, a significant number have been explored primarily in English (see e.g. the *do so*-substitution test). Given this, the strongest case against the A/AD would have to engage thoroughly with the English data.

The narrow focus adopted here precludes an overarching, definitive verdict on the A/AD. Nevertheless, I maintain that, if there is an A/AD, it is most likely to be revealed by examining PPs within the VP in English, for the reasons just mentioned. These are:

- *PPs* are an ideal test case for identifying intra-categorial distinctions.
- The *verbal domain* is an ideal test case, as the central locus of argument structure.
- *English* is an ideal test case, as the language for which the A/AD has been most extensively defended.

Hence, if there is an A/AD, it is most likely to be revealed in this dissertation's domain of focus.

[9] CPs conventionally are also sometimes adjuncts and sometimes arguments, but the different uses are more limited. Adjunct CPs *if*-clauses and relative clauses; full *that*-clauses are normally considered arguments.

Before I proceed to the chapter-by-chapter summary in section 5, I would like to make a final note about my approach to the A/AD. In my understanding, different implementations of the A/AD (as discussed in chapters 2 and 3) are hypotheses about the conventional A/AD. The connection to the conventional A/AD is crucial. A theoretical postulate is an implementation of the A/AD only if it draws a distinction that at least roughly resembles the conventional A/AD.

One might disagree with this position; instead, one might be willing to assign the label "argument/adjunct distinction" to a theoretical postulate which does not make the argument/adjunct partition along conventional lines. For example, the property of syntactic omissibility is well-known not to resemble the conventional A/AD; as such, many authors have acknowledged it is not a good diagnostic for argumenthood, at least on its own (see chapter 3). But if we sever our implementation of "the argument/adjunct distinction" from the conventional A/AD, then we needn't worry about this. We could simply conclude that the conventional A/AD is "wrong;" the *real* A/AD, defined by omissibility, would simply draw the argumenthood boundary in a totally different place than is generally thought.

This issue has major consequences for the interpretation of chapters 2 and 3. In those chapters, I find that none of the properties traditionally taken as evidence of a semantic or semantic implementation of the A/AD, neither individually nor as a group, correlate well with the conventional argumenthood boundaries (nor do they correlate well with each other). My conclusion is that the semantic and syntactic versions of the A/AD, *understood as hypotheses about the conventional A/AD*, are wrong; there are no theoretical postulates in i-language which properly correspond to the notions "argument" and "adjunct." Instead, the properties traditionally associated with argumenthood have independent sources. Omissibility is a property distinct from iterability, strandability under *do so*-substitution is distinct from extractability from weak islands, etc.

Even if one accepts that these properties are independent of one another, one could still take the position that the A/AD is real, just different from what is conventionally thought. For instance, one might observe that omissibility is distinct from the other traditional argumenthood diagnostics and conclude that omissibility *is* the A/AD (the other properties, being independent, would be irrelevant). This is simply a matter of definition; one certainly could decide to adapt the

label "A/AD" for some new phenomenon. From my point of view, however, it is critical that hypothetical instantiations of the A/AD bear some resemblance to the convention notion.

5. The chapters

I conclude this introduction by summarizing the chapters to follow.

Chapter 2 considers the evidence for the semantic A/AD. Previous literature understands the A/AD to concern lexical encoding of thematic information. For a given verb phrase VP, a thematic participant T in the event VP denotes is an argument if T's θ-role is encoded as part of the lexical meaning of the verb. This implementation of the A/AD has previously been motivated by three key semantic properties. One example is *obligatoriness*, the idea being that *arguments* are semantically obligatory even when syntactically unrealized, while *adjuncts* are semantically optional when unrealized. See chapter 2 for the complete list of diagnostics. I find that, while there might well be a lexical-encoding distinction (some thematic information being lexically encoded on verbs, and other thematic information introduced only syntactically), lexical encoding does not correlate well with the conventional A/AD. I conclude that a semantic implementation of the A/AD is unlikely. This chapter also introduces relevant background assumptions on the syntax of argument structure, and it develops a set of practical assumptions about Theta Theory.

Chapter 3 considers the evidence for the syntactic A/AD. Traditionally, the syntactic A/AD is thought to be supported by a number of diagnostics purported to treat canonical arguments differently from canonical adjuncts. The best-known (and possibly oldest) example is *omissibility*; adjuncts are supposed to be omissible, while arguments are supposed to be non-omissible. Other cases include *do so*-substitution (adjuncts are canonically thought to be strandable under *do so*-substitution, while arguments are not) and islandhood (adjuncts, but not arguments, are predicted to be islands for extraction). I identify nine of these properties (see chapter 3 for a complete list). After examining each diagnostic in detail, I conclude that they provide insufficient evidence to motivate a syntactic distinction between arguments and adjuncts; instead, each of the traditional diagnostics identifies a distinct property which has its own independent explanation. This entails rejecting syntactic implementations of the A/AD, such as the existence of distinct structural positions for arguments vs. adjuncts, or special operations for building adjunction structures. It follows that arguments and adjuncts participate in syntactic configurations in fundamentally the same way.

Chapter 4 considers the external syntax of prepositional phrases within the VP. Traditionally it has been assumed that the A/AD determines how PPs participate in VP structure, for example with arguments being attached in complement/specifier positions and adjuncts being right-adjoined in adjunct positions. This difference is unmotivated without the A/AD. The question then arises exactly what the configuration of PPs in the VP is. I point out that many traditional analyses of VP-structure face a major technical problem from the perspective of Labeling Theory (Chomsky 2013, 2015, 2020), and I explore the possibility of resolving this problem by analyzing the VP as consisting of multiple *n*-ary-branching layers. The gist of the proposal is that the VP is split into distinct layers headed by different functional elements, and that each layer can contain multiple PPs. The chapter discusses the technical assumptions necessary to implement this idea, and also explores a set of potential empirical problems used in previous literature to motivate strictly right- or left-branching VP-structure.

Chapter 5 considers the licensing of pronouns (i.e. non-reflexives: *them, him, her*, etc.) in PPs. Previous approaches to Condition B have struggled to give an adequate account of the relevant data, and crucially have often assumed the A/AD plays an important role. I argue, however, that binding into PP can be described even without the A/AD. I specifically propose a version of Condition B that combines aspects of two different types of previous approaches. One type of approach treats Condition B as a locality constraint: pronouns must not be bound within their local domain. Another type of approach treats Condition B as a constraint on co-argumenthood: a pronoun and its antecedent must not participate in the same predicate. I propose that that Condition B is a constraint on co-argumenthood evaluated within a local domain. In developing this proposal, I motivate certain aspects of the internal structure of PP, and I explore the possibility that PP could be a phase.

Chapter 6 considers Prepositional Passives (P-passives), which exhibit certain restrictions superficially related to the A/AD. For example, certain prepositions (especially purely *spatial* prepositions, as opposed to *directional* or otherwise *functional* prepositions) resist P-passivization. This restriction roughly correlates with the A/AD, because locatives are often (but crucially not always) considered *adjuncts*, and directional/functional prepositions are often (again, not always) considered *arguments*. However, close examination reveals the constraints on P-passivization crosscut the A/AD. I propose an analysis of P-passivization which does not rely on the A/AD.

Chapter 7 concludes by recapping the findings of the previous chapters, and by considering the outlook for the A/AD given these results.

CHAPTER 2

The Argument/Adjunct Distinction as a Semantic Notion

1. The argument/adjunct distinction in formal semantics

This chapter deals with the idea that the *meaning* of a sentence can be dichotomized into *core* and *non-core* (or *peripheral*) meaning. More specifically, the idea is that the thematic information encoded by sentences can be categorized into two types. Some packages of thematic information, the *core* thematic information, comprise *arguments* of the predicate, while packages of *peripheral* thematic information comprise *adjuncts* to the predicate.[1] I refer to this idea as the *semantic argument/adjunct distinction* (the semantic A/AD).

The semantic A/AD is a hypothesis about a more general notion, the *conventional* A/AD.[2] As discussed in chapter 1, the conventional A/AD concerns thematic elements (most specifically, thematic elements in their canonical syntactic realizations). The idea is that patients (canonically direct objects), agents (canonically grammatical subjects), recipients (canonically indirect objects or dative *to*-phrases), and goals (canonically directional PP complements) are different in linguistically relevant ways from other thematic elements, including benefactives (canoically *for*-phrases), instrumentals and comitatives (both canonically *with*-phrases), manner adverbials, as well as locatives and temporals, such that the former set of elements are called *arguments*, and the latter class of elements are called *adjuncts*.[3] The semantic A/AD states that this conventional distinction is a semantic property of the relevant thematic elements.

[1] The terms *complement* and *modifier* are sometimes used instead of *argument* and *adjunct* respectively.
[2] For a working definition of the semantic A/AD, see (25) below (p28).
[3] Subject to some exceptions around the edges. Syntactically non-omissible elements are normally taken as arguments, for instance, whatever their thematic role.

This chapter argues that the hypothesis of the semantic A/AD is untenable. I argue against the idea that the elements conventionally considered arguments (patients, agents, recipients, goals) are systematically distinguished from those conventionally considered adjuncts (benefactives, locatives, etc.) by semantic criteria. To accomplish this, this first section gives a detailed introduction of what the semantic A/AD is supposed to be, beginning in section 1.1. Later sections examine the evidence in support of this hypothesis in a manner described concretely at the end of this section.

1.1. Davidsonian event semantics

I will now provide detailed background on the semantic A/AD. I first describe Davidsonian (section 1.1) and neo-Davidsonian (section 1.2) event semantics, which plays an important role in the formulation of the semantic A/AD. Section 1.3 explains how the semantic A/AD is understood in this system of event representation.

Assuming a basic set-theoretic description (e.g. Heim & Kratzer 1998), predicates denote sets of individuals holding certain properties. For example, the verb *eat*, applied in a sentence such as (1), signals the subject *J* has the property "is an *eater*."

(1) J ate.

It is customary to represent sentences like this as propositions composed of a predicate applied to an individual. The notation in (2), ignoring past tense on *eat*, is meant to encode the ascription of the "is an eater" property to *J*. We treat *eat* as referring to a set of individuals, namely all those individuals which are eaters. Applying the predicate to *J* identifies *J* as a member of this set.[4]

(2) **eat**(**J**)

However, consider the sentence (3).

(3) J ate the pizza.

Rather than simply attributing a property to *J*, this sentence seems to denote a relation between the two noun phrases *J* and *the pizza*. The classical semantic description of this sort of sentence treats

[4] More precisely, *eat(J)* returns the value "true" iff *J* is a member of the set denoted by *eat*. I intend the semantic representations throughout the chapter in this way.

eat as a two-place relation, rather than a simple one-place predicate as in (2). Thus, *eat* in (3) denotes a set of ordered pairs. Each pair ⟨*x*, *y*⟩ in the set has an *eater* as the first element *x*, and something *eaten* by *x* as the second element *y*. The notation in (4) signals that the pair ⟨J, the-pizza⟩ is a member of this set.

(4) **eat**(**J**, **the-pizza**)

The representation just given for transitive *eat* in (3) is different than the one for intransitive *eat* in (1). The former is treated as a two-place relation, while the former is monadic. Yet the two versions of *eat* are seemingly related to one another; (3) entails (1), for instance.

We could treat this relation as purely coincidental, e.g. a product of language history – we might have two distinct verbs which speakers understand differently, but which happen to be quite close in pronunciation and interpretation because they share a diachronic source. The more common treatment of the relation, however, is one of identity. There are not two different verbs *eat*, but just one, which has the same essential semantic representation, though it can have distinct syntactic realizations.

On the same-*eat* hypothesis, the verb in (3) denotes the same relation that the verb in (1) does. It's just that the syntax of English allows the *eaten* element to be silent, and receive a generic interpretation. Rather than (2), we would then represent (1) along the lines in (5).[5]

(5) **eat**(**J**, something)

Just like (4) encodes an *eater-eaten* relation between *J* and *the-pizza*, (5) encodes an *eater-eaten* relation between *J* and some indefinite eaten entity. The entailment from (3) to (1) then follows naturally.

However, the *eater-eaten* relation is not the only information that *eat* can encode. Consider a sentence like (6), which seems to encode the same information as (3), with the additional information that *the fork* was the utensil (or *instrument*) applied by *J* to *the pizza*.

(6) J ate the pizza with the fork.

[5] Or more precisely as ∃*x*.**eat**(**J**, *x*).

How do we represent the meaning of this sentence? By textbook logic, one way is to take *eat* to be a three-place predicate denoting an *eater-eaten-instrument* relation, *eat* (*x*, *y*, *z*), where *x* is the eater, *y* is eaten, and *z* is the instrument which *x* applies to *y*. The sentence (6) would be represented as (7).

(7) **eat**(**J**, **the-pizza**, **with-the-fork**)

But again, there is a clear relation between (6) and (3)/(1) (e.g. entailment again), and we fail to capture this relation by describing (6) with three-place (7) and (3)/(1) with two-place (4)/(5). Surely, the relation here is not accidental; we do not want to stipulate a new verb *eat* which denotes a three-place predicate, co-existing alongside the two-place version in (4)/(5). Yet at the same time, it seems unnatural to conclude that there is one, three-place version of *eat*, which in (3) could be represented by (8a) and in (1) by (8b).

(8) a. **eat**(**J**, **the-pizza**, something)
b. **eat**(**J**, something, with-something)

If we were to take this path, then the unnaturalness would be compounded upon analyzing sentences such as those in (9).

(9) a. J ate the pizza with the fork in five minutes.
b. J ate the pizza with the fork in five minutes at the table.
c. J ate the pizza with the fork in five minutes at the table with M.

More and more syntactic dependents can be added to the sentence, leading to more and more detailed interpretations. If we were to continue with the approach to description as in (7)/(8), we would need to treat *eat* as a 6+-place predicate, specifying an *eater-eaten-instrument-duration-location-companion*-etc. relation.

(10) **eat**(**J**, **the-pizza**, **with-the-fork**, **in-five-minutes**, **at-the-table**, **with-M**, …)

This whole complex predicate would have to be present, though left largely unrealized syntactically, in sentences like (1), (3), (6), and (9a-b).[6]

[6] As Davidson (1967, p107, brackets, italics added) puts it, something like "*Jones buttered the toast* [would] be considered as *elliptical* for *Jones buttered the toast somewhere with something at some time*," and so on. See also Kenny (2003, p112).

(11) **eat**(**J**, something, with-something, for-some-duration, somewhere, with-someone, …)

This would capture the entailment relation between (9c) and all the others, but it requires a great deal of frequently invisible semantic complexity, besides feeling analytically very unnatural.

The problem of representing sentences like this, especially the aspects of the problem just described, motivated Davidson (1967) to propose his event-based semantics for "action sentences" (or sentences whose verbs denote predicates over events). He allowed the logic motivating (5) to go through, but stopped before allowing descriptions like (7)/(8). Instead, he proposed to treat the prepositional phrases added in (6)/(9), and further ones which could be added (like temporals, benefactives, etc.), as separate predicates conjoined with the core predicate (4). Specifically, he argued that action sentences ascribe properties to an abstract event variable *e*. The core predicate *eat(x, y)* is thus reanalyzed as a three-place predicate, specifying a property of the event variable. PPs such as *with the fork* in (6) also apply to the event variable.

(12) ∃e. **eat**(e, **J**, **the-pizza**) & INSTR(e, **the-fork**)

The other PPs in (9) are represented in the same way. *in five minutes* is a predicate *duration*(e, *five-minutes*), and so on.

As Parsons (1990) observes, Davidson's representations have certain desirable properties. First of all, they make explicit the notion "event" which plays an important role in the interpretation of such sentences (though this property is not relevant for present purposes). Another feature of these representations is their ability to capture relations of entailment. (9a) entails, for instance, the conjunction (13), but not vice versa.[7]

(13) J ate the pizza with a fork and J ate the pizza in five minutes.

This is desirable, since these relations of entailment are clearly captured by the corresponding logical forms.

(14) a. ∃e. **eat**(e, **J**, **the-pizza**) & INSTR(e, **the-fork**) & DUR(e, **5m**)

b. ∃e[**eat**(e, **J**, **the-pizza**) & INSTR(e, **the-fork**)] &
∃e′[**eat**(e′, **J**, **the-pizza**) & DUR(e′, **5-m**)]

[7] The reason (13) does not entail (9a) is that the two different conjuncts in (13) could be taken as separate events.

This represents a relatively mainstream understanding of the semantics of sentences denoting events. I will follow certain components of this analysis; for instance, the idea that different participants in an event are represented by conjunctions of predicates on an event variable, for its ability to capture certain entailments as just discussed.

1.2. Neo-Davidsonian event semantics

However, my concern here is not fundamentally with the logical representation of these *sentences*, but with the representation of their atomic components. To illustrate what I mean, I draw attention to the difference in (12)/(14) between, on the one hand, the *eater* and *eaten* elements, and, on the other hand, the PP elements. Specifically, the former elements are arguments of the predicate named *eat*, while the latter are arguments of dedicated *thematic* predicates.[8]

The point is that it doesn't have to be this way. We could (almost)[9] equally have represented the *eater* and *eaten* elements with dedicated thematic predicates too, as in (15). I will use abbreviations of Parson's terms to refer to the two ways of representing things: the version in (15), with an independent conjunct for each participant, is the *Conjunct Analysis* (CA), and the version in (12)/(14), with some participants incorporated into the lexical predicate, is the *Incorporation Analysis* (IncA).

(15) ∃e. **eat**(e) & AGENT(e, **J**) & PATIENT(e, **the-pizza**) & …

The CA kind of representation was proposed (in a certain form) by Castañeda (1967, replying to Davidson) and further defended by Parsons (1990). Why would we adopt one representation over the other? More specifically, why should we (dis)privilege as part of the *eat* predicate the *eater* and *eaten* elements in particular, and not any of the various other elements? For the purposes of this subsection, let's call the first question (CA or IncA?) *question (i)*, and the second question (what sets the agent and the patient apart?) *question (ii)*. I will deal with question (i) first, and return to question (ii).

[8] "Thematic" in the sense that they denote information generalized across events; many different kinds of predicates have "instruments" and "durations," but only *eat* has an "eat" predicate.
[9] I am glossing over the distinction between *thematic role types* and *individual thematic roles* (Dowty 1991). I will return to this issue later. See section 3.

1.2.1. Davidson's argument for the Incorporation Analysis

Related to question (i), Davidson (1967, p125) gave the following contrast as evidence in favor of the IncA (i.e. without dedicated *agent* and *patient* predicates). (16a-i) entails (16a-ii), but (16b-i) does not entail (16b-ii).

(16) a. i. I flew my spaceship.
ii. I flew.

b. i. I sank the Bismarck.
ii. I sank.

Davidson said that there is "no reason to believe the logical form of *I flew my spaceship* differs from that of *I sank the Bismarck*," and thus that the entailment from (16a-i) to (16a-ii) does not follow from the *logical form* of (16a-i). If it did, (Davidson assumes) we would expect that (16b-i) should entail (16b-ii) too.

The hypothetical logical forms Davidson had in mind for (16a-i) and (16b-i) are clear enough; they would have been something like (17a) and (17b) respectively.

(17) a. ∃e. **fly**(e) & agent(e, **me**) & patient(e, **my-spaceship**)
b. ∃e. **sink**(e) & agent(e, **me**) & patient(e, **the-Bismarck**)

The trouble here is that Davidson was not explicit about what exactly the logical forms are supposed to be for (16a-ii) and (16b-ii). For his reasoning to go through, he may have assumed that grammatical subjects would uniformly instantiate the *agent* role, and so the subject *I* in (16b-ii) would be represented like (18).

(18) ∃e. **sink**(e) & agent(e, **me**)

But it is not obvious this assumption is correct, and in fact the contemporary consensus is that it is false. Since the development of the unaccusative hypothesis (Perlmutter 1978, Burzio 1986), it has been common to assume that some subjects are patients or themes. *Sink* is a prototypical example of this. The representation for (16b-ii) would thus be more accurately rendered as (19).

(19) ∃e. **sink**(e) & patient(e, **me**)

With this representation for (16b-ii), the entailments (or lack thereof) work out just as expected on the CA. Davidson's objection does not go through.

1.2.2. Parsons's argument for the Independent Conjunct Analysis

In the opposite direction, Parsons gives one reason for adopting the CA, and to reject the IncA. The argument has to do with entailments with syntactically omissible elements; some appear to be entailed even when unexpressed, and some clearly are not. For example, with *stab* (Parsons's example), the instrument of the stabbing (knife, sword, needle, etc.) need not be expressed, but its presence is still entailed (or "understood"). In contrast, comitative *with*-phrases are also omissible, but when unexpressed, they are not entailed. Thus, (20a) appears to entail (20b), but does not entail (20c).

(20) a. C was stabbed.
b. C was stabbed by someone.
c. C was stabbed with someone.

This is captured in the CA and in the IncA in different ways. In the IncA, (20a) entails (20b) because the core predicate *stab* is treated as a three-place relation including the *stabber* and the *stabbed*. When one is syntactically unexpressed, it still must be present in the semantic representation.

(21) ∃e. **stab**(e, someone, **C**)

In the CA, omitted elements can simply be dropped from the conjunction of predicates. (20a) would then be represented as (22), without any specified instrument. The entailment, according to Parsons (p99), comes from world knowledge. In the real world, in order for there to be a stabbing event, something has to be used to do the stabbing, but this is not a matter of the logical form of the sentence.

(22) ∃e. **stab**(e) & patient(e, **C**)

A difference between the accounts is then predicted. If we can come up with a situation where relevant real-world assumptions are voided, then the CA predicts that (20a) need not entail (20b), while the IncA predicts (20b) should still be entailed (since the *stabber* is still part of the predicate). Parsons claims "dream situations," such as (23), verify the CA prediction.

(23) In a dream, I was stabbed, although in fact nobody had stabbed me …

According to Parsons, this shows that the *stabber* is not logically entailed by the *stab* predicate, supporting CA representations.

Whether or not this argument is sound is unclear. Parsons discusses certain potential objections, e.g., maybe the dream scenarios are simply incoherent, not a reflection of linguistic knowledge. Whatever the case may be, there is a more basic reason to prefer the CA over the IncA. In every respect besides potentially this issue with entailment of omissible elements, the two approaches make the same predictions (see Parsons 1990, p94-97). To distinguish between hypotheses in this situation, we can appeal to Occam's Razor, which in this instance favors the CA.[10] The reason is that IncA representations dichotomize thematic elements into those that participate in the core predicate and those that participate in dedicated thematic predicates. The CA eliminates this dichotomy, and instead treats all thematic elements with the same mechanisms. Thus, in lieu of empirical motivation to the contrary, CA is preferable to IncA.

1.3. The semantic A/AD in the lexicon

Even if we accept the CA as an answer to section 1.2's *question (i)*, we still must answer *question (ii)*. What, if anything, sets the *agent* and *patient* predicates apart from other kinds of thematic predicates (like *instrument* etc.)?

One answer to the question points to the lexicon. This is the approach of Jackendoff (2002), Koenig et al. (2003), and many others. As Koenig et al. point out, for instance, the lexical entry for a verb must contain all and only the *unpredictable* information about that predicate. Other *predictable* information can be omitted from the lexical entry. This could be applied to the thematic elements which may or may not occur with the verb, if some thematic elements are generally predictable (in some sense to be made precise), and others unpredictable. For instance, suppose the *agent* and *patient* roles with *stab* are "unpredictable." They must then be lexically specified as

[10] Section 2.2 reviews relevant work supplying further reason to adopt the CA over the IncA. See, e.g., Kratzer's (1996) arguments for severing the external argument from the verb.

part of the lexical entry for *stab*. In contrast, if the other elements (*instrument*, *duration*, *location*, etc.) *are* "predictable,"[11] then they can be left out of the lexical entry for *stab*.

This is a sense in which the *agent* and *patient* roles could be distinguished; they would be *sub-lexical*, e.g. part of the core predicate *stab*, whose lexical entry would have a semantic component along the lines of (24).

(24) $\lambda y\, \lambda x\, \lambda e.$ **stab**(e) & agent(e, *x*) & patient(e, *y*)

Other thematic elements can be added to the ultimate event description which this verb is used to denote, but only by a process of syntax-mediated modification. Jackendoff (2002) and Koenig et al. (2003) call this distinction between thematic predicates – between, on the one hand, those that are specified as part of a core predicate, and, on the other hand, those that are added to the predicate syntactically – the *argument/adjunct distinction*. The *arguments* of a verb are those that are specified in its lexical entry, and the *adjuncts* of a verb are those that are added by modification. Adapting terminology from Koenig et al. (2003), I will refer to this idea as the Lexical Encoding Hypothesis (LEH).[12] For the purposes of this chapter, this is what is precisely intended by the term *semantic A/AD*.

(25) *Lexical Encoding Hypothesis*:

a. Let E = **V**(e) & θ_1 … & θ_n be the logical description for an event built on verb V, where θ_1… θ_n are the thematic predicates of E.

b. The *arguments of V* are the thematic predicates θ_i that are encoded in the lexical entry for V.

c. The *adjuncts of V* are the thematic predicates θ_i that are not encoded in the lexical entry for V.

---

[11] Precisely what it allegedly means for thematic information to be "(un)predictable" is discussed in greater detail in sections 4.1, 5.1, and 6.1 with respect to the properties of semantic obligatoriness, compatibility, and unique entailment respectively.

[12] Koenig et al. (p75) defined the LEH as saying that: "A participant role is a (semantic) argument of a verb if and only if it satisfies both the SOC and SSC, that is, if its presence is required of all situations described by that verb and if it is required of the denotation of only a restricted set of verbs." Note that their conditions "SOC" (corresponding to semantic obligatoriness, see section 4) and "SSC" (which I divide into compatibility (section 5) and unique entailment (section 6)) are their criteria for determining lexical encoding. My statement of the LEH in (25) conveys the same idea, just remaining neutral about what exactly the criteria for lexical encoding are.

Assuming a lexical entry for *stab* along the lines of (24), *stab* has two arguments, an AGENT and a PATIENT; all other thematic predicates in a stabbing event would be adjuncts.

This framing opens an avenue for a potential answer to section 1.2's question (ii). By hypothesis, AGENT and PATIENT with *stab* are distinct from INSTRUMENT, DURATION, etc., because AGENT and PATIENT are *arguments* of *stab* – they are unpredictable in some sense, and so must be lexically specified – while INSTRUMENT etc. are somehow predictable, and are not lexically specified by *stab*. The answer to question (ii) then comes from answering *how exactly* the AGENT and PATIENT roles are *un*predictable and the other roles predictable.

This is one of two primary questions at issue for this chapter (recasting section 1.2's "question (ii)"). That is, what are the criteria for lexical specification of thematic elements? Or, what is the evidence that some thematic elements must be lexically specified, while others need not be? A second question, logically dependent on the first, asks whether the requirements on specification vs. non-specification are consistent with the A/AD. Does it make sense to identify the lexically-specified/lexically-unspecified distinction among thematic elements with the argument/adjunct distinction?

(26) Question 1: What are the criteria for specification of thematic elements in the lexical entry for a predicate?

Question 2: Given an answer to question 1, to what extent do patterns of lexical specification support the Lexical Encoding Hypothesis?

To answer question 1, I consider a set of properties held in prior literature to necessitate lexical specification, given in summary in (27), including references to sources where each property is adopted.

(27) a. *Obligatoriness*: some thematic information may be entailed by a given verb, even if there are no syntactic correlates for the entailed thematic content.
(Dowty 1982:90; Huddleston & Pullum 2002:226(f); Goldberg 1995:43-44; Jackendoff 2002:134; Koenig et al. 2003:71-72; Schütze & Gibson 1999:410(2))

b. *Compatibility*: some thematic information is compatible with virtually any predicate, while other thematic information is compatible only with a semantically-restricted set of predicates.
(Dowty 1982:90; Huddleston & Pullum 2002:227(g); Jackendoff 2002:134, esp. fn16; Koenig et al. 2003:73(i); Schütze & Gibson 1999:410(2))

c. *Unique entailment*: some thematic information is relatively regular, in that it contributes the same interpretation whatever verb it appears with, while other thematic information carries unique entailments, in that its interpretation is unpredictable from verb to verb.
(Dowty 1991:577fn19; Huddleston & Pullum 2002:227(h); Koenig et al. 2003:73(ii); Schütze & Gibson 1999:410(2))

Each of these properties is discussed in detail in a dedicated section in this chapter, including (i) the justification for why the property requires lexical specification, (ii) careful consideration of just which thematic elements must and must not be lexically specified by these criteria, and (iii) comparison of the results with the traditional boundaries of the A/AD.

In each case, the idea is that some lexical encoding is required to capture variation across predicates in terms of how the property applies to different thematic information. For instance, the fact that the patient of *eat* is semantically obligatory, while the patient of *swallow* is not, arguably requires information about the patient to be encoded in each verb's lexical entry (Jackendoff 2002, p134). I will not take this as self-evident; the goal of discussing each property, then, is to determine what – if anything – must be lexically specified in order to capture these properties, and to see how well the answer to that question aligns with the conventional A/AD.

Before I turn to the discussion of these properties and the consequences of their analysis for the semantic A/AD, there are two preliminary sections. Section 2 below is an abridged historical literature review tracing key developments in Minimalist approaches to the syntax-semantics interface, specifically argument structure, narrowing in on the status of the questions in (26) within these approaches. Section 3 then lays out some assumptions about Theta Theory which will be necessary in clearly articulating the LEH, especially with respect to the properties of *compatibility* and *unique entailment*. Specifically, these two properties are predicated on the

existence of θ-roles; it is then critical to have some means of identifying which θ-roles are which. That is the goal of section 3.

The remainder of this chapter is therefore structured as follows. First, section 2 describes and adopts certain assumptions about argument structure. Next, section 3 outlines a set of principles for identifying distinct θ-roles. Sections 4-6 then turn to the properties of semantic obligatoriness, compatibility, and unique entailment respectively. In section 7, I discuss how the findings of sections 4-6 bear on the major issues at hand. I conclude that, while some of the purported A/AD properties (27) – particularly obligatoriness – may motivate lexical encoding of thematic information in different ways, the patterns of lexical encoding they reveal do not motivate an understanding of the A/AD along the lines of the LEH.

2. The semantic A/AD and the syntax-semantics interface

I identify the semantic A/AD with the Lexical Encoding Hypothesis. In doing so, I take the semantic A/AD to be closely tied to argument structure. Therefore, some background on argument structure is needed in order to pursue the questions of (26). This background will also be relevant in later parts of the dissertation.

Given this, this section has two goals. The first is to establish and adopt certain background assumptions about the syntax of argument structure. I will specifically adopt the mainstream view that the syntactic dependents of the verb are introduced by functional heads. I will not engage in arguments for or against this view; I am simply "taking it off the shelf," as it were.

The second goal is to clearly establish the stakes for the rest of this chapter. The broad syntactic view I adopt is compatible with a range of approaches to the semantics of argument structure. E.g., it is compatible with the semantic A/AD, and it is also compatible with various views rejecting the semantic A/AD. It is important to make this point clear, and to make it clear what kind of evidence would be needed to determine which view is appropriate.

To meet these goals, subsections 2.1-2.4 trace a selective history of relevant ideas in the syntax-semantics interface, leading to the overall syntactic architecture for the verbal domain which I will assume going forward. Section 2.5 then discusses how the semantic A/AD might (or might not) be implemented given this framework.

2.1. Argument structure in the pre-minimalist framework

As just developed, the semantic A/AD hinges on the idea that verbs are lexically specified with a set of thematic elements which are intrinsic to the meaning of the verb. This idea plays an important role in many theories of argument structure, specifically questions of *argument selection* (Dowty's 1991 term) or *argument realization* (Levin & Rappaport-Hovav's 2005 term).

The question of argument selection seeks to explain certain correspondences (and divergences) between the thematic elements entailed by a given predicate, and the way those elements are expressed syntactically. For example, one regular correspondence across predicates and across (at least nominative-accusative) languages is the following. If a verb encodes a relation between an *agent* and a *patient*, then the way to express both these thematic elements is to realize the *agent* as a syntactic subject, and the *patient* as a syntactic direct object (Levin & Rappaport-Hovav 2005, p21).

(28) [$_{\text{Agent}}$ The bird] ate [$_{\text{Patient}}$ the worm].

An important class of argument-selection regularities occurs with what are called *argument structure alternations*, instances where the same thematic elements of the same predicate can be syntactically realized in two or more distinct ways. One example is the passive, which occurs with (among other things) the same set of *agent-patient* verbs.[13] The generalization just given (that agents and patients, when simultaneously expressed, are subjects and objects respectively) holds in the *active* voice only. In the passive voice, the patient is realized as a syntactic subject, and the agent as an oblique object.

(29) The worm was eaten by the bird.

Other widely cited examples include the *spray/load* alternation, the *dative* alternation, and the *causative/inchoative* alternation, illustrated in (30a) through (30c) respectively.

(30) a. i. Lee loaded the cart with the hay.
ii. Lee loaded the hay onto the cart.

[13] I use the passive to illustrate how thematic relations can be assigned in different surface configurations. It is relevant to note that, depending on the detailed analysis of passive vs. the other alternations discussed below, one could distinguish passive from the other alternations (e.g., treating passive as a more narrowly syntactic transformation).

b. i. Lee handed the files to the officials.
ii. Lee handed the officials the files.

c. i. Lee burned the evidence.
ii. The evidence burned.

The question of argument selection asks what determines regularities like these. With the verb *load* (and related verbs like *spray*, *scatter*, etc.), the patient element (*the hay* in (30a)) can be realized as the direct object, or as an oblique object with the preposition *with*. With none of the other verbs given in (28)/(30) can the patient vary in this way. Why is this option available with (30a) but not with the other verbs? A different option occurs in (30c), where the patient (*the evidence*) can be either the direct object or the subject. Why is this option available in (30c) but in none of the other cases?

The most traditional answer to this general type of question refers to the lexically specified properties of verbs (or verb classes). The reason why the patient of the verb *load* behaves differently than the patient of other verbs with respect to argument selection is that the lexical entry for *load* is equipped with different properties than the others. This was the approach of Hale & Keyser (1993), for example, which I describe shortly. Before describing relevant aspects of their approach, however, it will be useful to lay out some of the syntactic background preceding their work, since this background continues to play an important role in later work as well.

2.1.1. The Uniformity of Theta Assignment Hypothesis

Hale & Keyser's theory was developed in close proximity with two critical developments in generative grammar, Baker's (1988) Uniformity of Theta Assignment Hypothesis (UTAH) and Larson's (1988) VP-shell hypothesis. I describe the former idea in this subsection, and turn to the latter in the next.

Baker (1988) argued that there is a one-to-one mapping from, on the one hand, the set of *thematic roles* a given element can be assigned, to, on the other hand, the syntactic configurations which a theta-assigned element can participate in.

(31) *The Uniformity of Theta Assignment Hypothesis (UTAH)*:
Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure.

(Baker, 1988, p46)

The most salient aspect of this principle is its cross-linguistic predictions. If UTAH is correct, then the position in which *patient* elements occur should be the same in all languages. If evidence from well-studied languages is on the right track, and patient elements tend to occur as complements to the verb, then we should find this situation holds in every new language examined.[14]

UTAH also makes critical language-internal predictions. If the mapping from thematic roles to syntactic positions is one-to-one, then it follows that all sentences involving patient elements share certain aspects of their syntactic structure, namely the syntactic configuration associated with the patient role. Thus, if we take the active-passive alternation, where we assume that both the direct object of the active and the syntactic subject of the passive exemplify the patient role, the patient in both cases must participate in the same structural configuration.

(32) a. Someone saw Lee.
b. Lee was seen.

This has in fact been common for analysis of the passive since Chomsky (1957). It is typical to assume the patient is the complement of the verb *see* in both sentences in (32), with (A-)movement applying to the patient in (32b) but not in (32a):

(33) a. someone PAST [$_{VP}$ [$_{V}$ see] [$_{NP}$ Lee]]
b. [$_{NP}$ Lee] was+en [$_{VP}$ [$_{V}$ see] [$_{NP}$ ~~Lee~~]]

The same is argued to hold of other argument-structure alternations with shared thematic roles. In each instance, the different surface forms share an underlying syntactic configuration associated with the shared thematic roles. The two forms of the dative alternation would have the theme and

[14] In this respect, UTAH is a type of explanation for the cross-linguistic generalization noted above, namely that patients tend to be realized as direct objects. According to UTAH, the reason this generalization holds is that direct-object position (complement to the verb, traditionally) just so happens to be the position in which the *patient* role is assigned. Note this essentially just re-defines the original problem, which now becomes "why is direct-object position associated with the *patient* role?"

the recipient in the syntactic same relations to the verb and to each other, even though they are pronounced in different orders in the prepositional vs. double-object forms:

(34) a. [$_{VP}$ [$_{V}$ hand] [$_{PP}$ ∅ the junkie] [$_{NP}$ the contraband]]

b. [$_{VP}$ [$_{V}$ hand] [$_{PP}$ to the junkie] [$_{NP}$ the contraband]]

2.1.2. The VP-shell hypothesis

Larson (1988) proposed that verb phrases containing multiple complements involved multiple projections of the verb. Each additional projection provided a specifier hosting an additional thematic element, as well as a landing site for the verb. By allowing the verb to percolate up to the highest V position through head movement, an appropriate surface form for relevant constructions could be derived, while (i) capturing certain syntactic relations between complements,[15] and (ii) approaching a version of UTAH in the dative alternation and certain other multiple-complement constructions.

For example, a prepositional dative sentence like (35a) is assigned the structure in (35b), where there are two VP layers. The lower VP introduces the recipient *the officials* as its complement, and the theme *the files* as its specifier. The higher VP takes the lower VP as its complement, and provides an appropriate surface landing site for the verb (i.e. *hand* moves to e).

(35) a. Lee handed the files to the officials.

b. [$_{VP}$ [$_{V}$ e] [$_{VP}$ [$_{NP}$ the files] [$_{V'}$ [$_{V}$ hand] [$_{PP}$ to the officials]]]]

According to Larson, what is relevant for UTAH is the relative hierarchical relations among elements.[16] Since *the files* is higher than *the officials*, the former is assigned the *theme* role and the latter the *recipient* role.

---

[15] Specifically the c-command relations noted by Barss & Lasnik (1986); the leftmost complement appears to c-command complements to its right by various diagnostics, such as Condition C, quantifier binding, and superiority. I return to these properties in chapter 4.

(i) * Lee handed them$_1$ the students'$_1$ tests.

(ii) Lee handed each student$_1$ their$_1$ test.

(iii) * What did Lee hand who?

[16] Larson (1990) proposed "Relativizied UTAH," as opposed to what he referred to as the "strict UTAH" of Baker.

(i) *Relativized UTAH*:
Identical thematic relationships are represented by identical relative hierarchical relations between items at D-structure.

(Larson 1990, p601)

The same relative hierarchical relations are preserved in Larson's proposed structure for the double-object variant of this sentence, as represented in (36). In (36b), *the files* is structurally higher than *the officials* (c-commanding it), and so the same thematic relations are associated with these elements in both (35b) and (36b). (Larson argued that *the officials* would raise to e_2 at S-structure, as *hand* would raise to e_1.)

(36) a. Lee handed the officials the files.

b. $[_{VP}\ [_{V}\ e_1\ ]\ [_{VP}\ [_{NP}\ e_2\ ]\ [_{V'}\ [_{V'}\ [_{V}$ hand$]\ [_{NP}$ the officials$]]\ [_{NP}$ the files$]]]]$

The VP-shell hypothesis was proposed to apply any time there were multiple complements with a single verb (and even certain adjuncts). Thus, structures like (37) were generalized to underlie argument-structure alternations of different kinds, even when the surface forms did not look the same (Larson 1990).

(37) $[_{VP}\ [_{V}$ e$]\ [_{VP}$ Spec $[_{V}$ e$]\ [_{VP}$ Spec $[_{V}$ e$]$ … $]]]$

2.1.3. Deconstructing VP-shells

Hale & Keyser (1993) drew on both these ideas, UTAH and VP-shells, to develop a syntactic theory of argument structure. The authors later defined the subject of their theory as follows.

> We use the term *argument structure* to refer to the syntactic configuration projected by a lexical item. It is the system of structural relations holding between heads (nuclei) and their arguments within the syntactic structures projected by nuclear items. While a lexical entry is more than this, of course, argument structure in the sense intended here is nothing other than this.
>
> (Hale & Keyser 2002, p1, italics in original)

Their theory is a natural starting point for this discussion of the semantic A/AD in the syntax-semantics interface, because their theory presupposes the understanding of the semantic A/AD sketched in the previous section; verbs come pre-equipped with a set of core thematic elements, and any elements beyond those must be added via modification. For present purposes, this what is critical about Hale & Keyser's system; the "system of structural relations" maps from *lexical* structure to *syntactic* structure.

The resulting syntactic configurations share properties with the VP-shell structures proposed by Larson (1988), with distinct components of the VP-shell deconstructed into meaningful segments. Where Larson proposed a sequence of undifferentiated VPs, Hale & Keyser identified distinct levels with specific semantic contributions. To illustrate with one example, take Hale & Keyser's treatment of the dative alternation.

According to their theory, the structure of the prepositional dative is near-identical to Larson's (1988) VP-shell analysis, except that the different layers of the VP-shell – all part of an undifferentiated verbal projection for Larson – are decomposed into meaningful units. The verb *give* has a lexical representation along the lines of (38) (adapted from Hale & Keyser 2002, p160).[17] The verb has as its specifier an agent NP, and as its complement a PP, which in turn takes a theme NP as its specifier and a goal NP as its complement. The structure shares core properties with that in (35) above (the THEME c-commands the GOAL, for instance).

(38) [$_{VP}$ AGENT [$_{V'}$ [$_{V}$ give] [$_{PP}$ THEME [$_{P'}$ [$_{P}$ to] GOAL]]]

The double-object variation is the same, except that the preposition is null, and assigns the opposite theta roles to its arguments.

(39) [$_{VP}$ AGENT [$_{V'}$ [$_{V}$ give] [$_{PP}$ GOAL [$_{P'}$ P THEME]]]

The relation between the two variants is the result of what they call a "lexical parameter:"

> On this view, *saddle the horse*, *give John a saddle*, and *provide John with a saddle* all have the same [lexical] representation involving the preposition of central coincidence […], whereas *give a saddle to John* involves the preposition of terminal coincidence. By hypothesis, therefore, the dative alternation involves a lexical parameter: namely, the choice of the central or the terminal preposition at the head of the internal PP predicate […].
>
> (Hale & Keyser 1993:98-99, brackets added)

What's critical for present purposes is that each of the "arguments" (specifiers and complements) in the syntactic structure is licensed by information encoded in the *lexical verb*. The verb *give* is

[17] I have included the *agent* in the lexical representation of the verb for continuity of exposition. By 2002, Hale & Keyser had eliminated the *agent* from lexical argument structures, following Kratzer (1996).

specified to take an agent as its specifier, and a PP headed by either *to* or ∅ as its complement. The realization of arguments with *give*, and the thematic relations assigned to them, follow from these aspects of the verb's lexical representation. Thus, we have a close connection between the dependents of a verb in the syntax and the theta structure of the verb in the lexicon.

2.2. Argument introducers

Minimalist work on argument structure has seen a major shift from the pre-minimalist view. As just discussed, in e.g. Hale & Keyser's approach, lexical theta structure played an important role in argument realization. The trend since then has been to assign increasing important to verb-external structural elements. Instead of being associated with verbs themselves, θ-roles have come to be associated with dedicated functional heads (often but not always phonologically null) serving the narrow purpose of licensing a nominal and assigning it a specific θ-role.

These nominal-licensing, θ-role-assigning functional heads are sometimes referred to as "argument introducers" (see e.g. Pylkkänen 2002, 2008). In a sense, argument introducers flesh out the VP-shell hypothesis. With argument introducers, we do away with multi-layer verbs. Additionally, UTAH is narrowed, in the sense that "identical structural relationships" leading to "identical thematic relationships" are narrowed to the spec-head relation, i.e. between an argument introducer and its specifier.

I will approach the LEH in this context, as discussed in subsection 2.3. The remainder of this subsection traces the development of the argument introducers associated with different kinds of θ-roles.

2.2.1. External arguments

Perhaps the most influential proposal in the direction of argument introducers is Kratzer's (1996) "severing" of the external argument from the verb. Kratzer accepted the traditional idea that some thematic relations are central to the meaning of a verb, part of its lexical representation, while others are not. She was concerned, however, with identifying just which thematic relations are which – which are specified as part of the lexical representation of the verb, and which are not? Specifically, her focus was on the agent and patient (or theme) roles, sometimes called the *external* and *internal* argument relations respectively (based on Williams 1981).

Kratzer (following argumentation in Marantz 1984) claimed that the internal argument had to be lexically represented as part of a verb's core meaning, but that the external argument did not. Thus, while the agent role might have been part of the lexical representation of a verb in a system like Larson's or Hale & Keyser's, it was absent according to Kratzer's proposal.[18]

(40) a. λ*x*λ*y*λe. **stab**(e) & patient(e, *x*) & agent(e, *y*)

b. λ*x*λe. **stab**(e) & patient(e, *x*)

For Kratzer, the agent was added through a process of modification she called *Event Identification*, which served to conjoin two predicates abstracted over the same type of event variable (cf. Higginbotham's 1985 'θ-identification').

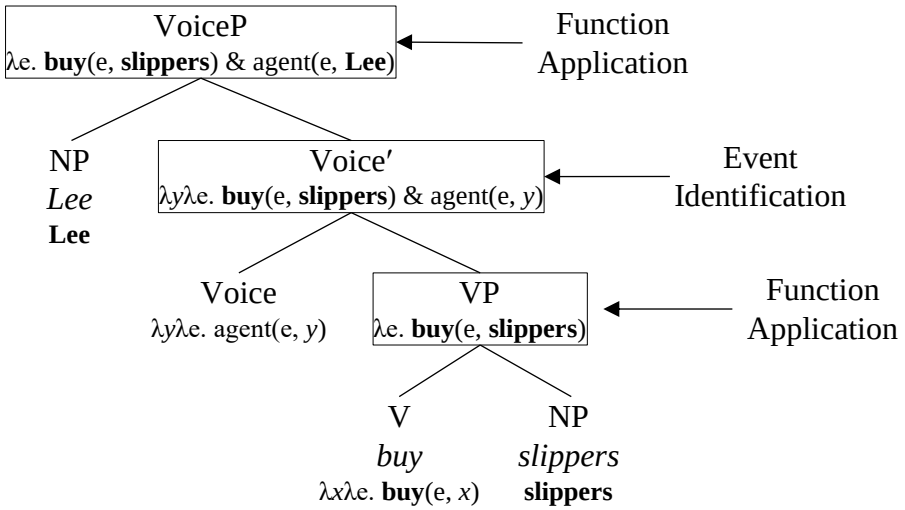
(41) *Event identification*:

f	*g*	→	*h*
⟨e, ⟨s, t⟩⟩	⟨s, t⟩		⟨e, ⟨s, t⟩⟩
			λ*x*λe. *f*(e, *x*) & *g*(e)

An external argument would thus only appear if it were added to a lexical verb via Event Identification. Kratzer argued this took place when a functional head *Voice*, with the semantic denotation "λ*y*λe. agent(e, *y*)," took the VP as its syntactic complement.

[18] As I discuss in subsection 2.3, this could already be taken as a radical departure from the traditional A/AD. The *agent* is one of the most venerated semantic arguments – if anything is an argument, the agent and the patient are arguments. Yet by the LEH (25), if the agent is not lexically encoded with the verb, then it isn't an argument of the verb.

(42)



The same effect can be achieved by treating Voice as a function with the denotation (43), so that Function Application applies to derive the denotation of Voice′.

(43) $\lambda f \lambda y \lambda e.\ f(e) \ \&\ \text{agent}(e, y)$

What is critical is that the syntactic realization of the agent NP no longer depends on the lexical properties of the verb. Instead, the AGENT NP is licensed in the syntax by Voice.[19]

2.2.2. Applied arguments

Kratzer (1996) radically modified the standard approach to argument selection by identifying the AGENT role with a functional element autonomous from the verb. Pylkkänen (2002, extended by Pylkkänen 2008) proposed to apply the same technique to applicatives and causatives. For example, in English double-object constructions (including benefactive and dative constructions), it has traditionally been assumed that both objects are specified as part of the lexical representation of the verb (see Hale & Keyser 1993, e.g. example (39) above). But Pylkkänen proposed to sever the RECIPIENT (or "applicative") argument along lines similar to Kratzer's severing of the AGENT.

For illustration, the verb *buy* can be used with a benefactive indirect object, as in (44).

(44) Lee bought Terry slippers.

[19] This is a (partial) generalizing of UTAH, in the sense that the absolute syntactic configuration for assignment of the agent role is irrelevant; it is simply the presence of an NP in the specifier of a dedicated functional head that leads to assignment of the AGENT role.

Pylkkänen argued that the lexical representation for *buy* excludes the AGENT (following Kratzer 1996), and *also* excludes the beneficiary (BEN). Hence, (45b) rather than (45a).

(45) a. λ*x*λ*y*λe. **buy**(e) & PATIENT(e, *x*) & BEN(e, *y*)

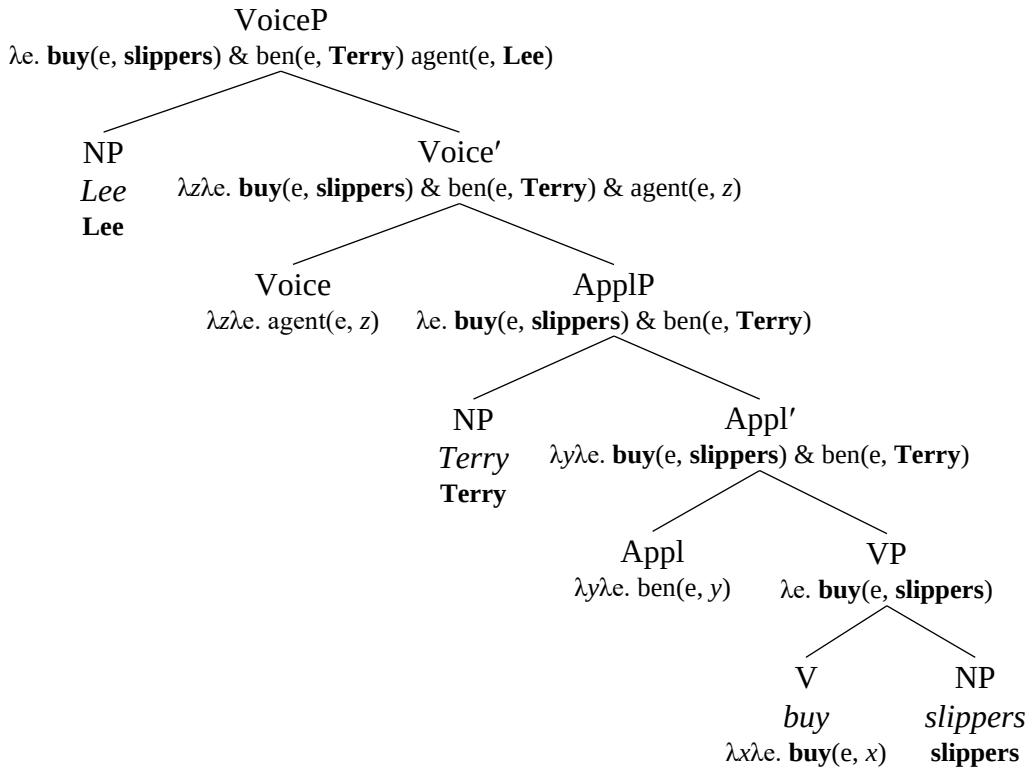
b. λ*x*λe. **buy**(e) & PATIENT(e, *x*)

Pylkkänen argues the benefactive element is added by a functional head Appl, where the benefactive role is added via Event Identification. One could also imagine using Function Application with a denotation like (46).

(46) λ*f*λ*y*λe. *f*(e) & benefactive(e, *y*)

Different approaches to the syntactic position of ApplP have been proposed. Pylkkänen in particular proposed Appl is "low" in English, attaching below the lexical verb. Others (e.g. Bruening 2010) argue Appl attaches between V and Voice, in which case the verbal domain for a sentence like (44) would be derived along the lines of (47). In order to derive surface constituent order (i.e. verb before indirect object), the verb is assumed to raise from V to Appl to Voice.

(47)

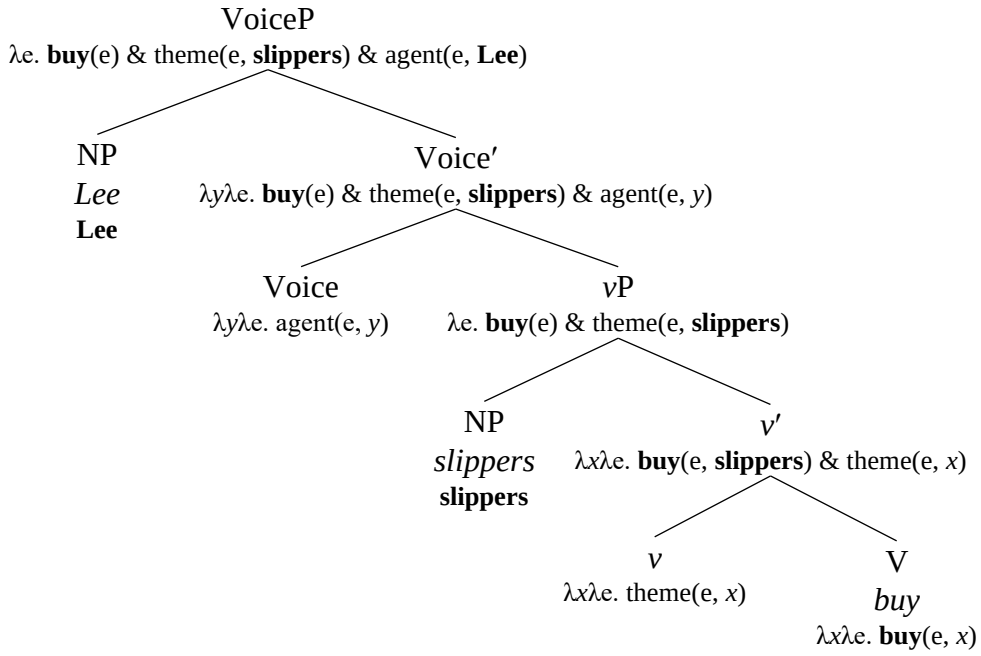


This severing of applied arguments from the lexical representation of the verb is relevant for present purposes for the same reasons as Kratzer's severing of the external argument. Critically, θ-positions no longer depend on the θ-structure of the lexical verb. Instead, θ-positions are *introduced* by functional heads (Voice and Appl here).

2.2.3. Internal arguments

The logical culmination of this trend is to extend it to every thematic predicate. On this view, every participant in an event would be licensed by an argument introducer, rather than being licensed by a verb's θ-grid. Even the internal argument, which Kratzer and Pylkkänen maintained as part of the lexical representation of the verb, would be extricated from the lexicon. A sentence like "*Lee bought slippers*" would thus be reanalyzed from (42) above. Instead of the direct object *slippers* being introduced as a complement of the verb, it would be introduced as the specifier of a functional head. The resulting structure would be along the lines of (48).

(48)



The tree diagram in (48) shows how the internal-argument-introducing head could compose with the verb via Event Identification. It could also compose via Function Application if it had a denotation like (49).

(49) λ*f*λ*x*λe. *f*(e) & theme(e, *x*)

Many different authors have argued for this position (i.e. that of assuming that the internal argument has its own argument introducer), though different authors often use different labels for the projection introducing the internal argument. Relevant works include Borer (2003), Lohndal (2014), Smith & Yu (2021), and Ahn (2022), among others. I follow Smith & Yu's notation in using the label *v* here.

I will adopt the argument-introducer approach for the purposes of this dissertation. It should be noted that the all-encompassing view of argument introducers represented by (48) is not the only position in the mainstream. There is a competing view, represented by, e.g., Harley (2014), which holds that the internal argument is an exception to the general pattern. Verbs (or the *roots* of verbs) assign a θ-role to their internal arguments only. The differences between these two positions do not affect the conclusions to be drawn here. I will adopt the all-encompassing view for notational consistency, and because I find it aids the exposition.

2.2.4. Θ-roles contributed by prepositions

The next subsection (2.3) discusses how the LEH might or might not be substantiated within an approach to argument structure which relies on argument introducers. First, I would like to briefly draw a connection between (i) the role of functional heads like Voice, Appl, and *v* in θ-assignment and (ii) that of prepositions.

I will assume in this dissertation that prepositions are argument introducers similar to Voice, Appl, and *v* above. The basic motivation for this is that certain prepositions are consistently correlated with specific θ-roles. For example, the preposition *to* often assigns the recipient role, the preposition *for* often assigns the benefactive role, and the preposition *with* often assigns the instrumental role.[20] Like Voice assigns AGENT and *v* assigns THEME, I take it that *to* assigns RECIPIENT, *for* assigns BENEFACTIVE, and *with* assigns INSTRUMENTAL.[21]

[20] *With* also often assigns comitative. I take this as a point of accidental homophony; there are two distinct prepositions *with* in English, one which assigns instrumental, and one which assigns comitative. The prepositions need not be homophonous in other languages, e.g. Tlaxcala Nahuatl using *ika* for instrumental and *inawak* for comitative (Flores Nájera 2019).

[21] Event Identification would not be able to apply in the same way for prepositions as for argument introducers. However, if argument introducers use function application, then prepositions could be treated identically to Voice etc., except in the order in which they compose with their arguments. Both prepositions and Voice-type heads compose

In many instances, the role of prepositions as argument introducers is obscured by idiomaticity. In cases like (50), prepositions are semantically inert, forming a small idiom with a verb.

(50) a. It **depends on** your preference.
b. I am **interested in** your idea.
c. People can easily **relate to** that story.

I assume that these prepositions do assign a θ-role, but that the θ-role they assign is determined by the idiom.

2.3. Argument introducers and the Lexical Encoding Hypothesis

The discussion of argument introducers in the previous section focused primarily on argument introducers' syntax. The verb is not what is syntactically responsible for θ-assignment to NPs; instead, argument introducers are.

We should now consider how the LEH, repeated in (51), sits against this background.

(51) *Lexical Encoding Hypothesis*:

a. Let E = **V**(e) & θ_1 … & θ_n be the logical description for an event built on verb V, where θ_1… θ_n are the thematic predicates of E.

b. The *arguments of V* are the thematic predicates θ_i that are encoded in the lexical entry for V.

c. The *adjuncts of V* are the thematic predicates θ_i that are not encoded in the lexical entry for V.

Critical to the LEH is the idea that verbs are stored in the lexicon with certain argument-structural information encoded on them. It is relevant, then, that there are two possible views on the

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with a predicate *f* and an individual *x*. The Voice-type heads compose first with *f* and then with *x*, and in (i), and the prepositions compose first with *x* and then with *f*, as in (ii).

(i) $\lambda f \lambda x \lambda e.\ f(e) \& \theta(e, x)$
(ii) $\lambda x \lambda f \lambda e.\ f(e) \& \theta(e, x)$

contribution of lexical verbs within the argument-introducer framework. Ramchand (2008, p17) describes the two positions as follows.

(52) a. *The Naked Roots View*:
The root contains no syntactically relevant information, not even category features.

b. *Well-Dressed Roots View*:
The root may contain some syntactic information, ranging from category information to syntactic selectional information and degrees of argument structure information, depending on the particular theory. This information is mapped in a systematic way onto the syntactic representation which directly encodes it.

The two positions require further elaboration. Ramchand's "Naked Roots View" is argued for by Borer (2003), among others. According to Borer, lexical "verbs" (actually category-neutral roots) have no role to play in the projection of argument structure. Instead, argument structure is fully determined by syntactic frames composed of independent functional heads (e.g. argument introducers). Lexical verbs simply act as "modifiers" of these frames. A common illustration of this idea (cf. Borer 2003, p40; Levin & Rappaport-Hovav 2005, p90; Tungseth 2006, p9; Ramchand 2008, p16; Lohndal 2014, p43; *inter alia*) is (53) from Clark & Clark (1979:803).

(53) a. The factory horns sirened throughout the day.
b. The factory horns sirened midday and everyone broke for lunch
c. The police car sirened the Porsche to a stop
d. The police car sirened up to the accident site
e. The police car sirened the daylight out of me

In each of these sentences, the verb *siren* appears to be associated with a different set of thematic relations. According to Borer, this indicates the argument structure is not intrinsic to the verb *siren*, but instead that *siren* is compatible with a variety of distinct argument-structural frames.[22]

If we adopt the Naked Roots View, then there is no room left for the semantic A/AD as understood by the LEH. The LEH presupposes that verbs come from the lexicon equipped with at

[22] In this respect, the argument-introducer approach resembles (at a level of abstraction) constructional approaches to grammar. One might argue that each "syntactic frame" represents a distinct "Construction."

least some argument-structural information, but the Naked Roots View holds that verbs are simply sound-meaning pairs; *they carry no argument-structural information at all*. On this approach, if there is an A/AD, it must be fundamentally syntactic in nature. This can be seen in Lohndal's (2014) implementation of the A/AD through Chomsky's (2004) mechanism of Pair Merge, or in Acedo-Matellán's (2010, p48, fn53) syntactic understanding of the A/AD:

> […] by no means do I want to imply that Borer's theory does not make a distinction between arguments and adjuncts. In fact, the distinction is very clear, since arguments are meant to be exclusively those XPs merged as specifiers of functional projections and providing range to their open values.

I discuss the syntactic A/AD in chapter 3. For this chapter, then, it is relevant to consider a version of the Well-Dressed Roots View (52b). Suppose that the use of argument introducers did not necessarily preclude there being argument-structural information on lexical verbs. For example, perhaps verbs could come into the derivation specified with a number of θ-roles[23] but be unable to *assign* their θ-roles to NPs. Argument introducers would play an intermediary role, assigning the θ-roles on behalf of verbs.

In order to leave room for the LEH, it would have to be *possible* for argument introducers to play such an intermediary role, but not *necessary* for them to do so, in the following sense.[24] Argument introducers should be *able* to cross-reference argument-structural information on the verb, but at least some of them must be able to contribute a θ-role to an event *without* cross-referencing the verb's argument structure. Specifically, adjunct θ-roles would be assigned without being cross-referenced on the verb.

Crucially, it does not have to be this way *a priori*. Presence or absence of θ-roles on a verb could in principle be an entirely distinct property than what is conventionally meant by the argument/adjunct distinction. The goal in the remainder of this chapter, then, is to examine evidence that might tell us to what extent lexical encoding aligns with the A/AD. Hence, the two

[23] Or, more likely, *i*-roles. See section 3.
[24] By this I do *not* mean that the verb should sometimes be able to assign a θ-role without the help of an argument introducer. I instead mean that argument introducers do not necessarily always have to assign a θ-role on behalf of a verb.

questions introduced in section 1.3, repeated in (54), with Question 1 reformulated in terms of θ-roles following the discussion in this subsection.

(54) Question 1: For an NP in a given sentence, what is the evidence that the θ-role assigned to that NP is lexically encoded on the verb?

Question 2: Given an answer to question 1, to what extent do patterns of lexical encoding support the Lexical Encoding Hypothesis?

Given the importance of the concept *θ-role* to this endeavor, I proceed in section 3 by outlining some basic assumptions about θ-roles, before turning to the alleged diagnostics for lexical encoding in sections 4-6.

3. Thematic relations

The alleged evidence for the semantic A/AD discussed in this chapter depends on the concept of *lexically-encoded thematic relations*, with θ-roles playing a particularly essential role in the properties of *compatibility* and *unique entailment* (cf. (27)). Lexical encoding of argument structure was discussed in section 2 above. This section addresses the concept of thematic relations.

It will be useful to adopt Dowty's (1991, cf. 1989) terminological distinction between *individual thematic roles* (*i*-roles) and *thematic role types* (θ-roles). *I*-roles are thematic relations encoded by a predicate which are to a certain extent unique to that predicate. That is, an *i*-role is part of the lexical entry of a predicate, and denotes information specific to that predicate.

Take the verb *eat*. The verb *eat* entails certain properties of its participants. In a sentence like (55), there are two specified participants, *Lee* and *a sandwich*.

(55) Lee ate a sandwich.

Of *Lee*, it is entailed that they take some material external to their body, and internalize it such that it enters their digestive tract. Of *a sandwich*, it is entailed that it is at one point an individuated object/substance in the external world, and no longer at a subsequent point when it begins to undergo the process of digestion. Because the specific combination of entailments associated with each participant is unique to the verb *eat* (or at least to a narrow class of near-synonymous

predicates), the verb *eat* can be taken to include at least two distinct *i*-roles, which we might call the *eater* and the *thing eaten*.

Koenig et al. (2003, p73-74), extending discussion from Dowty (1989b, p85), consider certain *i*-roles of *sing* and *write*. The verb *sing* in (56a) involves a participant, namely *Lee*, of whom it is entailed that their vocal folds are in motion, air is expelled from their vocal tract, and various other properties specific to singing. The verb *write* in (56b) involves a participant, namely *Lee* again, of whom it is entailed that they (in Koenig et al.'s (p74) words) "produce written exemplars of words or sentences." Critically, these entailments are distinct. There are specific entailments associated with the *singer* participant that are not associated with the *writer* participant, and vice versa. The same holds under comparison with the *eater* role of (55).

(56) a. Lee is singing.

b. Lee is writing.

In this sense, the *i*-roles *eater*, *singer*, and *writer* are all distinct from one another. Nevertheless, there are respects in which these *i*-roles can be considered to instantiate the same *type* of thematic relation. For example, they are all "agentive." That is, they are all "performed by an object [living things, certain types of machine, and natural agents] regarded as using its own energy in carrying out the action," (Dowty 1991, p553, citing Cruse 1973, p18-21; brackets are Dowty's). Moreover, the similarity between these *i*-roles seems to have linguistic consequences; all are realized as syntactic subjects in active voice, all appear in *by*-phrases in passives, etc. For such reasons, we might want a theory of thematic relations which includes a θ-role called *agent* encompassing each of the *i*-roles just discussed (*eater*, *singer*, *writer*), and various others sharing the same relevant properties.

Though the concept of θ-roles has been in widespread use since Gruber 1965 and Jackendoff 1972, there is no agreed-upon set of θ-roles. While many labels are in consistent use, especially regarding elements represented by prepositional phrases (e.g. *instrumental*, *benefactive*, etc.), there is no consensus as to the level of detail at which roles are to be defined, nor the criteria for establishing a set of *i*-roles as instantiating the same or distinct θ-roles. Unclarity is especially notorious with bare NPs (not introduced by PPs), as in (57).

(57) a. Lee resembles Terry.
b. Lee married Terry.
c. Lee bought the piano from Terry.
d. Lee sold the piano to Terry.

The predicates in (57a)/(57b) are symmetric; the subject and object appear to stand in the same thematic relations to one another. Dowty (1991, among others) points out the difficulty this poses for a theory of θ-roles: can we say that there are two distinct θ-roles instantiated in each of (57a)/(57b)? If so, what would distinguish them here? (57c)/(57d) pose a slightly different problem. Our intuition is to say that *Lee* is the agent in both sentences, yet (57c) and (57d) are synonymous, such that the relation between the oblique object and the subject in (57c) is the same as that in (57d). How then can *Lee* be associated with the agent role in both cases?

θ-roles themselves are not critical to the arguments of this dissertation; the proposals I adopt here do not generally hinge on the existence of a well-defined set of θ-roles. Instead, *i*-roles have a more important part to play, and θ-roles can be treated as useful abbreviations for sets of *i*-roles which are more-or-less similar to one another by a non-rigorous metric (e.g. by historical precedent). We can use θ-role labels like *agent, recipient* etc. in this way without making any commitment to the idea that these terms have a particular kind of status in the theory. Nevertheless, in this chapter, I argue against generalizations that are predicated on the existence of θ-roles. The development of a compelling argument in this direction requires provisional reference to θ-roles, which *are* supposed to have theoretical status in relevant approaches. This discussion therefore needs to be grounded with a working theory of θ-roles. I will now outline such a theory.

3.1. Identification of θ-roles

The theory of θ-roles assumed in this chapter is not intended to substantiate the notion "θ-role" as a component of the theory developed in the rest of this dissertation. Instead, it is meant to provide a practical basis on which to evaluate θ-role-based claims about semantic argumenthood, such as the purported *compatibility* and *unique entailment* properties of adjuncts (see (27b)/(27c) above). As such, the present system of θ-roles has different goals than a formal analysis of the θ-system, which would aim for a precise network of principles and hypotheses that could apply to predict

core θ-role-based phenomena, e.g. in the area of argument selection (as proposed by Dowty 1991).[25]

The present objective is simply to provide a method for identifying distinct θ-roles on the basis of principles which are either self-evident or sufficiently conventional to be adopted without argument. I take it the principles in (58) meet these criteria.

(58) a. Different *i*-roles of a single verb are different θ-roles.

b. Within a VP, a given *i*-role can be assigned only to a single syntactic constituent.

c. The same preposition (modulo lexical ambiguity) assigns the same θ-role with different verbs.

Principle (58a) provides the basis for a relation between *i*-roles and θ-roles. If an *i*-role *r* of a given verb instantiates θ-role T, then some other *i*-role *r′* instantiates some other θ-role T′. Compare with Dowty's (1989, p78) *distinctness* characteristic of θ-roles.

Principle (58c) serves the purpose of classifying *i*-roles across verbs. The assumption is that a given preposition P is linked to a given θ-role T, such that any sentence where P occurs entails T. This seems to be a widespread implicit assumption, uncontroversial enough to adopt here. It is important to note, however, that prepositions in English are highly ambiguous; there are only a handful of θ-role-denoting prepositions, with most prepositions associated with at least two distinct θ-roles.[26] Here, I assume that prepositions associated with multiple θ-roles are lexically ambiguous, rather than merely vague. I assume, for example, that there are at least two distinct *with*'s in the lexicon; one is instrumental, and one is comitative.[27]

(59) a. I built the shelf $\text{with}_{\text{instrument}}$ the tools.

b. I built the shelf $\text{with}_{\text{comitative}}$ my friends.

---

[25] Dowty's (1991) system, for instance, breaks down the roles *agent*, *patient*, *instrument*, *source*, etc. into proto-role features. Reinhart (2016) develops a similar system. Others (e.g. Jackendoff 1990b, 2002) have proposed to precisely define θ-roles in terms of their position in conceptual structure with respect to various primitive relations in a lexical predicate. These implementational issues can be ignored here, because my focus is simply on consistent identification of the boundaries between purported θ-roles.

[26] E.g. *with* is associated with the instrumental and comitative roles, *for* with the benefactive and durational roles, *to* is associated with the goal and recipient roles, *at* can be either locative or directional.

[27] As we will see, principles (58a) and (58b) can be used to tease out even more distinct roles denoted by *with*.

Principle (58b) corresponds to the θ-criterion of Chomsky (1981).[28]

(60) *θ-criterion*:

Each argument bears one and only one θ-role, and each θ-role is assigned to one and only one argument.

(Chomsky 1981:36)

Chomsky's original formulation is meant to account for certain aspects of the distribution of NP participants within the VP, particularly NP arguments. It also applies to CP complements. Some relevant examples are given in (61). The critical observation is that just one NP can be associated with the *thing eaten i*-role in (61a), and just one NP with the *recipient of gift i*-role in (61b). The same holds for the *thing said i*-role in (61c), which is realized by a CP.[29]

(61) a. *I ate [$_{NP}$ a sandwich] [$_{NP}$ a pizza].

b. * I gave [$_{NP}$ Lee] [$_{NP}$ Terry] the present.

c. *I said [$_{CP}$ that I'd attend] [$_{CP}$ that I'd bring chips].

Here, I restrict the θ-criterion to *i*-roles rather than θ-roles (cf. Chomsky's formulation (60)), because the relevant data directly implicate *i*-roles rather than θ-roles. For the examples in (61), we need some principle such as (58b) to block multiple NPs being associated with the same *i*-role. The extension to θ-roles depends on the particular theory of θ-roles we adopt and adds no predictive or explanatory power. I keep (58b) to *i*-roles for this reason.

A further aspect of the θ-criterion bears elaboration. Traditionally, the θ-criterion is used to restrict the distribution of NP and CP complements, and *perhaps* some PP complements. But it should be noted that the principle must apply for all PPs, including adjunct PPs, as illustrated in (62).[30]

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[28] Dowty (1989b, p79) gives a slightly different formulation.

(i) No two argument-positions of the same verb are assigned the same L-thematic role type.

Where *L-thematic role type* refers to a set of *i*-roles which has some special status in human language (as opposed to just some arbitrary set of *i*-roles having no special status in language), i.e., roughly a θ-role. A related concept "Univocality" is discussed in further detail in chapter 5.

[29] Throughout, the special case of apposition must be controlled for. If the second bracketed constituent in each of the examples in (61) is treated as an appositive, the sentences are all fine.

[30] Granting that the θ-criterion (58c) must apply to adjunct PPs raises certain questions about how exactly to implement this principle. Traditionally, it has been thought that θ-assignment in adjuncts is independent of argumental θ-

(62) a. * I thought [PP about Lee] [PP about Terry].

b. * I sailed [PP to the island] [PP to the shore].

c. *I built it [PP with my tools] [PP with a hammer].

d. * I went to the Halloween party [PP as a pirate] [PP as a zombie].

Example (62a) shows that two *about*-phrases cannot occur alongside the verb *think*, and (62b) shows the same for *to*-phrases with *sail*. Since these are typically considered argument PPs, these data suggest that, in addition to NP and CP complements (as in (61)), the θ-criterion should condition the distribution of PP arguments. (62c) shows that two instrumental adjuncts cannot occur alongside the verb *build*,[31] and (62d) shows the same for *as*-phrases. These data indicate the applicability of the θ-criterion to both argument and adjunct PPs. This will be further vindicated in the course of ensuing discussion (see sections 3.2 and 3.3).

With these principles, we have a precise mechanism for identifying distinct θ-roles among the participants in a specific event, and a less precise but workable mechanism for unifying those roles across predicates. First, by principles (58a) and (58b), we can tell that any two constituents occurring in a given predicate must be assigned distinct θ-roles. In an example like (63a), since two distinct constituents realize two distinct participants in the *eating* event, we can deduce that each one is assigned a different θ-role. By (58b), the *eater*-role assigned to *Lee* is a different *i*-role than the *thing eaten*-role assigned to *the pizza*, and by (58a), these distinct *i*-roles must be different θ-roles.

(63) a. [NP Lee] ate [NP the pizza].

b. Lee talked [PP to Terry] [PP about Casey].

c. Lee wrote a book [PP about the war].

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assignment. If that's the case, it becomes unclear how θ-assignment by adjuncts could be constrained by the θ-criterion. I return to this issue in chapter 5.

[31] On instrumentals, Tom Ernst (p.c.) finds the following example acceptable:

(i) I built it [with the drill] [with the new drill bits].

I find the example ok as well, but it seems clear it can't be extended much further, if at all. My hypothesis about this particular example is that the second *with*-phrase is not an instrumental, but an accessory comitative, as would appear in a sentence like *The builder arrived with the new drill bits*. See section 3.2.

The same reasoning applies in (63b) to distinguish the role assigned to *Terry* from the role assigned to *Casey*. Then, by principle (58c), it follows that the θ-role assigned to *the war* in (63c) is the same as that assigned to *Casey* in (63b).

I take the system of principles in (58) to distinguish between a number of commonly assumed θ-roles, including but not limited to the ones listed in (64).

(64) a. *Benefactive*:
Lee threw a party [PP for Terry].

b. *Comitative*:
Lee went to the store [PP with Terry].

c. *Locative*:
Lee sang [PP on the stage].

d. *Temporal*:
Lee left the party [PP at 10pm].

e. *Instrumental*:
Lee mixed the batter [PP with a whisk].

f. *Recipient*:
Lee gave the gifts [PP to Terry].

g. *Goal*:[32]
Lee swam [PP to the shore].

g. *Source*:
Lee stole the money [PP from the register].

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[32] I assume for the purposes of this dissertation *goal* and *recipient* are two different θ-roles. See Levinson (2005) for a detailed argument distinguishing the two roles. With the system of (58), it is relevant that *recipients* often can be bare NPs, while *goals* typically can't; i.e. *goals* don't participate in the dative alternation (Oehrle 1976, Harley 2002, Levin 2008, Rappaport-Hovav & Levin 2008). See footnote 33.

For example, take the contrast between (i) and (ii) from Levin (2008, p302). In (i), *the principal* must be interpreted as a locational goal, not a recipient; the children go to the principal's location, but don't become *possessed* by the principal. Thus, *the principal* can't undergo the dative alternation in (i). On the other hand, in (ii), it is perfectly possible for *the principal* to be a recipient, and therefore the dative alternation is allowed.

(i) a. The teacher sent the children to the principal.
b. #The teacher sent the principal the children.
(ii) a. The teacher sent the note to the principal.
b. The teacher sent the principal the note.

h. *Subject-Matter*:
Lee complained incessantly [$_{PP}$ about the bugs].

This system is limited to θ-roles associated with PPs. In addition to these, I will assume by convention that the core θ-roles *agent* and *patient* (or *theme*) are also valid. Additionally, I assume that NPs in alternation with PPs are assigned the same θ-role as the PP.[33] In double-object alternations, for example, I take the NP counterpart to a benefactive or dative PP to be assigned the *benefactive* or *recipient* role respectively.

(65) a. Benefactive NP:
i. Lee threw a party [$_{PP}$ for Terry].
ii. Lee threw [$_{NP}$ Terry] a party.

b. Recipient NP:
i. Lee gave the gifts [$_{PP}$ to Terry].
ii. Lee gave [$_{NP}$ Terry] the gifts.

This system allows us to draw certain relatively fine-grained distinctions among θ-roles that will be useful in this chapter and in following chapters. I will now take an aside from the main discussion to motivate fine-grained distinctions among benefactives, comitatives, and locatives. This is important, because it preempts a potential problem for the system just described, as I will now show.

3.2. Benefactives and comitatives

A potential difficulty for this system comes from the fact that certain PPs appear to be repeatable within a single VP. Take the benefactives and comitatives in (66), based on examples from Ernst (2002).

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[33] A formalization of (i) would incorporate these into the system, assuming a way of identifying NP-PP correspondences across alternations.
(i) Given two sentences S_1 and S_2 in an argument-structure alternation, if S_1 contains a bare NP complement corresponding to a PP in S_2, the same θ-role is assigned to NP and PP.
This would also accommodate the *agent* role, for example, by virtue of the passive, where the agent is expressed by a *by*-phrase.
(ii) Agent NP:
a. [$_{PP}$ Lee] broke the vase.
b. The vase was broken [$_{PP}$ by Lee].

(66) a. ?I baked it [for you] [for your parents].

b. ??The children are hiking [with the dog] [with their teacher].

These sentences may be odd (particularly (66b)), but not necessarily unacceptable. According to Ernst, they are grammatical to at least some extent. If both PPs in (66a) are benefactives, and if both PPs in (66b) are comitatives, this could[34] contradict the θ-criterion; the same benefactive role would be assigned to both PPs in (66a), and the same comitative role to the PPs in (66b).

The critical observation in defense of the θ-criterion is that iteration beyond two is difficult or impossible with benefactives and comitatives. It's very difficult to get sentences like (67),[35] and impossible to use four benefactives or four comitatives at once.

(67) a. *?I baked it [for you] [for your parents] [for a friend].

b. * The children are hiking [with the dog] [with their teacher] [with their parents].

The limitation to two (or possibly three in the case of benefactives) is most stark in comparison to locatives, which iterate unboundedly. Compare the degraded (67) with (68) involving locatives.

(68) I left it [in Columbus] [at the library] [in the back room] [on an old shelf].

The bound on iteration of locatives appears to be performance-based. From the perspective of syntactic competence, it seems any number of locatives can be used.[36] This is illustrated in (69), reaching 9 locatives. Imagine the following sentence uttered in response to someone proposing a new physical law which the speaker of this sentence finds outrageous.

(69) The laws of physics are supposed to be constant throughout the universe. But the law you've just proposed only holds [in the Milky Way] [in the Solar System] [on Earth] [in North America] [in the United States] [in Ohio] [near Columbus] [in an apartment] [in your stupid head].

---

[34] It would also be possible to treat the PPs as forming a single, complex PP constituent, as suggested by Roeper & Oseki (2018) and Chomsky (2021a, 2021b) for certain kinds of locatives. While this seems to sometimes be correct for locatives (see discussion in section 3.3), it does not seem correct for benefactives and comitatives.

[35] I find (67a) unacceptable, but Tom Ernst (p.c.) has suggested (67a) is possible under the right interpretation. If it is acceptable, I would expect it to involve *three* different types of benefactives. Suggestively, Van Valin & LaPolla (1997) and Bosse (2015) argue there are indeed three distinct types of benefactives.

[36] Subject to a condition of "concentricity": the locatives must be interpreted as overlapping. See section 3.3, as well as chapter 3.

Locatives thus serve as the exception that proves the rule for the θ-criterion. Though some PPs might appear to violate the θ-criterion to a limited extent, the violation is not unbounded, as illustrated by the comparison to unboundedly iterated locatives.

I return to the analysis of locative iteration from the perspective of the θ-criterion in the next subsection (section 3.3). For now, let us reconsider the data in (66). Given that apparent iteration is limited to two, there is a natural analysis according to which each "benefactive" in (66a) and each "comitative" in (66b) contributes a distinct θ-role.

Take (66a), with *it* being, e.g., a birthday cake. Support for the idea that the two PPs contribute distinct θ-roles comes from the fact that the two PPs seem to be interpreted differently. The sentence is acceptable under an interpretation where the baking occurred *for the sake of* or *at the request of* your parents, such that *you* receive the cake. For instance, (66a) could be used in a context where I'm the baker your parents hired to bake your birthday cake. Critically, (66a) does *not* work with an interpretation in which the two benefactives have the same status. That is, they can't both be the recipients of the cake, nor can they both have contracted the baking. In order to express those meanings, coordination is needed (*for you and for your parents*).

This difference aligns with Van Valin & LaPolla's (1997) and Bosse's (2015) distinction between *recipient benefactives* and *plain benefactives*. According to Bosse (p120), recipient benefactives are participants that "denote the (intended) possessor/ recipient," while plain benefactives are participants for which "there is some general benefit." Data such as (66a) are consistent with the θ-criterion if recipient benefactives and plain benefactives are thematically distinct, which is what I assume here.

What about the comitatives in (66b)? This example is less acceptable, but perhaps marginally possible according to Ernst (2001). I argue that, like the two benefactives in (66a) are necessarily interpreted as thematically distinct, thus the two comitatives in (66b) are also thematically distinct. I propose to distinguish between *ancillary comitatives*, which denote a purely circumstantial companion to a participant in the event (i.e. one of which active participation is not entailed), and *collaborative comitatives*, which denote an active participant in the event (i.e. one whose participation parallels that of another associated participant, as if the comitative were coordinated with another participant in the event). This distinction between ancillary and

collaborative comitatives mirrors Baker et al.'s (2013, p201) distinction between "true" and "adverbial" comitatives.

In support of the hypothesis that one of the comitatives in (66b) is an ancillary comitative and the other a collaborative comitative, observe that the sentence greatly improves in a context where the children are *carrying* the dog, so that the dog is an ancillary participant in the walking event.

(70) Context: The children and the teacher are hiking, and the children are carrying a dog.
The children are hiking [with the dog] [with their teacher].

Further support for these thematic distinctions comes from their behavior in different syntactic contexts. For example, Ernst (2002) reports that acceptability notably improves for (66a)/(66b) if one of the PPs is fronted.

(71) a. ?[For your parents], I baked it [for you].
b. ?[With their teacher], the children are hiking [with the dog].

The effect with benefactives is explained by Bosse's (2015) observation that plain benefactives are more easily fronted than recipient benefactives. This accords with the interpretation of (71a), where the strongly preferred reading takes *your parents* as a plain benefactive, and *you* as a recipient benefactive. The reverse interpretation, where *it* was baked with *your parents* as the recipient and *you* as the contractor is degraded at best, if not entirely unavailable. This supports the idea that plain and recipient benefactives are thematically distinct, because the distinction appears to be relevant for syntactic operations (here fronting).[37] This line of reasoning doesn't seem to apply straightforwardly to the comitatives, however.

I conclude that repetition of benefactives and comitatives does not pose a problem for the θ-criterion as a tool for identifying distinct θ-roles: the labels "benefactive" and "comitative" are actually too coarse. At the appropriate level of detail (distinguishing between *plain* and *recipient*

[37] Bosse (2015, p121, drawing on Kittilä 2005) also finds that recipient benefactives participate in double-object alternations, but plain benefactives do not. This is another way in which recipient and plain benefactives must be distinguished, further supporting the idea that they denote distinct θ-roles.

benefactives, and between *ancillary* and *collaborative* comitatives), repetition is not possible; hence the θ-criterion is respected.

3.3. Locatives

A further thematic distinction which will play a role in ensuing discussion is that between *event* locatives and *internal* locatives, on which I follow Maienborn (2001). Maienborn points out that a locative can be associated with two quite different interpretations with the same verb. Take the examples in (72), based on Maienborn (2001, p4).

(72) a. Lee boiled the water in the kitchen.
b. Lee escaped in the park.
c. Lee and Terry are sleeping in the living room.

The most natural interpretation of the locative in (72a) is that it denotes the location of the whole event. The same goes for the locatives in (72b) and (72c); they are most naturally construed here as describing the location in which the escaping event and the sleeping event respectively took place.

Compare the interpretation of these locatives with those in (73).

(73) a. Lee boiled the water in the pot.
b. Lee escaped on the bicycle.
c. Lee and Terry are sleeping on their backs.

The most natural interpretation of the locative in (73a) is that it constrains the location of the water: the water is in the pot. It doesn't necessarily say anything about *Lee*'s location. Thus, the locative in (73a) does not necessarily say anything about the location of the event as a whole, just about the location of a narrow element in the event. The same holds for the locatives in (73b) and (73c); they are most naturally construed here as describing the location of a circumscribed element of the event, not the event as a whole.

Along with Maienborn, Koenig et al. (2003) assume that these two sorts of readings are reflections of distinct thematic elements, an *event locative* θ-role and an *internal locative* θ-role. There does seem to be evidence for this distinction from the fact that the two elements can co-

occur. When there are two locatives in one sentence, one can get the *event locative* reading and the other can get the *internal locative* reading.

(74) a. Lee boiled the water in the pot in the kitchen.
b. Lee escaped on a bicycle in the park.
c. Lee and Terry are sleeping on their backs in the living room.

In (74a), the PP *in the pot* can be interpreted as the location of the water only, an *internal* locative (Lee doesn't have to be in the pot), while *in the kitchen* can describe the location of the whole event. Similarly, in (74b), the park can be the location of the entire event, with the bicycle as Lee's means of escape (the entire escaping event need not take place on the bicycle), and in (74c), the living room can be the event location, with Lee and Terry's backs as the narrow locations which support their sleeping.

Ordinarily, by the principles in (58), this would provide evidence for a thematic distinction between θ-roles. However, in the case of locatives, there is an additional confound which must be controlled for. Namely, locatives can be iterated unboundedly, as (69) illustrates.

Unless each locative denotes a distinct *i*-role, this potentially violates the θ-criterion. Fortunately, the interpretation of locative iteration is tightly constrained, in a way that supports the thematic distinction between event and internal locatives. Specifically, when we add a third locative to a sentence like (74a), it must be assigned one of two distinct interpretations, it either further specifies the internal locative, or it further specifies the event locative. Take (75).

(75) Lee boiled the water on the stove in the pot in the kitchen.

Consider a reading where *on the stove* denotes the location of the water in the boiling event and *in the kitchen* denotes the location of the whole event. Then *in the pot* can be interpreted in one of two ways. First, it could further specify the location of the water: the water is on the stove, more specifically, it is in the pot, which is on the stove. In this reading, *on the stove in the pot* denotes one, specific location, not two distinct ones. The single, specific location is interpreted as an internal locative.

The second possible interpretation for *in the pot* in (75) is that it specifies the location of the event as a whole. The whole event takes place *in the kitchen*, but more specifically, it takes

place *in the pot* (clearly this is pragmatically odd, but acceptable). In this case, *in the pot in the kitchen* denotes a single location, the location of the whole event.

It seems then that a single θ-role can be assigned to a whole *sequence* of locative PPs. To clearly identify the thematic distinction between event locatives and internal locatives, then, we can show that two *sequences* of locatives can denote two distinct locations in the event. (76) illustrates this: Two different *sequences* of locative PPs can bear two distinct θ-roles.[38]

(76) a. ?Lee boiled the water [on the stove in a pot] [in the mansion in a kitchen].
b. [In the mansion in a kitchen], Lee boiled the water [on the stove in a pot].

I take these facts to motivate a thematic distinction between internal locatives and event locatives.

4. Semantic obligatoriness[39]

As discussed above, this chapter asks two questions.

(77) Question 1: For an NP in a given sentence, what is the evidence that the θ-role assigned to that NP is lexically encoded on the verb?

Question 2: Given an answer to question 1, to what extent do patterns of lexical encoding support the Lexical Encoding Hypothesis?

We are now in a position to begin to consider the evidence pertaining to Question 1. As discussed in section 2, we assume for the sake of argument that, for any θ-role assigned in a given sentence, that θ-role may or may not be lexically specified as part of the verb. Thus, as a concrete step towards addressing Question 1, we might ask: in a sentence like (78), how do we tell whether the THEME role (assigned to *a sandwich*) is part of the lexical entry for *eat*?

(78) Terry ate [$_{\text{THEME}}$ a sandwich].

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[38] It is also relevant to point out that a sequence of locatives denoting a single, specific location forms a single complex syntactic constituent, as suggested by Roeper & Oseki (2018), Chomsky (2021a, 2021b), Goto & Ishii (2021), and Tom Ernst (p.c. 2021). Evidence for this comes from the fact that full sequences of locatives can be targeted by fronting operations, as in topicalization (i) or locative inversion (ii).

(i) [On the top shelf next to *Aspects*], we put the book.
(ii) [On the top shelf next to *Aspects*] sits *Syntactic Structures*.

These data suggest the sequence of PPs "*on the top shelf next to* Aspects" forms a single constituent.

[39] Note: I use the terms *(semantically) obligatory* and *(syntactically) non-omissible* for two different concepts. Omissibility (discussed in chapter 3) concerns overt syntactic realization. Obligatoriness is defined on p63 (see (84)).

The literature offers three core properties as potentially relevant. These are listed in (79) (repeated from (27) above).

(79) a. *Obligatoriness*: some thematic information may be entailed by a given verb, even if there are no syntactic correlates for the entailed thematic content.
(Dowty 1982:90; Huddleston & Pullum 2002:226(f); Goldberg 1995:43-44; Jackendoff 2002:134; Koenig et al. 2003:71-72; Schütze & Gibson 1999:410(2))

b. *Compatibility*: some thematic information is compatible with virtually any predicate, while other thematic information is compatible only with a semantically-restricted set of predicates.
(Dowty 1982:90; Huddleston & Pullum 2002:227(g); Jackendoff 2002:134, esp. fn16; Koenig et al. 2003:73(i); Schütze & Gibson 1999:410(2))

c. *Unique entailment*: some thematic information is relatively regular, in that it contributes the same interpretation whatever verb it appears with, while other thematic information carries verb-specific entailments, in that its interpretation is unpredictable from verb to verb.
(Dowty 1991:577fn19; Huddleston & Pullum 2002:227(h); Koenig et al. 2003:73(ii); Schütze & Gibson 1999:410(2))

The lexicon is used to encode non-predictable information about lexical items.[40] For example, the phonological form of a word is not predictable from its meaning, or vice versa; thus both must be encoded in a word's lexical entry. The idea behind the properties in (79) is that each one represents a potential property of θ-roles which would be *unpredictable* in some respect. As a result, some amount of information about the θ-roles with these properties must be lexically encoded.

In this section, I consider what the property of semantic obligatoriness tells us about lexical encoding of θ-roles (sections 5 and 6 then discuss compatibility and unique entailment, respectively). First, some examples to clearly illustrate what the property of obligatoriness is. Take (80).

[40] The lexicon is needed for non-predictable information generally. It must also encode idioms, for example, though this is not relevant for present purposes.

(80) a. Lee ate.
b. Lee ate something.
c. Lee ate with someone.

As discussed in section 1.1, sentence (80a) entails (80b). That is, even though a direct object is not expressed in (80a), the *i*-role (i.e. *thing eaten*) associated with that direct object is "understood," in the sense that we know there must have been *something* that filled that role. We can therefore say that the *i*-role *thing eaten* (or, for convenience, the PATIENT θ-role) is semantically obligatory. On the other hand, (80a) does not entail (80c); it is not necessary that there was a companion (either ancillary or collaborative, in the terms of section 3.2) to the eating.

For another example, take (81), with the *for*-phrase in (81c) treated as a plain benefactive.

(81) a. The robot delivered the pizza.
b. The robot delivered the pizza to someone.
c. The robot delivered the pizza for someone.

Sentence (81a) entails (81b); we cannot have a *delivering* event without a RECIPIENT to whom something is delivered. It is therefore understood in (81a) that, even though it is not overtly expressed, someone received the pizza. On the other hand, the robot may have been turned on by accident, operating at no one's request, and for no one's benefit. Thus, (81a) does not entail (81c); it need not be the case that the robot's delivery occurred *for the benefit of anybody*.

We can diagnose semantic obligatoriness by explicitly negating the participants in an event (cf. Jackendoff 2002, p134). With *eat*, we can say (82b), but not (82a), and with *deliver*, we can say (83b), but not (83a). This again shows that the PATIENT of *eat* is obligatory, while a COMITATIVE is not, and that the RECIPIENT of *deliver* is obligatory, while a BENEFACTIVE is not.

(82) a. #Lee ate, but they didn't eat anything.
b. Lee ate, but they didn't eat with anyone.

(83) a. #The robot delivered the pizza, but it didn't deliver it to anyone.
b. The robot delivered the pizza, but it didn't deliver it for anyone.

I take the contradiction of negation, as illustrated in (82) and (83), to indicate entailment: the PATIENT/RECIPIENT of (82a)/(83a) cannot be negated because they are entailed by the verbs. I will use this as a defining diagnostic for semantic obligatoriness.

(84) A given *i*-role or θ-role T of verb V is semantically obligatory if T's existence cannot be denied following a positive declarative sentence containing V with T unexpressed.

The remainder of this section is split into two subsections. Subsection 4.1 first considers precisely how obligatoriness requires lexical encoding of θ-roles; i.e. to what extent is obligatoriness of a θ-role *unpredictable* and thereby necessarily lexically encoded? Subsection 4.2 then applies obligatoriness to this chapter's Question 1 (i.e. for an NP in a given sentence, what is the evidence that the θ-role assigned to that NP is lexically encoded on the verb?) and Question 2; which θ-roles does obligatoriness actually require to be encoded, and to what extent does this align with the predictions of the LEH?

4.1. Necessity of lexical encoding

Grammatically relevant information must be stored in the lexicon if and only if that information is not predictable from independent information.[41] Obligatoriness of participants thus must be lexically encoded if and only if it is otherwise unpredictable. That is, it was just demonstrated above that some participants in an event are semantically obligatory, and others are not; obligatoriness would have to be lexically encoded to the extent that obligatoriness of different participants is idiosyncratic to the particular verb. If we can't predict which participants are obligatory and which are optional from independent principles, then this information will have to be encoded in the lexical entry for each verb.

Obligatoriness would be predictable if it correlated with θ-roles, or with some specific property of *i*-roles. For example, it could be that PATIENTS are always obligatory, while COMITATIVES are always optional. It could be that RECIPIENTS are always obligatory, while BENEFACTIVES are always optional. However, there is a vast amount of evidence this is not the case. Very similar *i*-roles may be obligatory or optional with different verbs. As one example, take the difference between *eat* and *swallow*, noted by Jackendoff (2002, p134). While *eat* entails a

[41] As Jackendoff (2002) points out, predictable information can still be stored in the lexicon. The point here is that predictable information *need not be* so stored. In contrast, *unpredictable* information *must* be stored in the lexicon.

PATIENT (i.e. the PATIENT of *eat* is obligatory), *swallow* does not. Sentence (85a) does not entail (85b), and a PATIENT can be expressly denied, as in (86).

(85) a. Lee swallowed.
b. Lee swallowed something.

(86) Lee swallowed, but they didn't swallow anything.

This shows that the PATIENT of *swallow* is optional. Other verbs with optional PATIENTs (and there are many) include *kick* and *punch*. Thus, it cannot be the case that PATIENTs are always obligatory. Whether a PATIENT is obligatory or not depends on the verb.

We can see the same pattern with RECIPIENTs; whether or not a RECIPIENT is semantically obligatory varies from verb to verb. With *deliver*, it is obligatory, as shown in (83a). The same holds for *pass* (i.e., of a ball); (87a) entails (87b), as demonstrated in (88).

(87) a. Lee passed the ball.
b. Lee passed the ball to someone.

(88) #Lee passed the ball, but they didn't pass it to anyone.

Yet RECIPIENTs are not always obligatory. Even though a RECIPIENT is *possible* with the verbs *throw* and *toss*, it is not *obligatory* with these verbs. It is possible to explicitly negate the existence of a RECIPIENT in (90), demonstrating that (89a) does not entail (89b).

(89) a. Lee threw/tossed the ball.
b. Lee threw/tossed the ball to someone.

(90) Lee threw/tossed the ball, but they didn't throw/toss it to anyone.

Many other thematic relations show the same pattern. A GOAL is required with *throw*, but not with *kick*; with *travel*, but not with *run*.

(91) a. #Lee threw the ball, but didn't throw it anywhere.
b. # Lee traveled, but didn't travel anywhere.

(92) a. Lee kicked the ball, but didn't kick it anywhere. (e.g. because it was fixed to the ground)
b. Lee ran, but didn't run anywhere. (e.g. because they were running on the treadmill)

A (COLLABORATIVE) COMITATIVE is required with *shake hands* and *go on a date*, but not with various other predicates with which COMITATIVEs are nonetheless compatible.

(93) a. #Lee shook hands, but didn't shake hands with anyone.[42]

b. # Lee went on a date, but didn't go on a date with anyone.

(94) a. Lee went on a walk, but didn't go on a walk with anyone.

b. Lee fell asleep on the couch, but didn't fall asleep on the couch with anyone.

In each of these cases, whether or not a given type of participant is obligatory depends on the particular verb being used. This suggests that obligatoriness must be specified in the lexicon, so that obligatoriness of similar *i*-roles can vary from verb to verb.

The need for lexical specification is amplified by additional idiosyncratic differences between obligatory elements. As Jackendoff (2002) points out, some semantically obligatory participants must be realized syntactically (i.e. they are also *syntactically non-omissible*), while others need not be, as illustrated by the difference between *fling* and *pitch* in (95), or the difference between *devour* and *eat* in (96).

(95) a. Lee flung *(the ball) hard.

b. Lee pitched (the ball) hard.

(96) a. Lee devoured *(a sandwich) violently.

b. Lee ate (a sandwich) violently.

I discuss syntactic (non-)omissibility in more detail in chapter 3. For present purposes, it is relevant to note that, while certain cases of (non-)omissibility may be explained by pragmatic factors (McConnell-Ginet 1994, Goldberg & Ackerman 2001, Ernst 2002, Glass 2020), there are also contrasts that can only be accounted for by lexical differences between verbs (Grimshaw 1979, Jackendoff 2002), as is the case with *devour* vs. *eat*. Syntactic omissibility of semantically obligatory elements must therefore be lexically specified.[43]

[42] Unless it is specifically stipulated that Lee shakes their own hand, in which case the required realization is (i), with a reflexive.

(i) Lee shook hands with themselves. (or *with themself*/*theirself* for some speakers)

[43] Though see Lohndal (2014, p47-48) for a potential counterpoint.

Among semantically obligatory participants that are syntactically omissible, there is a further division between anaphoric and indefinite participants (also noted by Grimshaw 1979, Dowty 1989, Jackendoff 2002). That is, some obligatory participants, when syntactically unrealized, can simply receive an indefinite or generic interpretation, as with *eat* in (96b). Others, however, depend on an antecedent in discourse, as with *go*. *Go* can leave its GOAL participant implicit, but only if there is an antecedent for it in prior discourse. In (97a), for example, the GOAL of *go* cannot be omitted in an out-of-the-blue context, but it can be omitted in (97b), where it is anaphoric to *the party*.

(97) a. A: What happened yesterday?
B: Lee went #(somewhere).

b. A: Who went to the party yesterday?
B: Lee went (to it).

The verb *travel*, in contrast, allows its GOAL to be omitted even in out-of-the-blue contexts, in which case it is interpreted as indefinite.

(98) A: What happened yesterday?
B: Lee traveled (somewhere).

I discuss these issues in more detail in chapter 3. Here, it is relevant to point out that the difference between anaphoric and indefinite participants varies from verb to verb, and does not seem to be predictable from, e.g., the type of θ-role. A GOAL role is anaphoric with *go*, but indefinite with *travel*, for instance. Thus, this distinction must also be lexically encoded.[44]

I conclude, along with Jackendoff (2002), Koenig et al. (2003), and many others, that obligatoriness must be lexically encoded (taking up the consequences for the A/AD in the next

[44] An entirely independent question is whether syntactically "omitted" elements are really absent or just covert. E.g., the obligatorily anaphoric participants might be *pro*. I will not address this issue here. All that matters from the present perspective is that, however the difference between anaphoric vs. indefinite semantically obligatory participants is implemented, it will require a form of lexical encoding.

subsection). I will assume that if a participant is semantically obligatory, then that participant is lexically encoded on the verb as an *i*-role with a feature [OBL].[45]

For example, since a recipient is semantically obligatory with *pass*, the lexical entry for *pass* must mark its recipient *i*-role with this feature, and hence *pass*'s recipient role must be listed as part of its lexical entry.

(99) *pass*: … recipient[OBL] …

Pass, with an obligatory recipient, is distinguished from, say, *throw*, with an optional recipient, in that *throw* does not have an [OBL] feature on its recipient (since the recipient is semantically optional with *throw*). Thus, the property of obligatoriness does not require that *throw* be lexically specified with a recipient.

The different subcases of semantically obligatory elements (indefinite/anaphoric/ syntactically non-omissible) can be encoded with subfeatures. For example, a syntactically non-omissible participant might have the feature [OBL$_{[SYN]}$], an omissible anaphoric participant might have the feature [OBL $_{[ANA]}$], and an omissible indefinite participant might have the feature [OBL $_{[IND]}$].

Given the conclusion that semantic obligatoriness does require lexical encoding to some extent, we can now consider what obligatoriness can tell us about the two main questions of this chapter.

4.2. Obligatoriness and the Lexical Encoding Hypothesis

The goal of this subsection is to consider the extent to which obligatoriness relates to the two main questions of this chapter. First, I will partially identify the sets of obligatory vs. optional thematic elements (Question 1). Rather than attempt to exhaust all the possible participants with different verbs, I will focus on specific participants with specific verbs, in cases that will be most relevant for relating these results to the semantic A/AD. For coherence with the discussion of the properties

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[45] Logically, it would also be possible to encode obligatoriness with an [OPT] feature signaling that the marked *i*-role is optional. With this logical alternative, *throw* would have its recipient specified with [OPT], while the recipient of *pass* could be unspecified.

(i) *throw*: … recipient[OPT] …

However, if we used a feature [OPT] instead of [OBL], we would need separate features to encode all the subcases for obligatory participants. The [OBL] feature is therefore preferable to the [OPT] feature

of compatibility and unique entailment in the following sections, I will center the discussion around θ-roles of different kinds. After identifying certain relevant elements as obligatory vs. optional, I will consider how this relates to the semantic A/AD (Question 2). I will show that obligatoriness alone does not yield patterns of lexical encoding which resemble the conventional A/AD in any way. Hence, support for the semantic A/AD must be augmented by additional semantic properties requiring lexical encoding, to be further explored in sections 5 and 6 (with the ultimate conclusion that the necessary additional support is lacking).

First, recall that, as shown in the previous subsection, some but not all PATIENTs, RECIPIENTs, GOALs, and COMITATIVEs are obligatory.[46] Relevant examples are repeated in (100)-(103).

(100) a. Obligatory patient:
  i. Lee ate, (#but didn't eat anything).

  b. Optional patients:
  i. Lee swallowed, (but didn't swallow anything).
  ii. Lee kicked, (but didn't kick anything).

(101) a. Obligatory recipients:
  i. Lee delivered the pizza, (#but didn't deliver it to anyone).
  ii. Lee passed the ball, (#but didn't pass it to anyone).

  b. Optional recipients:
  i. Lee threw the ball, (but didn't throw it to anyone).

(102) a. Obligatory goals:
  i. Lee traveled, (#but didn't travel anywhere).
  ii. Lee threw the ball, (#but didn't throw t anywhere).

[46] I am not listing the *agent* role here, though it also plausibly is sometimes obligatory and sometimes not. Unfortunately, more detailed arguments are required to show this than I am willing to go into here. A relevant example would be (i), where an agent is clearly not entailed. An agent is entailed, however, in passives, such as (ii).
(i) The boat sank.
(ii) The boat was sunk.

b. Optional goals:

i. Lee ran, (but didn't run anywhere).

ii. Lee kicked the ball, (but didn't kick it anywhere).

(103) a. Obligatory (collaborative) comitatives:

i. Lee shook hands, (#but didn't shake hands with anyone).

ii. Lee went on a date, (#but didn't go on a date with anyone).

b. Optional (collaborative) comitatives:

i. Lee went on a walk, (but didn't go on a walk with anyone).

ii. Lee fell asleep on the couch, (but didn't fall asleep on the couch with anyone).

In addition to these, sometimes ADDRESSEEs/EXPERIENCERs are obligatory, and sometimes they are optional. The verbs *speak*, *rehearse*, and *write* are clear examples where an ADDRESSEE/EXPERIENCER is possible, but not obligatory. For example, it is possible to speak without speaking *to* anyone (e.g. if one is simply speaking gibberish to the void). In contrast, there are also verbs such as *report*, *convey*, and *communicate*, where an ADDRESSEE/EXPERIENCER *is* obligatory. For instance, it is not possible to *report* something without there being someone to report it *to*.

(104) a. Obligatory ADDRESSEEs/EXPERIENCERs:

i. # Lee reported, but didn't report to anyone.

ii. # Lee conveyed their lines, but didn't convey them to anyone.

iii. # Lee communicated about their day, but didn't communicate to anyone about it.

b. Optional ADDRESSEEs/EXPERIENCERs:

i. Lee spoke, but didn't speak to anyone.

ii. Lee rehearsed their lines, but didn't rehearse them to anyone.

iii. Lee wrote about their day, but didn't write to anyone about it.

There are also some θ-roles which tend to be optional with every compatible verb. For example, as noted in the previous subsection, at least some BENEFACTIVEs are not obligatory. I know of no clear cases where a BENEFACTIVE clearly *is* obligatory.

(105) Optional BENEFACTIVEs:

a. The robot delivered the pizza, (but it didn't deliver it for anyone).

b. The machine produced a cake, (but it didn't produce it for anyone).

Additionally, ANCILLARY COMITATIVEs seem to be optional wherever they appear. I know of no cases where an ANCILLARY COMITATIVE is entailed when unexpressed. The examples in (106) show ANCILLARY COMITATIVEs which are optional.[47]

(106) Optional ANCILLARY COMITATIVEs:

a. Lee resigned from the office of US president, (but didn't do it with anyone).

b. Lee signed on as sole producer, (but didn't do it with anyone).

Other θ-roles seem to be obligatory whenever they appear. This seems to be the case for LOCATIVEs and TEMPORALs. I know of no instances where both a verb is compatible with a LOCATIVE and the LOCATIVE is not semantically obligatory with that verb. For every verb denoting an event, for instance, one of the thematic elements of the event must be a location in which the event takes place. As Koenig et al. (2003, p72) put it, citing Bresnan (1982), "location semantic dependents – more specifically those locations we call event locations – and time semantic dependents are entailed of almost all situations, despite the fact that they are widely believed to be adjuncts."

(107) Obligatory (event) LOCATIVEs:

a. Lee ate, (#but didn't eat at any location).

b. Lee talked to Terry, (#but didn't talk to them at any location).

c. Lee listened to the commotion, (#but didn't listen to it in any location).

d. Lee thought about leaving, (#but didn't think about it in any location).

Finally, I argue that INSTRUMENTALs have a similar status to LOCATIVEs: for every verb with which an INSTRUMENTAL could appear, an INSTRUMENTAL is obligatory. There are certain very clear cases of INSTRUMENTALs being obligatory even when covert, as in the examples in (108). In (108a), for instance, based on examples from Rissman et al. (2015), it is clear that one cannot chop something

[47] These examples are constructed to bring out the *ancillary* comitative reading over the *collaborative* comitative reading. See section 3.2.

without using something (probably a knife) to do the chopping. Further examples and relevant discussion can be found in Koenig et al. (2003), Rissman et al. (2015), and Kim et al. (2019).

(108) Obligatory INSTRUMENTALs:

a. Lee chopped something, (#but didn't chop it *with* anything).

b. Lee lashed the beams together, (#but didn't lash them together *with* anything).

c. Lee pricked Terry, (#but didn't prick them *with* anything).

d. Lee mowed the yard, (#but didn't mow it *with* anything).

Some have remarked that other cases are not so clear. Schütze (1995, p121-122), for example, comments that "[there is a] potential difficulty in ascertaining whether something is entailed (e.g., whether I broke the window entails the use of some instrument, possibly including a part of one's own body)." In other words, Schütze finds it unclear whether an INSTRUMENTAL is obligatory with the (transitive) verb *break*. Koenig et al. (2003) and Rissman et al. (2015) have offered similar reservations about obligatoriness of INSTRUMENTALs, with Rissman et al. proposing that obligatoriness is actually a gradient phenomenon (such that some INSTRUMENTALs may be more strongly entailed than others). Koenig et al. (2003) suggest that an INSTRUMENTAL is entailed with *chop*, but not with *eat*. As they say (p79), "*chop* describes situations which must include an instrument; in contrast, *eat* describes situations which can, but do not necessarily, include an instrument."

I contend that the difficulty here is in fact illusory. INSTRUMENTALs are semantically obligatory whenever they appear, just the same with *eat* and *break* as with *chop* or *lash*. This conclusion becomes clear once we admit that body parts can count as instruments, as evidenced by their complementarity with canonical INSTRUMENTALs. For instance, (109a) illustrates, by virtue of the θ-criterion, that *with their fists* saturates the same *i*-role as *with a rock* (since they could each occur independently, but cannot co-occur). Example (109b) illustrates the same thing with respect to *with their bare hands* and *with a knife*. Assuming the *i*-roles associated with *with a knife* and *with a rock* to be instances of the INSTRUMENTAL θ-role, this means the body-part *with*-phrases *with their fists* and *with their bare hands* are also INSTRUMENTALs.

(109) a. Lee broke the window with their fists (*with a rock).

b. (Astonishingly,) Lee chopped the vegetables with their bare hands (*with a knife).

Controlling for this then, *eat* and *break* clearly involve obligatory INSTRUMENTALs, as the examples in (110) attest. It is odd to assert that someone *ate* without using any instrument to eat with, where "instrument" includes things like their hands and mouth.

(110) a. #Lee ate lunch, but didn't eat *with* anything, not even a part of their body.
b. # Lee broke the vase, but didn't break it *with* anything, not even a part of their body.

Knowing of no cases where an INSTRUMENTAL is possible but not entailed (controlling for body-part instruments), I conclude that INSTRUMENTALs are obligatory whenever they are licensed.

4.3. Outlook based on semantic obligatoriness

Summarizing then, PATIENTs, RECIPIENTs, GOALs, COLLABORATIVE COMITATIVEs, and ADDRESSEEs/EXPERIENCERs can be either obligatory or optional, depending on the verb. BENEFACTIVEs and ANCILLARY COMITATIVEs tend to be optional, while LOCATIVEs, TEMPORALs, and INSTRUMENTALs tend to be obligatory.

(111) a. Sometimes obligatory:
patients, recipients, goals, collaborative comitatives, addresses/experiencers

b. Never obligatory:
benefactives, ancillary comitatives

c. Always obligatory:
locatives, temporals, instrumentals

Let's now turn to Question 2: to what extent do the patterns of lexical encoding identified above support the Lexical Encoding Hypothesis (LEH)?

Suppose we assume that obligatoriness demands lexical encoding. If so, then lexical encoding would be required for some but not all instances of the θ-roles in (111a), for no instances of the θ-roles in (111b), and for every instance of the θ-roles in (111c). This would pose major problems for the LEH, because it predicts highly unexpected boundaries for semantic argumenthood.

First, given that LOCATIVEs, TEMPORALs, and INSTRUMENTALs are always obligatory, these would always have to be considered arguments. While this might be less problematic for

INSTRUMENTALs, where there is a long history of debate over their argumenthood (see Schütze 1995, p124ff for a summary), LOCATIVEs and TEMPORALs pose a serious problem. LOCATIVEs and TEMPORALs are among the most prototypical adjuncts; if there is an A/AD at all, we can take it as given that LOCATIVEs and TEMPORALs should fall on the adjunct side of the divide. Yet if obligatoriness directly determines semantic argumenthood, they are considered arguments. See Bresnan (1980, p331), Schütze (1995, p121-122), and Koenig et al. (2003, p72) for the same conclusion.

However, recall that the LEH relates argumenthood not to the property of obligatoriness itself, but to the *lexical encoding* which follows from obligatoriness. Thus, Jackendoff (2002, p134, especially fn16), Koenig et al. (2003, p72-73), and others suggest a way around the LOCATIVE/TEMPORAL problem: even though LOCATIVEs/TEMPORALs might be semantically obligatory, this information does not have to be lexically encoded. The critical observation is that LOCATIVEs and TEMPORALs are *always* obligatory; thus, obligatoriness of LOCATIVEs and TEMPORALs could be stored as a property of the LOCATIVE and TEMPORAL *θ-roles* (assuming these exist), rather than as a property of *i*-roles in individual lexical items.

(112) *Obligatoriness condition for semantic argumenthood*:
Given a verb V with semantically obligatory θ-role T, T must be lexically encoded on V unless T is semantically obligatory with every compatible verb.

Even with this potential fix, obligatoriness alone does not provide support for the LEH; severe misalignments remain between the conventional A/AD and the predicted lexical encoding. We would still classify (on the basis of their semantic optionality) many PATIENTs, RECIPIENTs, GOALs, and ADDRESSEEs/EXPERIENCERs as semantic adjuncts, *including examples that are almost always considered semantic arguments*. PATIENTs, in their canonical realization as direct objects, are considered arguments virtually universally; if anything is an argument, PATIENTs are. Yet by the criterion of obligatoriness, many PATIENTs, being optional, need not be lexically encoded. RECIPIENTs also are nearly always considered arguments; the RECIPIENT of *throw* is specifically considered an argument by Huddleston & Pullum (2002, p220) and Dowty (2000, p72), among many others, yet it is optional (see (101) above). The same holds for most GOALs and ADDRESSEEs/EXPERIENCERs (e.g. *talk to*); these are typically considered arguments rather than adjuncts, and yet many of them are optional (see (102)/(104)).

Additionally, we revoke the possibility of lexically encoding – on the basis of obligatoriness alone – any (EVENT or INTERNAL) LOCATIVEs, TEMPORALs, or INSTRUMENTALs at all. Since these elements are always obligatory, there would be no reason for them to be lexically encoded, even though in many circumstances they are considered arguments, as with *reside*, *remain*, *stand*, and *sit* (see Bresnan 1994 for treatment of LOCATIVEs as arguments with these verbs).

Therefore, the patterns of lexical encoding required by obligatoriness align very poorly with the conventional notion of the A/AD. The classes of arguments and adjuncts are unrecognizable if we use obligatoriness as the sole diagnostic for it. I conclude that the criterion of obligatoriness cannot be the sole factor determining semantic argumenthood. Either obligatoriness plays no role at all in the semantic A/AD, or some additional properties must be taken into consideration.[48]

5. Compatibility (with broad vs. narrow classes of predicates)

This naturally leads us to the next property thought to play a defining role in the semantic A/AD, that of *compatibility* (see (119) below for a working definition). As just mentioned, Koenig et al. (2003) support the conclusion that obligatoriness cannot be the sole factor determining semantic argumenthood. Instead of rejecting a role for obligatoriness in the semantic A/AD, Koenig et al. point to an additional property requiring lexical encoding of thematic information. Specifically, they note that, given a theory of θ-roles categorizing *i*-roles into familiar classes such as AGENT, PATIENT, BENEFACTIVE, LOCATIVE, and so on (as discussed in section 3), certain θ-roles behave differently than others with respect to the range of predicates they can appear with.[49] Some θ-roles, such as the PATIENT role, are quite restricted in terms of the predicates with which they can appear. A PATIENT can occur with the verbs *jostle* and *fight*, for example, but not with a wide range of

[48] It is a logical possibility, of course, that traditional notions of the A/AD simply are completely wrong, and the *true* distinction between "arguments" and "adjuncts" looks nothing like almost every scholar assumes it does. I will not pursue this line of reasoning further here. If some critic prefers to totally redefine the A/AD along these lines, so that LOCATIVEs and TEMPORALs are always arguments, while many PATIENTs and RECIPIENTs are adjuncts, they are more than welcome to. See section 7 for further discussion of this point.

[49] It's important to bear in mind this all depends on the idea that there is a coherent theory of θ-roles. If it turned out that θ-roles did not exist as traditionally understood, the property of compatibility would be incoherent.

other verbs, including *convulse* or *struggle*, which would otherwise appear quite close in meaning to *jostle* and *fight* respectively.

(113) Lee { jostled / fought / *convulsed / *struggled } [Patient someone/something].

Other verbs with which a PATIENT is incompatible include *die, look, seem, recognize,* and many others.

RECIPIENTs are similarly limited. Many verbs are compatible with RECIPIENTs, such as *distribute* and *deliver*, but many others are not.

(114) Lee { distributed / deliver / *strewed / *insert } something [Recipient to someone].

At the same time, certain θ-roles would seem to be compatible with a much broader range of verbs. LOCATIONs and TIMEs, for example, seem to be compatible with just about any verb. Koenig et al. say that BENEFACTIVEs are similarly compatible with a broad class of verbs. They write as follows (from their p73):

> Constituents which encode event locations, times, or beneficiaries can co-occur with most event-denoting verbs (or nouns). In contrast, PPs expressing recipients, for example, cannot as easily combine with verbs (or nouns). In fact, we know of no verb which can combine with phrases which express recipients but not with phrases which express beneficiaries, event locations, and times. The set of verbs which can combine with constituents expressing beneficiaries, event locations, or time adverbials is thus significantly larger than the set of verbs which can combine with recipients

Many authors have cited this difference (between θ-roles which are *broadly* compatible, able to occur with just about any verb, and those which are *narrowly* compatible, able to occur only with a relatively restricted set of verbs), as a property distinguishing arguments from adjuncts (see, among others, Dowty 1982, p90; Huddleston & Pullum 2002, p227(g); Jackendoff 2002, p134, esp. fn16; Koenig et al. 2003, p73(i); Schütze & Gibson 1999, p410(2)). I refer to this purported property of the A/AD as *compatibility*.

(115) *Compatibility criterion for semantic argumenthood*:

Narrowly compatible θ-roles must be lexically encoded, but broadly compatible θ-roles need not be lexically encoded.

The idea is that, for example, PATIENTs and RECIPIENTs, in order to be compatible with a given verb V, must be specified on the lexical entry for V – by default, the PATIENT and RECIPIENT roles are incompatible with any given V. The broadly compatible roles (which presumably include at least LOCATIVEs and TEMPORALs) are always available with any V, and so don't need to be lexically specified to be licensed. This would make PATIENTs and RECIPIENTs semantic arguments, while LOCATIVEs and TEMPORALs could be semantic adjuncts.[50]

The goal of this section is to determine what compatibility can tell us about the two main questions of this chapter. On Question 1, exactly which θ-roles does compatibility require lexical encoding of, and on Question 2, to what extent do the results align with the predictions of the LEH? Ultimately, we would like to know whether a dichotomy between broadly and narrowly compatible θ-roles plausibly contributes to defining the semantic A/AD, as some proponents of the distinction hold.

The remainder of this section is split into three subsections. Section 5.1 first outlines the reasoning by which compatibility could be taken to demand lexical encoding. Section 5.2 then applies this reasoning, and section 5.3 relates the results to the semantic A/AD via the LEH.

5.1. Necessity of lexical encoding

The property of compatibility (115) requires lexical encoding only if it is unpredictable from verb to verb. For example, if some verbs are compatible with the RECIPIENT role and other verbs are not, and if it's arbitrary which verbs are which, then this must be a lexical property of each verb. The RECIPIENT role would then have to be lexically encoded in some way on the verbs with which it is compatible. It is thus implicit – in claims that compatibility requires lexical encoding – that compatibility, specifically narrow compatibility, is indeed arbitrary, unpredictable from, say, the conceptual meaning of the verb.

[50] Note that, so far in this section, compatibility has been left vague. Cf. section 4 on the diagnostic of semantic obligatoriness, where an operationalized definition (84) was given in the initial discussion. Problems with operationalizing the property of compatibility are discussed in section 5.1.

This subsection explores the rationale behind this idea. Why exactly should narrow compatibility of a θ-role require a form of lexical encoding? As a first step towards answering this question, we need to address a logically prior question, left unresolved above (see footnote 50). Namely, there is no formal diagnostic for determining whether a given θ-role should be considered broadly or narrowly compatible; how then do we know which roles to consider broadly compatible and which to consider narrowly compatible? In other words,

What empirically defines a θ-role as *broadly compatible* or *narrowly compatible*?

Compatibility is a property of θ-roles. It is therefore not possible to operationalize the property with a diagnostic applicable to individual verbs, as with obligatoriness.[51] That is, there is no test which we can apply to a given verb to determine whether its particular *i*-roles are broadly or narrowly compatible. Instead, broad vs. narrow compatibility of a given θ-role can be determined only by examining the behavior of that θ-role across a range of verbs.

This fact raises a potential problem. In theory, we would like to take a list of θ-roles and, for each θ-role in the list, check whether it is compatible with each verb in the lexicon. This procedure would yield an absolute numerical score for each θ-role, representing the number of different verbs that the θ-role is compatible with. "Broad compatibility" might then be defined by a threshold of some kind (e.g. "broadly compatible θ-roles are compatible with >95% of verbs").[52]

Unfortunately, this is not practical. We cannot be exhaustive, considering the compatibility of each θ-role with every single verb.[53] Additionally, the boundaries between θ-roles are not

[51] The diagnostic (84) proposed for obligatoriness applies to individual verbs. E.g., (84) could reach a conclusion like "the patient role of the verb *eat* is semantically obligatory." This is not possible for compatibility.

[52] One might think there is an additional potential problem here. Namely, judgments in many cases are gradient. A GOAL θ-role might be clearly acceptable with one verb, clearly unacceptable with another, and somewhere in between for a third. Given this, one might argue that compatibility should be analyzed as a gradient property instead of as a dichotomy (cf. Rissman 2010, Rissman et al. 2015, Kim et al. 2019). For the purposes of this chapter, that conclusion would be a red herring. Suppose we admit that compatibility is a gradient property of θ-roles. What would that tell us about lexical encoding? Even if we said that θ-roles can be, e.g., "50% encoded" on a verb, we would still need to identify a threshold under which (at least partial) encoding is required, and above which encoding is not required. The inference from gradience in judgments to gradience in grammar is independently problematic; see Armstrong et al. (1983) and discussion of that paper in Gorman (2013) and Yang (2018).

[53] It is relevant to note that Koenig et al. (2003) did conduct a study meant to approximate this (with 3909 verbs) for the AGENT, INSTRUMENTAL, TEMPORAL, BENEFACTIVE, EVENT-LOCATIVE, and INTERNAL-LOCATIVE roles. However, the study had important confounds suggesting that it may not have accurately identified compatibility of different θ-roles. See footnote 62.

always precise; the system described in section 3 for identifying θ-roles limits us to just the clearest cases.

Given these limitations, for the purposes of this chapter I will take LOCATIVEs and TEMPORALs to be the prototypical broadly compatible θ-roles, and I will consider aspects of the behavior of a limited number of other θ-roles in comparison to LOCATIVEs and TEMPORALs, as discussed in more detail below.

Let's now turn to the rationale behind the idea that compatibility of θ-roles can tell us something about lexical encoding.

Why should narrow compatibility require lexical encoding?

Recall that lexical encoding is closely tied to predictability. Therefore, a relevant question here is whether compatibility of a given θ-role T with a given verb V is *predictable* from some independently motivated property. In the case of *broadly compatible* θ-roles, we can safely say that compatibility with some V *is* predictable independently – that is, it is a property of the broadly compatible θ-roles themselves. If a LOCATIVE or TEMPORAL θ-role can occur with just about any V, then that property is predictable as a property of those θ-roles themselves, and doesn't need to be specified in V's lexical entry.

Thus, there is a clear rationale for why broad compatibility would *not* require lexical encoding. If a given θ-role would be compatible with any predicate, then no verb needs to be specified for compatibility with that θ-role. I will proceed assuming that TEMPORALs and LOCATIVEs meet this criterion; they do not require lexical encoding, because they can occur with essentially any predicate (as claimed by Jackendoff 2002, Koenig et al. 2003).

The rationale for why *narrow* compatibility *does* require lexical encoding is less straightforward. Say we find that a given θ-role is compatible with a certain range of predicates, but not with just any predicate. Take the RECIPIENT role, for instance; some verbs can have a RECIPIENT, and some verbs cannot, as (116) illustrates.

(116) a. Lee { feed / sacrifice / write / drive / sail } something [$_{\text{Recipient}}$ to someone].

b. Lee $\left\{\begin{array}{c}\text{*ate}\\ \text{*kill}\\ \text{*compose}\\ \text{*travel}\\ \text{*cruise}\end{array}\right\}$ something [$_{\text{Recipient}}$ to someone].

Why can *feed* take a RECIPIENT, when *eat* cannot? One explanation could hold that verbs are compatible with the RECIPIENT role only if they are *encoded* with a RECIPIENT feature in the lexicon. *Feed* would have the feature, and *eat* would not.

(117) a. $\left[\begin{array}{ll}\textit{feed}: & \text{AGENT}\\ & \text{PATIENT}\\ & \text{RECIPIENT}\\ & \vdots\end{array}\right]$

b. $\left[\begin{array}{ll}\textit{eat}: & \text{AGENT}\\ & \text{PATIENT}\\ & \vdots\end{array}\right]$

The property of compatibility as a diagnostic for semantic argumenthood presupposes this approach: narrowly compatible θ-roles can only occur with verbs that are encoded for them.

However, an alternative sort of explanation might hold that a verb's compatibility with a recipient is not determined by direct encoding of a RECIPIENT feature, but instead by some other, entirely independent feature.[54] There might be some feature [+F], which does not actually have anything directly to do with argument structure, but which determines compatibility with the RECIPIENT θ-role. *Feed* would have the feature, while *eat* would lack it.

(118) a. $\left[\begin{array}{ll}\textit{feed}: & +\text{F}\\ & \vdots\end{array}\right]$

b. $\left[\begin{array}{ll}\textit{eat}: & -\text{F}\\ & \vdots\end{array}\right]$

c. +F → compatible with RECIPIENT

On this approach, the property of compatibility is entirely independent of θ-structure. Narrowly compatible θ-roles actually *do not* require lexical encoding.

[54] Perhaps, e.g., aspectual class, agent entailments, or other properties pertaining to verb classes.

I will not attempt to empirically adjudicate between these two options, i.e. between (i) the hypothesis that a verb's compatibility with narrowly compatible roles is determined by lexical encoding, and (ii) the hypothesis that narrowly compatible roles are the same as broadly compatible ones with respect to encoding (i.e. neither is lexically encoded), but that narrowly compatible roles are licensed by independently-motivated lexical features. The question cannot be settled because it is impossible to prove that *there is no relevant feature* licensing a given θ-role. That is, although we can argue against specific extant or hypothetical proposals, there could always be a better proposal yet undiscovered.

If we adopt the latter position (represented by (118)), then this section would be finished. The conclusion would be that compatibility does not actually tell us anything about lexical encoding of θ-roles, and therefore that it is irrelevant for the LEH.[55]

Therefore, for the purposes of this section, I will explore the consequences of adopting the former position. The following subsection will consider the behavior of several different θ-roles, and will then discuss the consequences for the two main questions of this chapter.

5.2. Compatibility and the Lexical Encoding Hypothesis

This subsection applies the concept of compatibility to partially identify the set of narrowly compatible θ-roles. For practical reasons, I focus on crucial examples, rather than attempting to be exhaustive. I will specifically discuss RECIPIENTS, GOALS, BENEFACTIVES, and INSTRUMENTALS. In each case, I seek to identify the extent to which a given θ-roles is restricted in its distribution. I make the following practical assumptions, for the sake of argument.[56]

(119) a. Broadly compatible θ-roles are compatible with any verb, and do not require lexical encoding for this reason.

b. Narrowly compatible θ-roles are compatible with only a subset of verbs, and require lexical encoding for this reason.

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[55] In fact, this conclusion seems highly plausible. It has been defended by some neo-constructivists (e.g. Åfarli 2007, p14; Lohndal 2014, p46ff. Parsons 1990, p98-99 is also relevant). Goldberg (1995) proposes to handle compatibility along similar lines in Construction Grammar (see her Semantic Coherence Principle, p50).

[56] As noted in subsection 5.1, these assumptions can be contested. I adopt them here for the sake of argument, because they are necessary to motivate compatibility as a diagnostic for argumenthood. One could potentially make a strong case that compatibility does not require lexical encoding at all, in which case the problems of section 4 would remain.

Given this, identification of a given θ-role as *narrowly compatible* (potentially requiring lexical encoding) requires an argument that there is some subset of verbs with which the θ-role is not compatible. After running through the RECIPIENT, GOAL, BENEFACTIVE, AND INSTRUMENTAL θ-roles, I will consider whether the results, in conjunction with the results of section 4, could be taken to support the LEH.

Recipients

First, we can consider the case of RECIPIENTs, already discussed briefly above, in more detail. As (116) above showed (repeated here), some verbs are compatible with a RECIPIENT and some are not.

(120) a. Lee { feed / sacrifice / write / drive / sail } something [$_{\text{Recipient}}$ to someone].

b. Lee { *ate / *kill / *compose / *travel / *cruise } something [$_{\text{Recipient}}$ to someone].

This would imply that RECIPIENTs are narrowly compatible, and therefore would need to be lexically encoded.

Recall that the condition of semantic obligatoriness did *not* require lexical encoding of some RECIPIENTs. E.g., the RECIPIENT of *write* is not semantically obligatory, so obligatoriness alone would not require lexical encoding of RECIPIENT. Given that the RECIPIENT role is a canonical argument role (see e.g. Dowty 2000), this could have been taken as a problem for the LEH.

However, the conclusion that the RECIPIENT θ-role is narrowly compatible, and hence lexically encoded, would resolve this problem. RECIPIENTs would need to be lexically encoded for the purposes of compatibility, even if they are semantically optional.

Goals

Now consider GOALs. GOALs are well-known to be rather broad in compatibility. The so-called *caused motion construction* (Goldberg 1995, 2006, also Jackendoff 1990b, 2002) is notoriously flexible, as illustrated in (121).

(121) a. Lee sneezed the packing peanuts [$_{Goal}$ across the room].

b. Lee talked Terry [$_{Goal}$ into the corner].

c. Lee scared the kids [$_{Goal}$ back into the house].

d. Lee parried Terry's lunge [$_{Goal}$ into the ground].

e. Lee painted a mural [$_{Goal}$ into the alleyway].

At the same time, GOALs are similar to RECIPIENTs in that there are many readily available cases of verbs incompatible with GOALs.

(122) Lee { *saw / *ate / *created / *examined / *strewed } something [$_{Goal}$ into some location].

Compatibility of a given verb with a GOAL has been attributed in some prior literature to an independent feature of the verb, particularly the property of "causal force" (see e.g. Goldberg 2006, p100).[57] However, given the assumptions of this section, the data above would imply that the GOAL role qualifies as narrowly compatible; broadly compatible roles are not expected to be restricted in the verbs with which they can occur.

Thus, the GOAL θ-role would need to be lexically encoded. Since GOALs are typically (though not always, cf. Dowty 2000, among others) considered arguments, narrow compatibility of GOALs would be compatible with the LEH. It also resolves the potential problem of semantically optional GOALs, parallel to the problem of semantically optional RECIPIENTs discussed in the previous subsection.

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[57] There may independently be reason to doubt that "causal force" is the right property for compatibility with a GOAL. Consider data like (i). It is not clear that causal force distinguishes between these cases.

(i) Lee { walked / *traversed / *perambulated } into the park.

Instrumentals

Let us now consider INSTRUMENTALs. Recall that, by the criterion of obligatoriness, INSTRUMENTALs need not be lexically encoded (since they are always obligatory). Our question here is whether the INSTRUMENTAL θ-role is best characterized as broadly or narrowly compatible (and hence lexically encoded, or not, by the assumptions in (119)).

There is a significant literature on INSTRUMENTALs regarding their status as arguments vs. adjuncts, including questions about the readiness with which they co-occur with various predicates.[58] Certainly, like GOALs, INSTRUMENTALs are compatible with a wide range of verbs. However, it is well known that this compatibility is not absolute. Gruber (1965) noted that INSTRUMENTALs seem to bear some relationship to agentivity, such that in certain non-agentive contexts, INSTRUMENTALs are unacceptable.

(123) a. *John lost the book to Bill with bad luck.
b. * The board floated on the surface of the water with an inflated tube.
c. *The window broke with a hammer.

(Gruber 1965, p223-224)

(124) a. *Lee fell with a log.
b. * Lee died with a sword.

(adapted from Schütze 1995, p127, fn36)

Various authors have taken the restrictions on INSTRUMENTALs' compatibility to reflect a licensing condition related to agentivity (see e.g. Reinhart 2016; Rákosi 2006, p109ff).[59] However, given the assumptions (119) of this section, these data indicate that the INSTRUMENTAL θ-role is *narrowly compatible*. As such, INSTRUMENTALs would need to be lexically encoded.

The consequences of this conclusion for the LEH depend on whether we take it as given that INSTRUMENTALs should be treated as arguments/adjuncts. The most common position seems to be that INSTRUMENTALs are adjuncts, but, as mentioned, this has been contested. The conclusion that INSTRUMENTALs should be lexically encoded thus might be taken to pose a problem for the

[58] Schütze (1995, p124ff) gives a detailed summary of the relevant literature.
[59] On this view, instrumentals would not require lexical encoding. See section 5.3 for further discussion.

LEH, but it need not be problematic; it could merely indicate that INSTRUMENTALs are in fact semantic arguments.

Benefactives

We can now turn to BENEFACTIVEs. According to Dowty (1982) and Koenig et al. (2003), BENEFACTIVEs should be considered broadly compatible, and hence need not be lexically specified by the criterion of compatibility. Dowty (1982, p90, brackets added) writes that "one can add a benefactive to virtually any [verb phrase] whatsoever," and Koenig et al. (2003, p72-73, brackets added) say that "most events occur […] for the benefit of somebody. Constituents which encode […] beneficiaries can co-occur with most event-denoting verbs (or nouns)."

Surely, many verbs are compatible with benefactives. Whether or not *most* verbs are is difficult if not impossible to say, as judgments in many cases are unclear. However, simply being compatible with many different verbs does not necessarily qualify a θ-role as broadly compatible. As we have seen in the preceding subsections, different kinds of θ-roles may be compatible with many different verbs, and yet there may still be an argument that the θ-role is narrowly compatible. GOALs and INSTRUMENTALs are quite flexible, compatible with a wide variety of verbs, and yet it is far from obvious that they can be characterized as broadly compatible.

We should ask about BENEFACTIVEs, then, whether their compatibility really is absolute, as Dowty and Koenig et al. suggest. In fact, it seems the answer is no. There are many verbs which fail to license a BENEFACTIVE. Rákosi (2006) gives (125a), indicating that a BENEFACTIVE is incompatible with *know*. To this, I add the additional examples in (125b)-(125g), showing that a variety of other verbs are incompatible with a BENEFACTIVE.[60]

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[60] It is important to distinguish the BENEFACTIVEs in these examples from perspectival *for*-phrases. I assume that in examples such as (i) and (ii) from Richardson (1985), the *for*-phrase denotes a perspective, rather than a BENEFICIARY.

(i) The sun shines for rich and poor alike.

(ii) The parachute wouldn't open for Reginald.

The *for*-phrases here can be distinguished from BENEFACTIVEs in that the NP complement to *for* need not be understood to benefit from the event. The shining sun could be understood as a bad thing, and (i) would still be felicitous. Compare with (iii), with a plain BENEFACTIVE. For this sentence to be acceptable, Lee's singing has to (be expected to) benefit Terry.

(iii) Lee is singing for Terry.

Note that with some of the verbs in (125), a perspectival *for*-phrase can occur. Example (iv) illustrates with a weather verb.

(iv) Terry and Lee had their wedding in April, and Casey and Avery had their wedding in September.
It rained for Terry and Lee, but it didn't rain for Casey and Avery.

(125) a. *I know the answer for Kate.

b. * It's hot out for Lee.

c. *It seems for Lee that everything's coming up daisies.

d. * An explosion occurred for Lee.

e. *Lee heard the sudden crack of thunder for Terry.

f. * Lee inherited a million bucks for Terry.[61]

g. * Lee got hungry for Terry.

How do we capture the fact that verbs such has those in (125) are incompatible with BENEFACTIVEs, while many others are compatible with them? On the one hand, we might relate the availability of a BENEFACTIVE to the presence of an AGENT, as Rákosi (2006, citing Marelj 2005) does. The idea is that the sentences in (125) are unacceptable because the verbs there are not agentive. Verbs which have an AGENT, such as those in (126), are compatible with a BENEFACTIVE.

(126) a. Lee researched the answer for Terry.

b. Lee heated the room for Terry.

c. Lee caused an explosion for Terry.

d. Lee listened to the sudden crack of thunder for Terry.

On the other hand, given the assumptions of this section, data like (125) indicate that there is a subset of verbs with which the BENEFACTIVE θ-role is not compatible. As such, the BENEFACTIVE role would need to be lexically encoded.[62]

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[61] In my judgment, this sentence is unacceptable with a PLAIN-BENEFACTIVE reading, paraphrased by (i), but it is acceptable with a DEPUTATIVE-BENEFACTIVE reading, paraphrased by (ii).

(i) # Lee inherited a million bucks for the sake of Terry.

(ii) Lee inherited a million bucks on Terry's behalf.

[62] As noted above, Koenig et al. (2003) claim that BENEFACTIVEs are broadly compatible to the same extent as LOCATIVEs and TEMPORALs. I reach a different conclusion here. I believe the reason why Koenig et al. reached the opposite conclusion involved the methodology of their study. As mentioned in footnote 53, their study used a set of 3909 verbs from the English lexicon. Participants were trained to assess questions like (i) for each verb in the list. Similar questions were asked for a number of different θ-roles. Question (i) was specifically meant to get at compatibility with a BENEFACTIVE.

(i) Does the verb describe situations which must, can, or cannot be performed for the benefit of someone or something? (e.g. Mary in Marc cooked a wonderful dinner for Mary)?

However, certain events can happen "for the benefit of someone" but that does not necessarily mean that a verb describing such an event is compatible with a BENEFACTIVE. An event of *seeming* as in (i) could certainly benefit someone, but *seem* is not compatible with a BENEFACTIVE.

(ii) It seems (*for Lee) to be hot out.

As such, the study may have overestimated how broadly compatible BENEFACTIVEs are.

If we conclude that BENEFACTIVEs are lexically encoded, then this poses a problem for the LEH. BENEFACTIVEs are among the most prototypical adjuncts (for instance, Koenig et al. 2003 list BENEFACTIVEs together with LOCATIVEs and TEMPORALs as clear examples of adjuncts).[63]

This subsection has examined a number of θ-roles to determine whether they are broadly or narrowly compatible. In summary, all four roles addressed (RECIPIENTs, GOALs, INSTRUMENTALs, AND BENEFACTIVEs) are to be considered narrowly compatible, in the sense that there are restrictions on which verbs they can co-occur with. If narrow compatibility requires lexical encoding (as required if compatibility is to be a diagnostic for argumenthood), then this means all these θ-roles should be considered arguments.

The next subsection turns to the consequences of this for the LEH.

5.3. Outlook based on compatibility and obligatoriness

Consider the two main questions of this chapter.

(127) Question 1: For an NP in a given sentence, what is the evidence that the θ-role assigned to that NP is present on the verb?

Question 2: Given an answer to question 1, to what extent do patterns of lexical encoding support the Lexical Encoding Hypothesis?

The previous subsections addressed Question 1. I argued that, if compatibility is a diagnostic for semantic argumenthood, then narrow compatibility should require lexical encoding; if a verb can occur with a narrowly compatible θ-role, then that θ-role must be lexically encoded on the verb. Given this, I found that the RECIPIENT, GOAL, INSTRUMENTAL, AND BENEFACTIVE θ-roles would all need to be lexically encoded.

I conclude this section by considering the consequences of this for Question 2. First, recall the problems for the LEH which we encountered in section 4 with obligatoriness alone. According to the LEH, we should find that all and only the arguments of a verb must be lexically encoded on it. However, many canonical arguments are not semantically obligatory (including many PATIENTs,

[63] An exception is Baker (1985), who suggests that locatives, benefactives, and instrumentals are all actually arguments. This is a radical departure from the conventional A/AD.

RECIPIENTs, and GOALs), and so would not need to be lexically encoded from the perspective of obligatoriness. This would appear to contradict the LEH.

Another problem involves LOCATIVEs. Since LOCATIVEs are always obligatory, they do not need to be lexically encoded by the criterion of obligatoriness (112). If we take obligatoriness alone to require lexical encoding, then the LEH would classify all LOCATIVEs as adjuncts. This is another potential problem for the LEH, since LOCATIVEs are not always considered adjuncts (see (128) below).

Next, consider how compatibility resolves or does not resolve these problems. Take the problem of semantically optional "arguments." Compatibility has been claimed (by e.g. Jackendoff 2002, Koenig et al. 2003) to resolve the apparent problem through the stipulation that, e.g., PATIENTs are narrowly compatible. PATIENTs thus need to be lexically encoded, even if they are semantically optional. However, while this resolves the problem for optional PATIENTs (and arguably for GOALs and RECIPIENTs, which would also be narrowly compatible), it extends lexical encoding too far, so that it also covers INSTRUMENTALs and BENEFACTIVEs. I argued that INSTRUMENTALs and BENEFACTIVEs should also be considered narrowly compatible (i.e. there are verbs which they cannot occur with). This is a problem for the LEH, because it would imply that INSTRUMENTALs and BENEFACTIVEs should be considered arguments.

The problem of LOCATIVEs is also not resolved. Given that LOCATIVEs are assumed to be broadly compatible, we lack any way of justifying lexical encoding of LOCATIVEs. This is fine for LOCATIVEs which are conventionally considered adjuncts, but not all LOCATIVEs are. The verbs *remain*, *reside*, *live*, *sit*, *stand*, and *tower* are all normally analyzed as taking a LOCATIVE argument.

(128) a. Lee remained [PP in the house].
b. Lee resides [PP in an apartment].
c. Lee lives [PP in Columbus].
d. Lee sat [PP on a stool].
e. Lee stood [PP on the mat].
f. Lee towered [PP over Terry].

Lexical encoding of such LOCATIVEs would not be supported by compatibility. This conflicts with the LEH.

In summary, while compatibility may resolve certain gaps left by obligatoriness, it cannot do so without also introducing new problems. Additionally, it fails to solve the problem of LOCATIVEs. In the following section, I consider the property of *unique entailment* and the consequences it has for lexical encoding. It will be seen that this last property yields results fatal to the idea that the A/AD has a basis in lexical encoding.

Before doing so, I would like to make one final comment on compatibility. I mentioned at different points above that the relevance of compatibility for lexical encoding cannot be taken for granted. That is, although I assumed *for the sake of argument* that narrow compatibility requires lexical encoding of θ-role, it is also plausible that compatibility might have nothing to do with lexical encoding of θ-roles. Instead, compatibility might follow from entirely independent properties. The literature has offered possible analyses along these lines for many narrowly compatible θ-roles. I mentioned above the relation of INSTRUMENTALs and BENEFACTIVEs to agentivity, and the possibility that compatibility with a GOAL might be connected to the notion "causal force." If these ideas are on the right track, then there would be no reason to expect compatibility to tell us anything about the LEH.

Moving forward, I will assume that this alternative position is indeed on the right track. Compatibility of θ-roles with different verbs is not a matter of lexical encoding of the θ-roles. It is instead derived from independent properties of the verbs, such as agentivity. Compatibility of a GOAL (a narrowly compatible θ-role, being compatible only with a subset of verbs) with the verb *sneeze* but not *see* does not then imply that *sneeze* has a GOAL feature and *see* does not. It instead implies that *sneeze* has some other independent property which *see* lacks. Therefore, in considering the property of unique entailment in the next section, I take it that the problems raised by obligatoriness (that of optional PATIENTs/RECIPIENTs/etc. and that of "argument" LOCATIVEs) remain unresolved.

6. Unique entailment

This brings us to the final criterion motivating lexical encoding of thematic information. The *unique entailment* criterion is based on the observation that certain θ-roles are associated with distinct, specific entailments with different verbs. The examples from section 3 involving the AGENT θ-role are illustrative. The verbs *eat*, *sing*, and *write* all have an AGENT, but it means something different to be the AGENT of an eating event than it does to be the AGENT of a singing

or writing event. An *eater* (i.e., an agent of an eating event) has to ingest some external material, beginning the process of digestion, but this is not required of the AGENT of a singing or writing event (which have their own, distinct properties). Hence, the AGENT θ-role can be said to carry *unique entailments*; the entailments contributed by an AGENT are not constant across predicates.

Other θ-roles are, by comparison, constant across predicates. An EVENT-LOCATIVE, for example, always contributes the same entailments, whatever verb it happens to occur with (at least according to some authors, such as Dowty 1989, Koenig et al. 2003, and Hunter 2009). Such θ-roles can be called *regular* in interpretation.

The idea is that unique entailment demands some form of lexical encoding. Specifically, thematic information carrying unique entailments would be analyzed as lexically encoded *i*-roles, while un-encoded θ-roles would receive a regular interpretation.

(129) *Unique entailment criterion for semantic argumenthood*:
Lexically encoded *i*-roles may carry unique entailments, but un-encoded θ-roles cannot carry unique entailments.

This section considers the consequences of this principle for the semantic A/AD via the LEH. As in the previous two sections, I begin by outlining the reasons why this property requires lexical encoding. Next, I apply this reasoning in a number of specific cases, to partially identify the set of θ-roles which require lexical encoding by the principle of unique entailment. I then consider the consequences these results have for the semantic A/AD. In the end, I argue the semantic A/AD is not supported. The broader consequences of this conclusion will be discussed in the next section (section 7).

6.1. Necessity of lexical encoding

Dowty (1989, p85) offers a clear argument for lexical encoding based on unique entailment. Say that a given θ-role T is associated with entailment P with verb V_1, and is associated with the distinct entailment Q with verb V_2. Given that the entailments P and Q associated with T differ from verb to verb, P and Q cannot be intrinsic to T. Instead, P and Q must follow from some property of V_1 and V_2 respectively. Dowty points out that the natural way to capture this is to say that P is an entailment of the *i*-role instantiating T on V_1, while Q is an entailment of the *i*-role instantiating T on V_2.

The argument is reproduced by Koenig et al. (2003, p74), referring specifically to the case where T is AGENT, and where V_1 is *sing* and V_2 is *write*. The AGENT of *sing* is associated with a particular entailment P = moving vocal folds, which is not associated with the agent of *write*, and the AGENT of *write* is associated with a particular entailment Q = producing writing, which is not associated with the AGENT of *sing*. In order to capture this, Koenig et al. assume that *sing* is equipped with an *i*-role *writer* which instantiates the AGENT θ-role, and *write* is equipped with its own *i*-role *singer* instantiating the AGENT θ-role. The *singer i*-role is understood to denote a set of entailments (of event participants), one of which is P, and the *writer i*-role is understood as a set of entailments including Q.

(130) a. [∃e, *x*. *singer*(e, *x*)] → *x*'s vocal folds move

b. [∃e, *x*. *writer*(e, *x*)] → *x* produces writing

Thus, Koenig et al. argue that θ-roles with unique entailments are lexically encoded as *i*-roles. The verb *sing* will have as part of its lexical entry an *i*-role *singer* with the property (130a), and the verb *write* will have as part of its lexical entry an *i*-role *writer* with the property (130b).

(131) a. *sing*: … singer …

b. *write*: … writer …

Critically, not all θ-roles seem to behave like the AGENT θ-role. According to Dowty, Koenig et al., and others, some θ-roles, like the EVENT-LOCATIVE θ-role, make essentially the same contribution across predicates, with entailments remaining relatively constant across verbs. If that's the case, then compositionality does not require that these θ-roles be lexically encoded as *i*-roles. If they make the same contribution across verbs, they can exist as verb-independent θ-roles only. There will not need to be a special *location-of-singing i*-role for *sing*, or a special *location-of-writing i*-role for *write*. Locative thematic information can be added to the verbs *sing* or *write* in the same way, i.e. by conjunction with a constant *location* predicate.

It is important to note that this reasoning is not indisputable. Lexical encoding for unique entailments is required only to the extent that the unique entailments are not predictable from independent factors. It would *not* be necessary to encode an *i*-role *singer* with the entailment (130a) if (130a) could be derived from some other independently motivated property. For example, it is possible that the unique entailments identified by Koenig et al. simply follow in a regular way

from real world knowledge. If our relevant assumptions about the world changed, then so would the observed entailments. Suppose, for instance, that a bird is singing, or a robot for that matter. The entailments associated with the AGENT role change under these conditions.[64]

Thus, as with compatibility, there is an alternative approach according to which the property of unique entailment does not necessarily require lexical encoding of thematic information. If this alternative approach were accepted, then this section would be over; unique entailment would not bear on the LEH. We would therefore have to evaluate the LEH on the basis of semantic obligatoriness alone (assuming obligatoriness *does* require lexical encoding).

For the sake of argument, then, I will assume in this section that unique entailment does require lexical encoding, following Dowty's and Koenig et al.'s argument that unique entailments associated with θ-role T requires lexical encoding of an *i*-role on verbs with which T occurs.

We can thus ask, for a given θ-role T, whether T carries unique entailments in the sense just described, and hence whether T needs to be lexically encoded as an *i*-role in order to be interpreted. A conclusion one way or the other depends on the existence of unique entailments idiosyncratic to different verbs, such as the AGENT entailments in (130). If the θ-role's semantic contribution appears to be constant across different verbs, then it has a *regular* interpretation, and it need not be lexically encoded. If its semantic contribution varies from verb to verb, then it carries *unique entailments*, and it must be lexically encoded.

The next two subsections consider the relevance of the unique entailment diagnostic for the two main questions of this chapter.

(132) Question 1: For an NP in a given sentence, what is the evidence that the θ-role assigned to that NP is present on the verb?

Question 2: Given an answer to question 1, to what extent do patterns of lexical encoding support the Lexical Encoding Hypothesis?

Section 6.2 addresses Question 1 by examining several different θ-roles in this respect, specifically GOALs, INSTRUMENTALs, INTERNAL-LOCATIVEs, and COLLABORATIVE-COMITATIVEs. Section 6.3

[64] In fact, this alternative analysis plays an important role in the semantic analysis of events as consisting of independent, conjoined thematic predicates. Parsons (1990, p98-99) gives relevant discussion.

deals with Question 2. In the end, I will conclude that the criterion of compositionality fails to resolve the problems generated in the previous sections, and introduces new critical problems. Namely, it requires that many θ-roles be lexically encoded which ought (by convention) to be considered adjuncts. In the final section of this chapter (section 7), I argue that these facts pose an insurmountable problem for the semantic A/AD.[65]

6.2. Unique entailment and the Lexical Encoding Hypothesis

As just mentioned, I will now consider a variety of θ-roles' behavior with respect to the unique entailment diagnostic. I will first describe the behavior of GOALs, which seem to have a regular interpretation (according to Dowty 1989, 2000 and Koenig et al. 2003). Then, I will discuss some examples of θ-roles associated with unique entailments, including INSTRUMENTALs, INTERNAL-LOCATIVEs, COLLABORATIVE-COMITATIVEs, and MANNER adverbs.

Goals

First, GOALs. According to Dowty (2000, p60), GOALs are always interpreted in the same way: "the *to*-PP always adds the information that the object of *to* denotes the new location at/near which the direct object referent ends up as a result of the action performed on it." This is illustrated in examples like (133) from Dowty.

(133) a. Mary kicked the ball to the fence.
b. John pushed the desk to the wall.
c. Sue slid the paperweight to the edge of the table.

(Dowty 2003, p60)

It also holds for more exotic examples, like Goldberg's (1995, p3) *sneeze the napkin off the table*. For this reason, the GOAL θ-role can be considered regular, and does not require lexical encoding by the criterion of unique entailment.

Notice that this is potentially problematic if we take GOALs to be among the canonical arguments. We have seen in section 4 that GOALs are often semantically optional, and thus are not

[65] As mentioned in footnote 48 (p74), it is always logically possible to radically redefine the semantic A/AD to comport with the results of this chapter. However, this would be highly misleading, because the A/AD is an already-existing notion. By so radically redefining it, we are really inventing a new concept. See section 7.

required by that criterion to be lexically encoded. If GOALs have a regular interpretation (without unique entailments), then those potential problems remain unresolved.

Instrumentals

Now consider the case of INSTRUMENTALs. INSTRUMENTALs are arguably always semantically obligatory, and so would not necessarily have to be lexically encoded by the criterion of obligatoriness. However, Schütze (1995) offer strong evidence that the interpretation of the INSTRUMENTAL θ-role varies unpredictably from verb to verb. Consider Schütze's (1995, p128) examples in (134), which he attributes to Dowty (1994).

(134) a. record the event with a video camera
sight the bird with a telescope
solve the problem with ingenuity
[no entailment that instrument changes position]

b. hit the nail with a hammer
sweep the floor with a broom
crack open the safe with a crowbar
[instrument moves, but not to a specific endpoint]

c. fasten the picture with nails
enrich the soil with fertilizer
weight the ship's hold with rocks
[instrument ends up in a specific position]

d. fill the glass with wine
cover the table with books
[instrument has higher degree of affectedness, often comparable to direct object]

The INSTRUMENTALs in each set of sentences are subject to a unique entailment (shown in brackets).[66] Thus, it is clear that the interpretation of an INSTRUMENTAL depends upon the verb

[66] Notice that the entailments arise independent of the particular instrument used; all the same entailments occur if the instruments are replaced with body-part nouns (where these are possible). In (134a), to *sight the bird with one's eyes* fails to entail any movement of the *eyeball* instrument, but in (134b), to *sweep the floor with one's feet*, movement (to an unspecific endpoint) is entailed of the *feet* instrument.

with which it is used. Therefore, INSTRUMENTALs are associated with unique entailments, meaning they must be lexically encoded.

As mentioned in section 5.2, there is a debate in the literature on the argumenthood of INSTRUMENTALs, with some arguing that they should be considered arguments. However, the conventional assumption is that they are adjuncts. If so, then the lexical encoding of INSTRUMENTALs poses a difficulty for the LEH; it represents a misalignment between the set of lexically encoded θ-roles and the set of conventional argument θ-roles.

Internal locatives

The unique entailment diagnostic also faces a potential problem with INTERNAL-LOCATIVEs. INTERNAL-LOCATIVEs are normally considered adjuncts (as by, e.g., Maienborn 2001), but they are nevertheless often associated with unique entailments. Consider the LOCATIVEs in (135).

(135) a. Lee fled [on a bicycle].
b. Lee boiled water [in a pot].
c. Lee carried the books [in a backpack].
d. Lee signed the contract [on the last page].
e. Lee branded the sheep [on the ears].

Maienborn points out (with respect to similar examples) that these kinds of LOCATIVEs do not denote the location of the event itself. Instead, they represent the location of some internal, circumscribed aspect of the event. For instance, in (135a), *on a bicycle* refers to the location which supplies Lee's *means* of fleeing. The whole fleeing event certainly does not take place *on a bicycle*.[67] Similarly, the boiling event of (135b) does not take place *in a pot*; hence, *in a pot* is not an EVENT-LOCATIVE. Instead, *in a pot* specifies the location of the water. The precise interpretation of the INTERNAL-LOCATIVE seems to be distinct with each verb. This means that the interpretation of an INTERNAL-LOCATIVE depends upon idiosyncratic aspects of the verb with which it is used. By the unique entailment diagnostic, the INTERNAL-LOCATIVE θ-role depends upon lexically

[67] As Maienborn points out, this is clear from the fact that there is an alternative, semantically odd reading in which the fleeing does indeed take place on top of the bicycle. See her p4.

encoded thematic information. This is reflected in the following passage from Maienborn (2001, p17):

> These findings disprove many convictions about […] locative modifiers in particular that can be found in the literature. The standard picture is the following: modifiers differ from arguments in that only the latter receive a theta role from the verb. Having no theta role, the semantic function of a modifier must be derivable from its inherent lexical properties. On this basis, it is generally assumed that modifiers make a single, constant semantic contribution […] As we have seen, this view is wrong, because it relies on a perception of the relevant data that is too limited. In the case of locatives, the vast majority of the literature takes the external modifier variant as the only existing option, thereby ignoring internal and frame-setting modifiers

This is problematic for the LEH. As the above passage attests, INTERNAL-LOCATIVEs are to be considered adjuncts (just as event locatives are). Yet INTERNAL-LOCATIVEs must be lexically encoded, if we accept that unique entailments reflect lexical encoding.

Collaborative comitatives

COLLABORATIVE-COMITATIVEs are considered adjuncts as well, and so would be expected to make a regular contribution across predicates. However, this does not seem to be the case. Consider the data in (136). In each case, there are distinct properties associated with the COLLABORATIVE-COMITATIVE PP.[68]

(136) a. Lee wrote a book with Terry.
b. Lee cooked dinner with Terry.
c. Lee walked a mile with Terry.
d. Lee signed up for the newsletter with Terry.

For example, in (136a), *Terry* (the collaborator in each of these examples) does not actually have to do any writing in order to be a *co-author* with *Lee* (the main actor in each example). Terry and Lee could have just talked about the ideas in the book, and Lee could have been the only one to

[68] Recall the distinction between COLLABORATIVE and ANCILLARY COMITATIVEs from section 3.2. The discussion here applies specifically to the COLLABORATIVE COMITATIVE readings of these *with*-phrases.

actually write them down. The situation in (136b) is different. Terry cannot just have been talking with Lee about cooking dinner, but must actually participate in the cooking. I take such differences to indicate that the COLLABORATIVE-COMITATIVE θ-role carries unique entailments. By the unique entailment diagnostic, the COLLABORATIVE-COMITATIVE θ-role must then be lexically specified.

Manner adverbs

MANNER adverbs pose a similar problem. The same MANNER adverb can make a radically different contribution depending on the verb it is used with. Take the adverb *violently*, which has been given as a paradigm case of an element which makes a purely regular thematic contribution (see e.g. Hunter 2009). However, examples like those in (137) suggest that the interpretation of *violently* is not constant. In (137a), *violently* describes something Lee did physically, such that it would be appropriate to say that *Lee was violent*. In (137b), that's not necessarily the case. (137b) is appropriate for a situation in which nothing about Lee's physical actions are violent in any way, but in which violence may merely be *threatened* or *implied*. And in (137c), the actual description itself needs to be violent or imply violence, not necessarily Lee's physical production of that description. Thus we could say that *the description produced was violent*, but not necessarily that *the describing event was violent*.

(137) a. Lee ate the cereal violently.
b. Lee stole the cereal violently.
c. Lee described the cereal violently.

In other words, the event in (137a) is violent in the manner of an eating event. The event in (137b) is violent in the manner of a stealing event. And the event in (137c) is violent in the manner of a describing event. The interpretation of the adverb depends upon the particular event it describes.

If we take these data to show that MANNER adverbs like *violently* can contribute unique entailments, then the unique entailment diagnostic would tell us that MANNER information must be lexically encoded as an *i*-role. There may be *i*-roles in the lexical entries for these verbs which relate to MANNER information.

(138) $\begin{bmatrix} \text{eat:} & \text{eater[OBL]} \\ & \text{thing-eaten[OBL]} \\ & \text{manner-of-eating}^{69} \\ & \vdots \end{bmatrix}$

Since these are *i*-roles, the specific attributes may be different with different verbs.

6.3. Outlook based on unique entailment and obligatoriness

To summarize, I argued in this section (i) that the GOAL θ-role can be considered to make a regular contribution (lacking unique entailments), and (ii) that the INSTRUMENTAL, INTERNAL-LOCATIVE, COLLABORATIVE-COMITATIVE, and MANNER θ-roles all carry unique entailments to some extent. I will now consider the consequences of these findings for the LEH.

First, take the behavior of GOALs. Since their contribution is roughly the same from verb to verb, the GOAL role is not required to be lexically encoded from the perspective of the unique entailment diagnostic. This is potentially problematic for the LEH. First, recall that GOALs are conventionally considered arguments, and as such the LEH would expect GOALs to be lexically encoded. Yet unique entailment does not require GOALs to be lexically encoded, nor does the diagnostic of semantic obligatoriness. As discussed in section 4.2, many GOALs are semantically optional, and do not have to be lexically encoded for that reason. The behavior of GOALs is therefore problematic, even taking the properties of semantic obligatoriness and unique entailment together.

Second, consider the behavior of INSTRUMENTALs, INTERNAL-LOCATIVEs, COLLABORATIVE-COMITATIVEs, and MANNER adverbs. All of these are conventionally considered adjuncts, and so the LEH would predict them *not* to be lexically encoded. However, I argued that these θ-roles are all associated with unique entailments; some aspects of their interpretation depends on the particular verb with which they are used. As such, the unique entailment diagnostic holds that these roles actually *are* lexically encoded as *i*-roles.

This would extend the set of lexically encoded elements far beyond the set of conventional arguments. INSTRUMENTALs, INTERNAL-LOCATIVEs, COLLABORATIVE-COMITATIVEs, and MANNER

[69] I assume manner does not need an [OBL] feature marking it as obligatory, because manner is always obligatory. If an event can be performed in some manner, it is always performed in some manner.

adverbs are all conventionally considered adjuncts, [70] and as such their lexical encoding would be a problem for the LEH.

Therefore, if the reasoning in this section is correct, the LEH faces serious problems. I return to this shortly in the final section. First, I should re-emphasize the fact that this section adopted the assumptions of the unique entailment diagnostic *for the sake of argument*. That is, I assumed that thematic information associated with unique entailments requires lexical encoding that thematic information. However, I did not engage with the alternative view holding that such entailments do *not* require lexical encoding. As mentioned in section 6.1, it could very well be that apparently idiosyncratic entailments actually follow from world knowledge, rather than from lexical encoding of *i*-roles.

If this alternative view is on the right track, then the unique entailment diagnostic would not be relevant for lexical encoding. Then, obligatoriness would be the only property of the three considered in this chapter that would be relevant for the LEH. As discussed in section 4.3, this would be highly problematic; obligatoriness on its own does not align well with the conventional A/AD. I will remain agnostic for the purposes of this dissertation as to which approach is appropriate. Unique entailment might require lexical encoding, or it might not. I will take both possibilities into account in the (now imminent) conclusion to this chapter. In either case, the prospects for the LEH are dim.

7. Conclusion

This chapter took up two main questions. The first question concerns the criteria for lexical encoding of thematic information. I have focused on three such criteria, *obligatoriness*, *compatibility*, and *unique entailment*. In the preceding three sections (4 through 6), I argued that each of these properties requires lexical encoding to some extent.

The second question at issue in this chapter concerns the relationship between lexical encoding and the semantic A/AD. To the extent that the properties of obligatoriness, compatibility, and unique entailment require lexical encoding of thematic information, is it plausible that the

[70] Note the potential debate on instrumentals discussed in section 5.2.

semantic A/AD could be identified with lexical encoding? In other words, do the patterns of lexical encoding required by these properties align with generally accepted ideas about the A/AD?

(139) Question 1: For an NP in a given sentence, what is the evidence that the θ-role assigned to that NP is present on the verb?

Question 2: Given an answer to question 1, to what extent do patterns of lexical encoding support the Lexical Encoding Hypothesis?

In this final section, I recap the results pertaining to Question 1, and then discuss the overall conclusions to be drawn with respect to Question 2.

In sections 4 through 6, I examined three properties proposed in the literature as answers to Question 1.

(140) a. *Obligatoriness*: Some thematic information may be entailed by a given verb, even if there are no syntactic correlates for the entailed thematic content.

b. *Compatibility*: Narrowly compatible θ-roles must be lexically encoded, but broadly compatible θ-roles need not be lexically encoded.

c. *Unique entailment*: Lexically encoded *i*-roles may carry unique entailments, but un-encoded θ-roles cannot carry unique entailments.

It has been argued that, for any given θ-role, its behavior with respect to each of these properties is unpredictable. To the extent this argumentation is valid, it suggests that θ-roles' unpredictable behavior needs to be encoded from verb to verb.

Of these three properties, I found the clearest evidence for lexical encoding in semantic obligatoriness. For example, with some verbs, a PATIENT is semantically obligatory, and with other verbs, a PATIENT is semantically optional. Minimal pairs like (141) suggest this is really an unpredictable property. As such, obligatoriness of θ-roles must be encoded in the lexicon.

(141) a. Obligatory PATIENT:

i. Lee ate, (#but didn't eat anything).

b. Optional PATIENTS:

i. Lee swallowed, (but didn't swallow anything).

ii. Lee kicked, (but didn't kick anything).

In summary, obligatoriness provides evidence for (142) as a partial answer to this chapter's Question 1.

(142) *Lexical encoding required by obligatoriness*:

a. Sometimes lexically encoded:
recipients, goals, collaborative comitatives, addresses/experiencers

b. Not lexically encoded:
benefactives, ancillary comitatives, (event and internal) locatives, temporals, instrumentals

Less conclusive evidence for lexical encoding comes from compatibility and unique entailment. It could be argued that compatibility requires lexical encoding, such that a given θ-role either (i) is compatible with any verb or (ii) can only occur with verbs which lexically encode that role. If so, then RECIPIENTS, GOALS, INSTRUMENTALS, and BENEFACTIVES would all be expected to be lexically encoded on any verb with which they are compatible.

It seems more likely, however, that compatibility of θ-roles with different verbs is not determined by direct lexical encoding of the θ-roles themselves. Instead, it is more likely that compatibility depends on other, independent lexical properties, such as agentivity (as in the case of INSTRUMENTALS, BENEFACTIVES, and GOALS). If so, then compatibility does not provide evidence towards this chapter's Question 1.

Finally, some θ-roles are associated with different entailments from verb to verb. These unique entailments arguably provide evidence for lexical encoding of θ-roles. The idea would be that, when a θ-role has specific entailments with a given verb, these entailments reflect encoding of that θ-role as an *i*-role of the verb. If that reasoning is on the right track, then unique entailment provides evidence for (143) as a partial answer to this chapter's Question 1.

(143) *Lexical encoding required by unique entailment*:

a. Lexically encoded:
agents, instrumentals, internal locatives, collaborative comitatives, manner adverbs

b. Not lexically encoded:
event locatives, temporals, goals

On the other hand, these unique entailments might simply reflect logical inferences on the basis of world knowledge. If that were the case, then we would not be able to draw the conclusions in (143).

Let's now turn to Question 2. How do the results above bear on the Lexical Encoding Hypothesis (LEH)?

(144) *Lexical Encoding Hypothesis*:

a. Let E = **V**(e) & θ_1 … & θ_n be the logical description for an event built on verb V, where θ_1… θ_n are the thematic predicates of E.

b. The *arguments of V* are the thematic predicates θ_i that are encoded in the lexical entry for V.

c. The *adjuncts of V* are the thematic predicates θ_i that are not encoded in the lexical entry for V.

Suppose that the property of unique entailment requires lexical encoding: θ-roles associated with unique entailments with different verbs must be lexically encoded on those verbs. Then the θ-roles which need to be lexically encoded include those in (143a), and some of those in (142a). This would be a problem for the LEH from two directions. First, INSTRUMENTALS, INTERNAL-LOCATIVES, COLLABORATIVE-COMITATIVES, and MANNER adverbs are all conventional adjuncts, but unique entailment would require them to be lexically encoded.

Second, GOALS are conventionally considered arguments, but not all GOALS would be required to be lexically encoded. While some GOALS (particularly those that are semantically obligatory) would be lexically encoded, others would not. For instance, the GOALS of *travel* and *throw* would be encoded, but the GOALS of *run* and *kick* would not.

(145) a. Obligatory GOALs:

i. Lee traveled, (#but didn't travel anywhere).

ii. Lee threw the ball, (#but didn't throw t anywhere).

b. Optional GOALs:

i. Lee ran, (but didn't run anywhere).

ii. Lee kicked the ball, (but didn't kick it anywhere).

The LEH would predict the former two GOALs to be semantic arguments, but the latter two GOALs to be semantic adjuncts.

Thus, if unique entailment requires lexical encoding as in (143), there are major problems for the LEH. Suppose instead that unique entailment does not require lexical encoding, leaving us with only the encoding required by obligatoriness as in (142). This too would be problematic for the LEH. In one direction, we would have many conventional arguments which would be unencoded (e.g. semantically optional PATIENTs, RECIPIENTs, GOALs, etc.). In the other direction, LOCATIVEs would always be unencoded, even though LOCATIVEs are often considered semantic arguments (as with *live*, *reside*, *sit*, etc.).

The data reviewed in this chapter therefore pose a problem for a semantic understanding of the A/AD along the lines of the LEH. Lexical encoding just does not seem to align well with the conventional A/AD as it is understood in textbooks and in research literature. Given this, how should we understand the A/AD? One stance is to radically redefine the A/AD. Following (143a), we might say that INSTRUMENTALs and EVENT-LOCATIVEs really are arguments, and that the GOALs in (145b) really are adjuncts. Under this view, the literature would simply be "wrong" about the boundaries between argument and adjunct; as a semantic notion based on lexical encoding, the boundaries would fall at a different place than is normally assumed.

I would object that the A/AD already exists as a concept in the field; it is introduced in certain ways in textbooks and is presupposed in much research literature. The concept is characterized by certain generally agreed-upon categorizations; certain elements are considered arguments, and others adjuncts. The conventional A/AD is defined by these expectations. Some of these expectations are particularly strong. If there is an A/AD, then PATIENTs certainly must be considered arguments, and most LOCATIVEs certainly must be considered adjuncts. Minor

deviances from these expectations, while potentially surprising, would not be problematic for the semantic A/AD as a concept; it could simply be that the canonical picture needs to be slightly adjusted. However, major deviances are not compatible with this concept. It would be inappropriate to redefine the A/AD to totally eschew these expectations.

Thus, I would argue it only makes sense to accept the existence of something called "the argument/adjunct distinction" if it resembles this conventional concept in meaningful ways. One could of course disagree with this, in which case nothing more can be said. There can be no argument against such a response.

Suppose, though, that we take the LEH as a particular hypothesis about what the conventional A/AD, the concept present in much prior literature, is. I would argue that, given the encoding required by semantic obligatoriness and (possibly) unique entailment, the LEH is in major conflict with the conventional A/AD. I conclude that the term "argument/adjunct distinction" is not appropriate to describe the patterns of lexical encoding described in this chapter. Instead, lexical encoding is a property in its own right, not related to the traditional concepts "argument" and "adjunct."

Therefore, this chapter makes the case that the A/AD is not well understood as a semantic notion. It is more plausible that lexical encoding of thematic information is governed by independent principles. It should be acknowledged that this conclusion does not in any way preclude the possibility that the A/AD could instead be understood as a *syntactic* notion. That is the focus of the next chapter.

CHAPTER 3

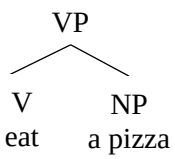
The Argument/Adjunct Distinction as a Syntactic Notion

1. Introduction

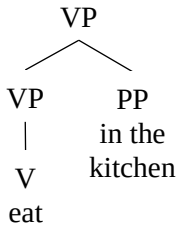
As discussed earlier in this dissertation, the A/AD can be understood as a property of syntactic objects, or as a property of semantic participants in an event. A semantic understanding of the A/AD concerns lexical encoding of the participants of a predicate: for example, the arguments of a verb are those that are lexically specified as part of the verb's core meaning, while the adjuncts are those that are not lexically encoded. As argued in chapter 2, this idea is not supported by linguistic evidence. Therefore, I conclude that the A/AD lacks a semantic implementation. It might be the case that some thematic information is encoded on verbs, but this is a property in its own right, not related to the A/AD.

The *syntactic* A/AD, on the other hand, postulates the existence of two *syntactically defined* classes of constituents. One approach is to identify certain structural configurations as *adjunct configurations*. This was the standard method in Government and Binding Theory, with adjunct configurations identified by those positions in a phrase structure tree whose mother and sister are of the same bar-level (Haegeman 1994, p104-105).[1]

(1) a. *Argument*:



b. *Adjunct*:



[1] This example shows adjuncts as sister and daughter to XP. A variation of this approach treats adjuncts as sister and daughter to X′. Head-adjunction (adjuncts to X^0) may also be assumed.

This idea became problematic with Bare Phrase Structure, when the richness of projection in GB was significantly reduced (entailing, for instance, the elimination of bar-level information; Harley 2007, p11). Still, the idea resurfaced in a somewhat different form in Hornstein & Nunes 2008, where it is argued that adjuncts are identified by label-less-ness; adjunction structures do not need to be labeled at all in order to be licensed.

Another prominent approach is to treat adjuncts as products of special operations. For instance, Chomsky (2004) proposed that adjuncts are the product of *Pair Merge*, an operation which creates ordered pairs (where "regular" Merge simply creates unordered sets). Syntactic adjuncts are then distinguished from arguments by virtue of the operation which introduces them into the structure. In a sense, this is another way of implementing the configuration-based approach. It is important to note, however, that Pair Merge goes beyond the configuration-based approach in postulating a new structure-building operation (beyond simplest Merge). Another operation-based proposal involves Late Merge, where the idea is that adjuncts differ from arguments in being introduced countercyclically. On this approach, the properties of adjuncts are thought to follow from their entering the derivation "later" than arguments do. Note that Late Merge, just like Pair Merge, is an added operation going beyond simplest Merge (Epstein et al. 2012, Chomsky 2015), and thus deviates from the Strong Minimalist Thesis (Chomsky et al. 2019).

In order for any syntactic implementation of the A/AD to be theoretically meaningful, the postulated syntactic differences must have empirical correlates. In fact, there are believed to be a number of such correlates, the traditional diagnostics for argumenthood. For example, it is thought that adjuncts are always omissible, while arguments are typically non-omissible. It is thought that adjuncts can be stranded in *do so*-substitution, while arguments cannot. Adjuncts are thought to be islands, while arguments are thought not to be.

The goal of this chapter is to evaluate whether the traditional diagnostics succeed in motivating a dichotomy in the external syntax of constituents that corresponds to the A/AD. If there is indeed a syntactic A/AD, then (at least some of) these syntactic diagnostics should be able to (at least partially) identify it. I evaluate the success of each diagnostic in this capacity in sections 3-11. As I discuss in section 2, the validity of the A/AD depends crucially on its application within (not across) categories. I therefore focus on the results of the diagnostics applied to prepositional phrases. PPs make the ideal empirical test domain for the evaluation of the A/AD, because the

very same PP can be an argument or an adjunct (e.g. *on the boat* in the two readings of *They decided on the boat*). No other syntactic category so clearly has this property in English.[2] In addition, the chapter concentrates on verbal dependents, where the diagnostics are thought to be most robust.

The remainder of this chapter is structured as follows. Section 2 first develops a framework for evaluating the evidence for the syntactic A/AD, explaining the logic by which traditional *argumenthood diagnostics* are taken to support a syntactic A/AD, and proposing criteria against which the diagnostics can be evaluated. Sections 3 through 11 then apply these criteria to nine different diagnostics often cited as evidence for the existence of the syntactic A/AD (see example (2) below for the complete list). In each case, I find that the evidence fails to meet the proposed criteria of evaluation. Section 12 concludes by considering the possibility that the syntactic A/AD could be eliminated from theories of syntax.

2. The logic of argumenthood diagnostics

In sections 3-11, I evaluate the results of nine diagnostics for argumenthood, common in prior literature, as they apply to verbal dependents in English. The diagnostics are listed below.

(2) a. *Omissibility*:
A verb and its arguments must co-occur. A verb need not co-occur with its adjuncts.
(Haegeman 1994:40-41; Huddleston & Pullum 2002:221(b); Mihalicek & Wilson 2011:206; Rákosi 2012:6-7; Schütze 2012:3; Kim et al. 2019:8; Zyman 2020:1(1a))

b. *VP-anaphora*:
If a VP-anaphor takes a given VP as its antecedent, the adjuncts of the VP can be excluded from the antecedent VP, but the arguments must be included.
(Huddleston & Pullum 2002:222(c); Hornstein & Nunes 2008:60-61; Schütze 2012:8)

[2] Different kinds of CPs may also be considered either arguments or adjuncts, but in a more limited way.

c. *VP-fronting*:

When a VP is fronted, its adjuncts can be stranded at the extraction site, but its arguments cannot be.

(Hornstein & Nunes 2008:60-61)

d. *Iterability*:

An argument of a verb cannot be iterated. Adjuncts can be iterated freely.

(Goldberg 2006:37fn15; Hornstein & Nunes 2008:59-60; Mihalicek & Wilson 2011:206; Needham & Toivonen 2011:6; Schütze 2012:4-5; Zyman 2020:1(1b))

e. *Islandhood*:

Adjuncts are islands for extraction. Arguments are not.

(Huang 1982:502-503; Baker 1988:367-368; Hedberg & DeArmond 2009:11; Needham & Toivonen 2011:7; Rákosi 2012:11; Schütze 2012:8-9; Chomsky et al. 2019:249)

f. *Reconstruction (for Condition C)*:

Arguments reconstruct for Condition C. Adjuncts do not.

(Chomsky 1995:187; Heycock 1995; Fox 1999; Lebeaux 1988; Lebeaux 2000)

g. *Variability (of head preposition)*:

The head of an argument PP can be invariable, while adjunct PPs can be headed by a variety of prepositions.

(Huddleston & Pullum 2002:220; Needham & Toivonen 2011:5; Zyman 2020:1(1c))

h. *Extractability (from weak islands)*:

Adjuncts cannot be extracted out of weak islands. Arguments can.

(Schütze 1995:115-116; Schütze & Gibson 1999:427-428; Schütze 2012:8-9; Toivonen 2016:2)

i. *Permutability*:

Adjuncts can be freely re-ordered with respect to each other. Arguments cannot.

(Radford 1988:235; Huddleston & Pullum 2002:225(e); Mihalicek & Wilson 2011:206; Culicover &Jackendoff 2005:130-131)

Before evaluating these diagnostics, this section takes up the goal of establishing what a successful argument for the syntactic A/AD would look like. I propose two criteria for this. The first is a heuristic. As discussed in chapter 1, the syntactic A/AD has a long history, and it is associated with certain canonical categorizations. Certain PPs are canonically considered adjuncts, and others arguments, albeit with a certain number of unclear cases. For instance, manner, temporal, locative, and benefactive phrases are usually classified as adjuncts, while goals, directions, addressees, and recipients are normally considered arguments (see e.g. Huddleston & Pullum 2002).

(3)

Canonical Arguments:		Canonical Adjuncts:	
a.	Terry ran [$_{\text{Goal}}$ *into the park*].	e.	Terry swam [$_{\text{Manner}}$ *like a fish*].
b.	Terry looked [$_{\text{Dir.}}$ *at Lee*].	f.	Terry looked [$_{\text{Temp.}}$ *at 10pm*].
c.	Terry talked [$_{\text{Addr.}}$ *to Lee*].	g.	Terry talked [$_{\text{Loc.}}$ *in the house*].
d.	Terry donated [$_{\text{Recip.}}$ *to the charity*].	h.	Terry donated [$_{\text{Ben.}}$ *for Lee*].

As in the preceding chapters, I use the term *conventional A/AD* to refer to the traditional classification of dependents of different types. Heuristically, then, a successful defense of the syntactic A/AD would have the results of each diagnostic align with the predictions which come from the *conventional* A/AD. That is, a diagnostic should treat most of the conventional arguments one way, and most of the conventional adjuncts another way. More concretely, if a diagnostic, say the *VP-anaphora* diagnostic, predicts that adjuncts can be stranded under *do so*-substitution, while arguments cannot, we would expect to find that all or most of the separable PPs are conventional adjuncts, and that all or most of the non-strandable PPs are conventional arguments.

As for the second criterion of evaluation, a diagnostic must make a distinction among PPs *which is not motivated independently* of the A/AD. For example, suppose that a diagnostic draws a distinction between prosodically heavy PPs and prosodically light PPs. Because prosodic heaviness is orthogonal to argumenthood, this diagnostic could not be taken as evidence for a syntactic A/AD. More concretely, I argue below that the *iterability* diagnostic distinguishes locative/temporal PPs (regardless of their argumenthood) from other PPs. Since locatives and temporals form a natural class independently of the A/AD, *iterability* can be attributed to that distinction, with no need to invoke the A/AD. Thus, diagnostics motivating the A/AD should be sensitive to properties specific to the A/AD, not attributable to other phenomena.

A corollary of this second criterion is the following: for a diagnostic to be relevant to the syntactic A/AD, it must be sensitive to properties which cut across categorial distinctions. If a diagnostic draws a distinction only *across* categories (e.g. between NPs and PPs), but does not draw distinctions *within* categories (e.g. treating all NPs equally and all PPs equally), then there is no need to appeal to an A/AD to explain these facts; the differences can simply be attributed to the already-needed category distinction. For this reason, my focus will primarily be on prepositional phrases here – by sticking to a single category, it will be possible in principle to identify differences in empirical behavior which would need to be explained by something like the A/AD. Thus, for the purposes of this chapter, a given diagnostic can be relevant for the A/AD only if it detects a difference of some sort *among PPs*.

The two criteria are summarized below.

(i) *Heuristic criterion*:
Does the diagnostic draw a distinction that aligns with the conventional A/AD?

(ii) *No-independent-motivation criterion*:
If the diagnostic draws a distinction among PPs, does the distinction lack motivation from independent grammatical properties (even in the absence of the A/AD)?

In order to provide motivation for the syntactic A/AD, a given diagnostic must meet both criteria. Imagine, for instance, that a given diagnostic meets criterion (ii), the no-independent-motivation criterion, but not criterion (i), the heuristic criterion. In this case, we would be looking at a diagnostic which motivates a theoretical concept of *some* kind, but it would be an error to identify this concept with the A/AD. The conventional A/AD exists independently of any particular theory of the distinction. Thus, even if a diagnostic were to identify a syntactic dichotomy between PPs, if the boundary drawn does not resemble the conventional A/AD in some way, then it makes more sense to call the new distinction by a new name (as a property in its own right); there would be no reason to relate it to the A/AD if it did not bear some resemblance to the conventional, off-the-shelf concept.

What if a given diagnostic satisfies the heuristic criterion, but fail to do so for the no-independent-motivation criterion? In this case, the appropriate conclusion depends on the behavior of other diagnostics. If a number of other diagnostics pattern the same way, all reducible to the

same, independently motivated property, while at the same time passing the heuristic criterion, then we would conclude that the A/AD could be *reduced* to this independent property. On the other hand, if it is not the case that multiple diagnostics reduce to the same principles – even if they partition dependents into *similar* but crucially *not identical* classes – then we must conclude that the A/AD is not supported. That is, multiple diagnostics passing the heuristic criterion while failing the no-independent-motivation criterion *for different reasons* would not motivate the A/AD. In this case, several independent properties would happen to pattern somewhat closely, but there would be no reason to unify those properties under the larger umbrella of the A/AD (as this would violate principles of parsimony).

As an illustration of this point, consider Binding Conditions A and B. There is arguably a consensus that the distribution of plain pronominals obeys principles distinct from those governing the distribution of reflexive pronouns. Hence, authors now entertain distinct formulations of Conditions A and B (i.e. they are not complements of one another, contra Chomsky 1981). See e.g. Ke (2019), Charnavel (2020), Varaschin (2020), among others. The distributions of pronouns and anaphors are *relatively* close to what is predicted by the classical theory, but this fact does not provide evidence in favor of the classical theory. In the same way, the syntactic A/AD would not be motivated by the observation that two or more argumenthood diagnostics display *distinct* behaviors which *independently* resemble predictions of the conventional A/AD. In this event, the A/AD should be viewed as an illusion, occurring because of the relatively similar behaviors of verbal dependents under fundamentally unrelated diagnostics, just like the classical idea that pronouns and reflexives are in complementary distribution was an illusion.

The following sections demonstrate that, by these criteria, no traditional diagnostic succeeds in distinguishing argument PPs from adjunct PPs within the VP. For most of the diagnostics, there are severe misalignments between the distinctions drawn and the conventional A/AD. This is problematic from the perspective of the heuristic criterion. Further, in many cases, I argue that argumenthood diagnostics are better explained without reference to the A/AD. This is problematic from the perspective of the no-independent-motivation criterion. Thus, I conclude that this set of diagnostics fails to provide evidence in favor of a syntactic A/AD in the English VP.

3. Omissibility

I begin with the diagnostic of *omissibility*, which holds that adjuncts are syntactically omissible and that arguments are not.[3] Thus, the A/AD is thought to explain such prototypical contrasts as (4).

(4) Lee devoured *(something) (yesterday).

The direct object of *devour* is non-omissible, while a temporal like *yesterday* is omissible. According to the omissibility diagnostic, this is explained by the A/AD: direct objects are arguments, while temporals are adjuncts.

Omissibility was one of the earliest formal diagnostics for argumenthood (see e.g. Harris's 1970, p275fn1 Structuralist application of the diagnostic), and it continues to be a primary test for argumenthood used in textbooks on syntax. Huddleston & Pullum's (2002, p222) grammar of English, which places great emphasis on empirically justifying grammatical postulates, assigns omissibility an important role in identifying adjuncts. Indeed, Boeckx (2003, p96) refers to omissibility as "adjuncts' core property."

Despite this, it is also well-known that the *omissibility* diagnostic has major problems, with some authors already noting that it does not provide good motivation for the A/AD (e.g. Culicover 2009, p69; Needham & Toivonen 2011, p9). This section develops this claim in detail, using the two criteria of section 2 as guideposts. I begin by discussing the no-independent-motivation criterion in subsections 3.1-3.2, and then illustrate heuristic problems with the criterion in subsection 3.3. In summary, I find that, although some special theoretical machinery is required to capture patterns of omissibility (i.e., although omissibility arguably passes the no-independent-motivation criterion), it cannot be used as motivation for the A/AD, because the patterns it identifies do not closely resemble the conventional A/AD (i.e. it radically fails the heuristic criterion).

[3] The diagnostic is often stated in a *one-way* format, such that if a dependent is non-omissible, then it is an argument, but omissibility cannot diagnose argumenthood of omissible elements. I scrutinize this version of the diagnostic in detail in section 3.3.2.

3.1. Independent motivations for (non-)omissibility

This subsection and the next one (subsection 3.2) consider whether the omissibility diagnostic passes the no-independent-motivation criterion as described in section 2. In brief, much of the data can be accounted for by independently motivated principles, but some data require a concept like subcategorization. This subsection begins by describing two independent factors which contribute to explaining non-omissibility of certain dependents, and subsection 3.2 then considers data that lack an independent explanation and thereby motivate subcategorization in some form.

3.1.1. Idiomaticity

One relevant factor is idiomaticity. Certain verb + preposition combinations are obviously idiomatic, with a clearly non-compositional meaning.

(5) a. Terry looked after the accounts. (*look after* = 'maintain')
b. Terry went over the details. (*go over* = 'review')
c. Terry stood for the reforms. (*stand for* = 'support')
d. Terry turned into a villain. (*turn into* = 'become')
e. Terry ran into an old friend. (*run into* = 'encounter')

The combinations in (5) are clearly idiomatic because they all have a compositional, non-idiomatic counterpart. For example, *look* is a verb of attention in its non-idiomatic use; that *look after* is idiomatic in (5a) is very clear in contrast with the non-idiomatic meaning of *look*.

There are also cases like those in (6), where the preposition is invariable, non-omissible, and semantically bleached.

(6) a. The decision resulted in a problem.
b. Terry depends on the bank.
c. Terry dealt with the problem.
d. The money belongs to Terry.
e. The dish consists of two ingredients.

I take these to be idiomatic as well, following Pesetsky (1995, p135), who writes "… when a predicate takes an 'idiosyncratic' preposition, such as *on* in *depend on* …" this represents "… a special case of idiomaticity." Pesetsky uses the term "L-selection" to refer to this kind of

relationship between a verb and a preposition. Other names for the phenomenon include "lexical dependency" (Hawkins 2000, p241-243) and "specified prepositions" (Huddleston & Pullum 2002, p273). As Huddleston & Pullum put it, contrasting the idiomatic *refer to* with the non-idiomatic *fly to*, "the dictionary entry for *refer* must specifically mention *to*, whereas that for *fly* need say only that the verb takes complements of goal, source, and path."

If a particular verb + preposition combination were idiomatic, then we'd expect the presence of the preposition (and hence the PP) to be obligatory. Compare with other frozen idioms, like *without further ado*, or *in cahoots with* in (7).

(7) a. Without {further / *more / *greater / ⋮} ado.

b. {*on / in / *with / ⋮} cahoots {*on / *in / with / ⋮} X.

The word *ado* does not have a non-idiomatic usage,[4] and so when *ado* appears, the (normally *omissible*) adjective *further* is *non*-omissible. Similarly, whenever the word *cahoots* appears, the prepositions *in* and *with* must also occur. The PPs in (5) and (6) are therefore correctly predicted to be obligatory, entirely independently of the A/AD. That is, we don't need to say anything about the argumenthood of the PPs in (5) and (6); all we need to say is that the verb + preposition combinations are idiomatic. I discuss the role of idiomaticity in verb + preposition combinations like those in (5) and (6) in more detail in section 9.

3.1.2. Pragmatic felicity

In addition, Goldberg & Ackerman (2001), building on ideas of McConnell-Ginet (1994) and Ernst (1984), suggest that some canonical adjuncts are syntactically non-omissible for pragmatic reasons. Specifically, Goldberg & Ackerman suggest that some PPs are non-omissible because without them, the Gricean maxim of quantity is violated.

[4] This slightly overgeneralizes. There is another idiom, *much ado about nothing*, which also involves *ado*. This does not affect my argument.

Take the PP that occurs with *dress*, which has traditionally been characterized as an "obligatory adverb" (Jackendoff 1972).[5]

(8) Lee dressed *(like a clown).

Goldberg & Ackerman suggest the reason the PP is non-omissible here is that, without it, the pragmatic contribution of the sentence is insufficient, at least out of the blue. The assertion that someone "dressed," in the sense that they simply wore clothing of some unspecified style, is not sufficient to satisfy the maxim of quantity. Perhaps out of the blue, (and given certain cultural norms), whether or not someone "dresses" (irrespective of *how* they dress) is not a reasonable potential question with respect to which the assertion can be integrated into discourse. What's critical for this pragmatic approach is the observation that the PP *can* be omitted when the pragmatic context is enriched such that "dress or not dress" *is* a reasonable potential question. Take (9), for instance. In this context, Pat & Lee's decision to "dress" (whatever the manner of their dressing happens to be) is put on the table as a potential issue. Thus, omission of the PP is allowed.

(9) Committed nudists they may be, but if Pat and Lee want to attend the wedding, they will have to DRESS.

This observation could be taken as evidence that the manner adverbial with *dress* is non-omissible not for syntactic reasons, but for pragmatic reasons. Verbs like *dress* "give the *appearance* of needing an adverb only because in most contexts they do not provide sufficient information by themselves," (Ernst 2002, p273, emphasis mine).

A further potential role for pragmatics in omissibility comes from Glass (2020). According to her, NP omission is facilitated in contexts with conventionalized VPs. The verb *stow*, for example, takes what could be considered an obligatory NP object; out of the blue, it's not possible to use *stow* without an overt NP complement. But in a context where the NP object of *stow* is conventionalized, particularly obvious to interlocutors, it can be freely omitted. For example, one of the jobs assigned to Amazon warehouse workers involves cataloging incoming merchandise

[5] My stated focus in this chapter is VP-internal PPs. For the purposes of this chapter, adverbs can be included in this group, on the assumption that adverbs are one-word PPs like *there* and *then* (Bresnan & Grimshaw 1978, Bešlin 2018).

and stowing it away for future shipment. This task can be described with the object omitted, as (10) below from Google shows.

(10) I'm stowing on Lanes D 1 to 8.
(Retrieved from Google, August 17, 2020. URL)

Further examples can be found in Glass 2020, including *lift (weights)*, *pass (a ball)*, and *bottle (beer)*, among dozens of others.

This subsection has discussed two ways in which independent principles can explain when certain dependents are omissible and when they are not. Specifically, PPs which are partially idiomatic (with the preposition forming an idiom with the verb) are naturally non-omissible, and some PPs may be non-omissible for pragmatic reasons (such as those discussed by Goldberg & Ackerman 2001 and Glass 2020). However, while these factors can explain a large portion of the data (i.e. many instances of non-omissible PPs are explained by idiomaticity/pragmatic felicity, with no reference to syntactic subcategorization needed), not all the relevant data can be accounted for in this way. The next subsection (3.2) shows this, while also demonstrating that *semantic obligatoriness* is not a factor in explaining syntactic omissibility.

3.2. Subcategorization (lexical specification)

Some examples of syntactically non-omissible dependents are not explained via idiomaticity or pragmatics. A relevant example is the verb *put*, which takes an obligatory PP denoting a goal location. Other similar verbs include *place* and *set*.

(11) Lee put the book *(on the case).

The PP does not form an idiom with the verb, as evidence by the fact that the preposition used is variable. The prepositions *in front of*, *near*, *behind*, and so on could all replace the preposition *on* used in (11). Therefore, idiomaticity is not what makes the PP non-omissible here. Additionally, it is unlikely that the PP with *put* is obligatory for pragmatic reasons; there do not seem to be any pragmatic contexts which facilitate omission of the PP.[6]

[6] Sometimes, the PP dependent of *put* can be omitted, as in (i), e.g. where a student is asking another about their answers on a recent test.
(i) You got an answer for number five, right? What did you put?

Other examples come from verbs like *slog*, *lumber*, *trudge*, *tramp*, and *traipse* (all meaning roughly "walk effortfully"). These all take a non-omissible PP denoting a path or goal, as shown in (12) with *trudge*.[7]

(12) Lee trudged *(through the field).

It is clear that non-omissibility does not come from idiomaticity with these verbs, since a variety of prepositions can be used. Consider *into, around, out of*, and so on in place of *through* in (12). Further, it is clear that non-omissibility does not come from pragmatics either, not only because altering the context does not facilitate omission, but also because paraphrases (with *walk*) do *not* require a goal PP.

(13) Lee walked effortfully (through the field).

These are examples of PPs whose non-omissibility is not attributable to idiomaticity or pragmatic felicity. While relatively rare (additional relevant examples can be found with the verbs *reside* and *hand*, among others), the existence of these cases implies that something like syntactic *subcategorization* is at work, as a lexical property of verbs. That is, it is not possible to deduce, from one verb to the next, which dependents will be syntactically omissible and which will not. As mentioned above, the verbs *slog, trudge*, etc. have a non-omissible goal PP, while related verbs like *walk* and *travel* do not.

In chapter 2, I argued something similar for the *semantic* property of obligatoriness: some participants in a predicate must be lexically specified as semantically obligatory. I assumed, following Grimshaw (1979) and Jackendoff (2002), among others, that this specification is instantiated by a feature in a predicate's lexical entry. If a predicate has an obligatory patient participant, then its lexical entry includes a feature specification [PATIENT, +OBL].

It is tempting to relate the *syntactic* property of omissibility to the *semantic* property of obligatoriness. Specifically, one might hypothesize that syntactic omissibility can be (perhaps only partially) reduced to semantic obligatoriness. I will conclude this subsection (in section 3.2.1) by

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I assume this is a different lexical item than the typical locative *put*. This version takes a *for*-phrase where the typical, locative *put* would take a directional PP.

(ii) What did you put [for number five]?

[7] The particles *along* and *away* can also satisfy this requirement.

arguing, however, that this is not the case. The semantic property of obligatoriness and the syntactic property of omissibility are distinct; one cannot be reduced to the other. As such, non-omissibility – when not attributable to idiomaticity or pragmatic factors – necessitates a syntactic mechanism like subcategorization. This means, further, that some instances of non-omissible PPs – specifically those that are subcategorized – pass the no-independent-motivation criterion as discussed in section 2 of this chapter.

3.2.1. Syntactic omissibility does not follow from semantic obligatoriness

There are two ways in which one might hypothesize that syntactic omissibility is related to semantic obligatoriness. On one hand, it could be that semantically obligatory elements are always syntactically non-omissible. On the other hand, it could be that semantically optional elements are always syntactically omissible. (One could also argue for both possibilities simultaneously.)

(14) a. Semantic obligatoriness → syntactic non-omissibility
(equivalent to: syntactic omissibility → semantic optionality)

b. Semantic optionality → syntactic omissibility
(equivalent to: syntactic non-omissibility → semantic obligatoriness)

However, I argue that neither of these implications holds. Take the implication (14a). If true, we would predict semantically obligatory elements to be syntactically non-omissible. This is contradicted by such examples as (15) with *eat*, whose semantically obligatory patient is in fact syntactically omissible.

(15) #I ate, but I didn't eat anything.

The location-participant of *eat* is also semantically obligatory but syntactically omissible, as is its time-participant. That is, just as *I ate* presupposes a patient, it also presupposes a time and a location.

(16) #I ate lunch, but I didn't eat it at any time.

The fact that semantically obligatory participants can be syntactically omissible demonstrates that the implication (14a) does not hold.

The second possible implication (14b) does not hold either. If it did, we would expect semantically optional participants to always be syntactically omissible. This is not the case; semantically optional participants are sometimes syntactically non-omissible. The best illustration of this comes from verbs like *slog, trudge*, etc., already mentioned above, which have non-omissible goal PPs.

Given that the relevant PPs are syntactically non-omissible, it is not possible to probe their semantic obligatoriness directly (since the direct test, as in (15)/(16), requires syntactic omission of the dependent being tested; see chapter 2 section 4). However, these normally non-omissible goal PPs *can* be shown to be semantically optional by using the particle *away*. This particle can occur with verbs of several different types, the most directly relevant type here being directional verbs like *walk*.

(17) Lee has been walking away on the treadmill for hours.

It can occur with verbs like *slog* and *trudge* as well, and when it does, the goal PP which these verbs usually require becomes omissible.

(18) Lee has been trudging away for hours.

While *away* affects syntactic omissibility, it does not affect semantic obligatoriness. This can be seen with the verb *travel*, which has a semantically obligatory but syntactically omissible goal. That is, even when the goal PP is omitted, it is still semantically entailed, as shown in (19); it is not possible to cancel the entailment that Lee moves towards some goal.

(19) #Lee has been traveling all evening, and they haven't moved an inch.

This property is preserved when *away* is used with *travel*. As (20) shows, a goal is still entailed when *travel* is used with *away*.

(20) #Lee has been traveling away all evening, and they haven't moved an inch.

When applied to *trudge* etc., this test shows that the normally non-omissible goal is actually semantically optional. Consider (21), which is acceptable in a context where Lee is walking effortfully on a treadmill.[8]

(21) Lee has been trudging away all evening, and they haven't moved an inch.

The fact that (21) is acceptable shows that the goal of *trudge* is semantically optional, even though it is normally syntactically omissible (e.g. when *away* is not used).

A variety of verbs have this same property. In addition to the class of verbs including *trudge* and *slog*, certain synecdochic locomotion verbs, like *wing* and *wheel*, have a syntactically non-omissible PP goal; but this goal can be shown to be semantically optional with *away*.

(22) a. The bird has been winging *(through the trees) all day.

b. The bird has been winging away all day, just hovering in the same spot.

This demonstrates that the implication (14b) does not hold; not all semantically optional participants are syntactically omissible. Therefore, syntactic omissibility must be a distinct property from semantic obligatoriness. I will assume that syntactic omissibility is implemented by a form of lexical *subcategorization*; a feature in the lexical entry for a verb can determine that one of its dependents is syntactically non-omissible (with omission possible in the absence of this feature. This was initially discussed in chapter 2).

While the detailed *implementation* of subcategorization is not directly relevant for the purposes of this dissertation, it is relevant that it is *distinct* from semantic obligatoriness; this means that the omissibility diagnostic partially meets the no-independent-motivation criterion. Specifically, some non-omissible dependents require the stipulation of subcategorization in the grammar. The omissibility diagnostic meets the no-independent-motivation criterion only if we restrict its scope of application to just these dependents (i.e. those whose (non-)omissibility is not explained by either idiomaticity or pragmatics). Thus, the ability of the omissibility diagnostic to motivate the syntactic A/AD depends upon how the set of subcategorized dependents fares against the predictions of the conventional A/AD.

[8] The same context fails for (20) with *travel*. Also, importantly, the context does not allow omission with *trudge* etc. unless *away* is used. Omission in (12) above is still unacceptable in this context, for instance.

This question (i.e. whether omissibility passes the heuristic diagnostic laid out in section 2 of this chapter) is addressed in the following subsection (3.3). Ultimately, I conclude that omissibility does not support the A/AD, because the set of dependents for which subcategorization is required bears little resemblance to the conventional A/AD. Therefore, the formal apparatus required to account for certain examples of non-omissibility, namely subcategorization, bears no necessary connection to argumenthood.[9]

3.3. Heuristic problems for the omissibility diagnostic

So far, this section has argued that, while omissibility can be partially explained by independently-motivated principles, it cannot be *entirely* explained by them. This subsection argues that, despite this, the omissibility diagnostic should not be considered as evidence in favor of the syntactic A/AD. The reason is that the set of elements which can be argued to be subcategorized on the basis of omissibility does not bear a close resemblance to the conventional A/AD. Thus, omissibility cannot be considered to meet the heuristic criterion.

The heuristic criterion requires that a diagnostic for argumenthood draw distinctions which align at least roughly with predictions from the conventional A/AD. If the diagnostic makes a radically different distinction, then it is not appropriate to identify it as evidence for the A/AD, but rather for some other property. Before applying this criterion to the omissibility diagnostic, it is important to flag the fact that omissibility comes in two flavors. One version, which I will call the *strong* omissibility diagnostic, adopts a bijective relationship between omissibility and argumenthood, as in (23).

(23) Strong omissibility diagnostic:
   a. Arguments are always non-omissible.
   b. Adjuncts are always omissible.

In other words, the inability to be omitted is a necessary and sufficient condition to identify a given dependent as an argument. (And the converse, the ability to be omitted is a necessary and sufficient condition to identify a dependent as an adjunct.)

[9] While this state of affairs is *compatible* with the existence of an A/AD, it does not provide *motivation* for the A/AD. This is discussed in more detail in subsection 3.3, especially subsection 3.3.2.

There is also a *weak* version of omissibility, as in (24).

(24) Weak omissibility diagnostic:
Adjuncts are always omissible.

The weak omissibility diagnostic states only that omissibility is a necessary condition for adjuncthood. Thus, *weak* omissibility is only a *one-way* diagnostic; it is capable of identifying *non-*omissible dependents as arguments, but it cannot identify *omissible* dependents either way.

I discuss both versions in this subsection. I first show that the *strong* omissibility diagnostic does not meet the heuristic criterion, and then return to *weak* omissibility.

3.3.1. The strong omissibility diagnostic

As I mentioned at the beginning of this section, previous authors have already recognized the heuristic problems faced by the omissibility diagnostic (see e.g. Culicover 2009, p69; Needham & Toivonen 2011, p9; Sailor & Schütze 2013). These criticisms primarily apply to the *strong* version of the diagnostic. Although strong omissibility states that arguments are non-omissible, the more general case by far seems to be that PPs are omissible, even PPs that are canonically considered arguments. Consider, for instance, the canonical argument PPs of verbs of motion like *run (to)*, *swim (to)*, and *fly (to)*, verbs of indication like *point (at)*, *gesture (to)*, and *motion (to)*, verbs of attention like *listen (to)*, *stare (at)*, and *glare (at)*, verbs of cognition like *think (about)*, *forget (about)*, and *remember (about)*, and many others. The canonical argument PPs of all these verbs are freely omissible.

Verbs with non-omissible PP complements appear to be comparatively rare, with examples including verbs of resemblance like *seem *(like)*, *look *(like)*, and *sound *(like)* and verbs of reliance like *depend *(on)*, and *trust *(in)*.[10] Idiomatic verb + preposition combinations[11] also give rise to non-omissible PPs, as in *look into* (meaning 'investigate'), *stick to* (meaning 'continue'), and *turn into* (meaning 'become'), by virtue of their being idioms.

[10] Many non-omissible PPs are in fact omissible when used with a different sense of the verb. The verb *look* can be used without a *like*-phrase, for example, but not with the meaning 'bear a resemblance to.' Similarly, the verb *depend* can be used without an *on*-phrase, but not with the meaning 'need.'
[11] In fact, cases like *depend on* and *trust in* are also idiomatic, as discussed in section 3.1.1.

In order to roughly quantify the disparity (to get an idea of how much more common it is for a VP-internal PP to be omissible than non-omissible), I searched the Corpus of Contemporary American English (CoCA; Davies 2008) for the most common verb + preposition sequences, and noted whether the PP in the construction could be omitted in my judgment. After excluding irrelevant examples[12] and consolidating repetitions in the 400 most common verb + preposition combinations,[13] I found a total of 119 distinct, relevant combinations, in 84 of which the PP was omissible, and in 35 of which the PP was non-omissible. Of the 119 relevant verb + preposition combinations I found, 94 could be considered to involve conventional argument PPs. 62 of these argument PPs were omissible, and 32 were non-omissible. The strong omissibility diagnostic thus seems to get the story backwards for argument PPs within the VP. By far the more general situation is that such PPs are omissible; only a minority are non-omissible (contra the strong diagnostic's predictions). This poses a heuristic problem: most conventional argument PPs appear to be omissible, when the diagnostic predicts they should be non-omissible.

	omissible	non-omissible	total
conv. argument	62	32	94
conv. adjunct	22	3	25
total	84	35	119

Table 3.1: Omissibiltiy by conventional argumenthood in first 400 results from CoCA search for VERB + PREPOSITION

While the pattern for conventional adjuncts trends in the predicted direction (i.e. 22/25 conventional adjuncts are omissible in this sample),[14] "obligatory adjuncts" (i.e. *syntactically non-omissible adjuncts* in the terminology I have been using) have been argued to pose a further heuristic problem for the omissibility diagnostic. Sailor & Schütze (2013, p1) consider a range of examples, and conclude that the prevalence of obligatory adjuncts is so significant as to constitute

[12] The target of the search was verbs with PP complements, so I excluded as irrelevant passivized transitive verbs (e.g. *be found in the woods*). Copula+PP structures were also excluded.

[13] Note that, *a priori*, this procedure skews in favor of finding non-omissible PPs; if a PP is non-omissible, it can be expected to appear more frequently than a PP which is omissible (as the omissible PP will sometimes not appear). Therefore, assuming verbs with omissible vs. non-omissible PP complements have an equal chance of occurring in corpora, this procedure can be expected to detect non-omissible PPs more frequently than would be expected by randomly sampling the verbal lexicon.

[14] It should be noted that apparent adjuncts' behavior also reflects the *general* trend that omissibility is the general case.

a "paradox" which "calls for a fundamental re-thinking of how adjuncts should be conceived and analyzed." Among their data relevant to PPs within the VP, they cite Levin's (1993) examples of verbs requiring an "obligatory adverb," such as those in (25).[15,16]

(25) a. Terry acquitted themselves *(well/poorly).
b. Terry acted *(well/poorly).
c. Terry behaved *(well/poorly).
d. The omen bade *(well/poorly).
e. Terry did *(well/poorly).
f. Terry phrased their comments *(well/poorly).
g. Terry treated themselves *(well/poorly).
h. Terry worded the letter *(well/poorly).
(adapted from Levin 1993:109(422))

Sailor & Schütze (2013, p3) also note that middle constructions often require the presence of an "adjunct." They give the examples in (26a) and (26b). Many equally clear examples can easily be constructed, such as those in (26c)-(26e).

(26) a. The luggage stows away *(easily).
b. Cotton shirts iron *(quickly).
c. Pine cuts *(like butter).
d. The car drives *(like a dream).
e. The story tells *(like an epic royal saga).

These same problems are recognized by Culicover (2009, p69) and Needham & Toivonen (2011, p9).[17]

Thus, while many conventional adjuncts are omissible, there is also a non-negligible number of conventional adjuncts which are non-omissible. This is also the general pattern

[15] The verb *behave* can be used without an adverb, but only to mean "behave well" (not "behave badly" or "behave like a tennis player" etc.). I take this to be a separate lexical item. The distinct use of *behave* in (25) requires an adverb and is not restricted to the meaning "behave well."
[16] Also, while the original examples use adverbs, as shown here, PPs can be used instead.
[17] Sailor & Schütze also report examples of non-omissible adjuncts in other domains, e.g. in NPs and APs. I only consider their examples of non-omissible adjuncts in VPs, since this dissertation focuses on the A/AD in the VP.

exhibited by canonical arguments, as I illustrated above regarding PPs; most are omissible, with a notable subset being non-omissible. The *omissibility* diagnostic therefore fails the heuristic criterion from two directions. In one direction, the majority of canonical argument PPs are omissible. In the other direction, many canonical adjunct PPs are non-omissible.

Therefore, the strong omissibility diagnostic fails to meet the heuristic criterion for argumenthood; the results of this diagnostic do not align well with the conventional A/AD.[18] I conclude that omissibility serves to motivate the syntactic phenomenon of *subcategorization*, but that it does *not* motivate the syntactic A/AD. In other words, the omissibility diagnostic is valid when stated as in (27), but not in its usual strong formulation as in (23).[19]

(27) *Omissibility diagnostic*:

a. Subcategorized constituents are always non-omissible.

b. Non-subcategorized constituents are always omissible.

3.3.2. The weak omissibility diagnostic

The standard reaction to the strong omissibility diagnostic's failure is to adopt the *weak* omissibility diagnostic instead. This version of the diagnostic is repeated in (28).

(28) *Weak omissibility diagnostic*:

Adjuncts are always omissible.

Weak omissibility faces an immediate problem in the existence of non-omissible adjuncts, such as those shown in (25)-(26). The weak omissibility diagnostic must explain these apparent exceptions away, either by showing that the non-omissible PPs should really be considered arguments, or that there is some independent reason for non-omissibility here, which does not also apply to non-omissibility of arguments.

Both these approaches are sometimes taken for different examples. For example, a common approach for the exceptions in (26) is to attribute non-omissibility to pragmatic factors.

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[18] The unreliability of *omissibility* is sometimes rationalized by stating it as a one-way implication; if a given constituent is an adjunct, it will certainly be optional, but if it is an argument, it may or may not be optional (e.g. Huddleston & Pullum 2002, p222(c)). This move is contradicted by the existence of obligatory adjuncts.

[19] There are caveats involving idiomaticity and pragmatics along the lines discussed in section 3.1. Specifically, the "(non)-subcategorized constituents" in this definition do not include elements which are (non-)omissible for reasons of idiomaticity or pragmatic felicity.

The idea is that, in the right context, omission is in fact possible in cases like (26); in contrast, truly non-omissible arguments cannot be omitted in any context. In contrast, the cases in (25) are often treated merely as *apparently* non-omissible adjuncts; the idea is that the non-omissible PPs should really be considered arguments.

If these caveats can be made successfully (i.e. if it can be shown that, besides instances of subcategorization like (25), all adjuncts are omissible in at least some contexts), then the one-way version of the omissibility diagnostic could be *consistent* with the existence of a syntactic A/AD. Many authors hold that this is possible. Consider Zyman's (2020, p1, fn1) pertinent comments:

> There are apparent cases of obligatory adjuncts [references omitted], but most of the relevant constraints appear to be semanticopragmatic, and the remaining cases likely do not involve true structural adjuncts.

In other words, Zyman holds that some adjuncts are non-omissible for reasons other than argumenthood (particularly semanticopragmatic reasons), and that the remaining cases of apparently non-omissible adjuncts are not really adjuncts at all. Though others disagree (cf. Culicover 2009, Needham & Toivonen 2011, Sailor & Schütze 2013), Zyman's position (also accepted by others, e.g. Huddleston & Pullum 2002) is plausible; weak omissibility might be compatible with the existence of the syntactic A/AD.

Nevertheless, even if weak omissibility is *consistent* with the syntactic A/AD, it does not follow that it provides *evidence* for the A/AD. To see why, consider how weak omissibility could be implemented. Let's begin by accepting that omissibility directly identifies the phenomenon of *subcategorization*; i.e., if an element is non-omissible (for non-pragmatic reasons), then it is subcategorized. From here, there are two basic approaches to implement weak omissibility. On one hand, we could identify subcategorization with argumenthood (i.e., subcategorized ↔ argument), but stipulate the existence of some other feature (or set of features) F *on top of* subcategorization which can render subcategorized elements omissible. In other words, this first approach states that omissible arguments both (i) are subcategorized and (ii) bear some additional feature F, while non-omissible arguments are subcategorized elements lacking F.

(29) Approach 1: subcategorized ↔ argument, {subcategorized, +F} → omissible

a. omissible argument

$$\begin{bmatrix} \text{XP} & \begin{matrix} \text{subcategorized} \\ +\text{F} \\ \vdots \end{matrix} \end{bmatrix}$$

b. non-omissible argument

$$\begin{bmatrix} \text{XP} & \begin{matrix} \text{subcategorized} \\ \vdots \end{matrix} \end{bmatrix}$$

On the other hand, a second approach could reject the identification of subcategorization with argumenthood, and instead assume merely that argumenthood is *necessary* for subcategorization. There must then be some additional feature (or set of features) F which is both identifiable with argumenthood (i.e., +F ↔ argument) and necessary for subcategorization, but which is not sufficient for non-omissibility. In other words, this second approach states that omissible arguments are F-bearing elements that are not subcategorized, while non-omissible arguments are F-bearing elements that *are* subcategorized.

(30) Approach 2: subcategorized → +F, +F ↔ argument

a. non-omissible argument

$$\begin{bmatrix} \text{XP} & \begin{matrix} \text{subcategorized} \\ +\text{F} \\ \vdots \end{matrix} \end{bmatrix}$$

b. omissible argument

$$\begin{bmatrix} \text{XP} & \begin{matrix} +\text{F} \\ \vdots \end{matrix} \end{bmatrix}$$

In both cases, we must stipulate an additional relationship between subcategorization and argumenthood which omissibility itself does not justify. In approach 1, we must stipulate that, in conjunction with some additional feature F, subcategorized elements become omissible. Note that if we didn't stipulate some F in approach 1, we would predict all subcategorized elements (hence all arguments) to be non-omissible. In order to make omissibility only a *one-way* reflection of argumenthood, we need F. Similarly, in approach 2, we must stipulate that subcategorization requires the presence of some additional feature F. Again, some F is required above and beyond the direct implication of subcategorization.

Therefore, although omissibility may directly identify subcategorization (i.e. [non-omissible] → [subcategorized] in both approaches), by implementing omissibility as a one-way diagnostic for argumenthood we are forced to say that subcategorization is related to argumenthood in a way that omissibility is not *itself* capable of diagnosing. In other words, we must assume both (i) that there is a three-way distinction between *non-omissible arguments*,

omissible arguments, and *adjuncts*, and (ii) that omissibility itself identifies only non-omissible arguments, leaving the additional necessary distinction between omissible arguments and adjuncts unmotivated.

Therefore, omissibility has to be paired with some independent diagnostic which can identify the difference between omissible arguments and adjuncts. In the absence of that additional evidence, omissibility does not provide evidence for the A/AD. Either way, omissibility does not motivate the A/AD by itself. It may motivate subcategorization, but the connection from subcategorization to argumenthood is not motivated by omissibility alone; that connection requires additional evidence.

3.4. Conclusions on omissibility

In summary, this section argued that omissibility can be used to argue in favor of the phenomenon of *subcategorization* for a relatively small number of non-omissible dependents (specifically those which are non-omissible for reasons besides idiomaticity and/or pragmatics). Additionally, while there are ways to make omissibility *compatible* with a syntactic A/AD (specifically, by treating subcategorization as a one-way diagnostic of argumenthood), such approaches are not self-motivating; they need to be supplemented with argumentation involving other argumenthood diagnostics. As the remainder of this chapter seeks to demonstrate, existing argumentation in this direction is not compelling. I conclude, therefore, that the phenomenon of omissibility does not provide support for the idea that there is a syntactic distinction between arguments and adjuncts.

4. VP-anaphora

The VP-anaphora diagnostic assumes that pro-VPs, including *do so* and *do what* (as in *do what*-pseudoclefting) can have dependents corresponding to adjuncts in their antecedents, and cannot have dependents corresponding to arguments in their antecedents. For example, in (31a), since *tomorrow* can occur with *do so*, the VP-anaphora diagnostic concludes that the corresponding dependent in the antecedent clause is an adjunct (i.e. *last Tuesday* is an adjunct in the VP *take a trip last Tuesday*). In (31b), *onto the wagon* cannot co-occur with *do so*; therefore, the corresponding dependent in the antecedent clause (i.e. *onto the truck*) is considered an argument.

(31) a. John [$_{VP}$ took a trip last Tuesday], and I'm going to do so tomorrow.

b. * John [$_{VP}$ loaded a sack onto the truck], and I did so onto the wagon.

This section argues that this diagnostic does not provide evidence in favor of the syntactic A/AD. More specifically, the section argues that the distinctions drawn by VP-anaphora diverge in crucial ways from predictions of the conventional A/AD, and, critically, that these divergences are better explained by analyses predicated on principles entirely independent of the A/AD. The VP-anaphora diagnostic therefore fails to meet the no-independent-motivation criterion, and as such cannot be taken as evidence motivating the syntactic A/AD.

The section begins (in subsection 4.1) by introducing the logic underlying the VP-anaphora diagnostic, including how this applies in A/AD-based analyses of *do so*-substitution and *do what*-pseudoclefting. Subsection 4.2 then evaluates the predictions of such analyses in light of the behavior of several different types of PPs; I show that there are crucial divergences from the A/AD-based predictions. Finally, subsection 4.3 demonstrates that A/AD-free analyses of VP-anaphora are better able to capture the data. I therefore conclude that VP-anaphora fail to provide evidence in favor of the syntactic A/AD.

4.1. *Do so*-substitution and *do what*-pseudoclefting as VP-anaphora

This section evaluates the VP-anaphora diagnostic by the two criteria described in section 2 above, including (i) the heuristic criterion and (ii) the no-independent-motivation criterion. In order to do so, it is necessary to establish the logic by which VP-anaphora has been connected to the A/AD. That is the goal of this first subsection. Here, I introduce the Differential Attachment-height of Verbal Dependents (DAVD) hypothesis, the idea that arguments attach strictly *internally* to a specified projection in the VP, while adjuncts attach *externally* to that projection.

(32) *Differential Attachment-height of Verbal Dependents (DAVD) hypothesis*:
Given a verb V, there is a projection of V within which all arguments of V and no adjuncts to V must occur.

This hypothesis is critical to the VP-anaphora diagnostic. If all arguments of a given verb must attach within the VP projection, then it follows that any operation *targeting* the VP will have to affect all the arguments of the verb. Further, if all the adjuncts attach outside the VP projection, then it follows that any operation targeting the VP need not affect the adjuncts. The VP-anaphora diagnostic assumes that pro-VPs, such as *do so* or *do what* (as in *do what* pseudoclefts), must identify a syntactically complete VP as their antecedent. In other words, a pro-VP is predicted to

be able to take as its antecedent a projection of the verb including all the verb's arguments and excluding all its adjuncts, but no projection smaller than this. Therefore, given a VP consisting of a verb V plus dependents $XP_1 \ldots XP_n$, if a given pro-VP can receive an interpretation corresponding to that of the verb plus some but not all of $XP_1 \ldots XP_n$, then the excluded dependent(s) XP_i can be concluded to be adjuncts to V; any dependent(s) XP_k which cannot be excluded are concluded to be arguments of V.

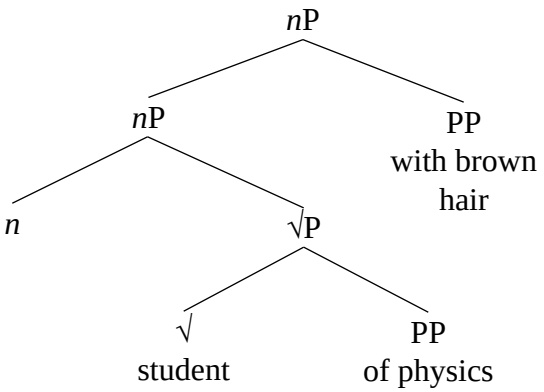
Notice that the VP-anaphora diagnostic depends crucially on the assumption that pro-VPs like *do so* and *do what* find their antecedents by targeting a VP constituent. The next subsection (4.2) argues on the basis of empirical evidence that this analysis of *do so* and *do what* is incorrect. The behavior of several types of PP dependents is better explained by alternative analyses which do not assume pro-VPs require VP-constituent antecedents. As such, the VP-anaphora diagnostic fails both the heuristic criterion (since its predictions are contradicted in several critical cases) and the no-independent-motivation criterion (since the data are better explained without reference to the A/AD), and therefore cannot be taken as evidence motivating the syntactic A/AD.

Before I continue, some clarification on notation is required. The DAVD hypothesis stipulates the existence of *some projection* in syntactic structure which contains all of a verb's arguments and none of its adjuncts. For the purposes of this chapter, the particular label of this projection does not matter. The projection could be labeled 'V-double-bar' in Jackendoff's (1976) version of X-bar Theory, it could be labeled 'V-single-bar' in Chomsky's (1981) version, or it could be labeled 'VP' in another theory. All that matters for present purposes is that there is some such projection with this property in syntax.

For this section, I will consider an implementation of the DAVD based on Harley's (2007, 2014) analysis of *one*-substitution in the nominal domain. Harley's approach utilizes key assumptions of Bare Phrase Structure (Chomsky 1995, *inter alia*), as well as Distibuted Morphology, particularly (Halle & Marantz 1993, Harley 1995, Marantz 1997). From Bare Phrase Structure, it is relevant that projections are not differentiated by bar-levels as in X-bar Theory. From Distibuted Morphology, the relevant assumption is that nouns are underlyingly roots √ in the presence of an abstract nominalizer *n*, and that the *arguments* in a noun phrase are sisters to (a

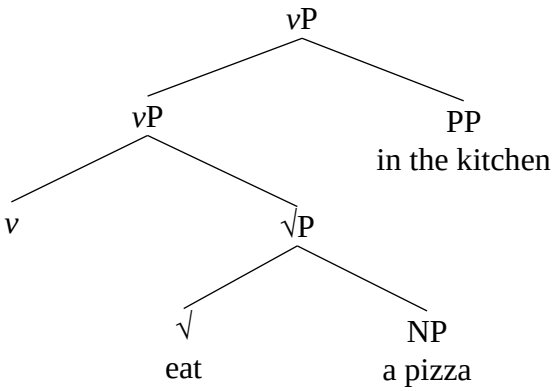
projection of) √, while *adjuncts* are sisters to (a projection of) *n*. Thus, structures like (33) are predicted.[20]

(33)



The principles applying in the nominal and verbal domains are analogous; the proposal can be carried over directly to the verbal domain. The argument-containing projection of the DAVD hypothesis, then, is the *v*P: *arguments* of the verb will be strictly internal to *v*P, while *adjuncts* will be external to *v*P. Thus, in (34), which assumes that *in the kitchen* is an adjunct – and *a pizza* an argument – of a verb like *eat*, a *v*P-targeting operation could separate *in the kitchen* from the verb, but could not separate *a pizza* from it.

(34)



This structure differs from that assumed for the verbal domain in chapter 2. Specifically, the direct object is complement to √, rather than being introduced as a specifier of *v*. VoiceP is still assumed

[20] The analysis is proposed to capture *one*-substitution under the assumption that *one* substitutes for *n*P,

to dominate *v*P. This section considers the predictions of the DAVD for structures like (34), for the sake of argument.

I will now provide background on *do so*-substitution and *do what*-pseudoclefting, explaining how these phenomena have been analyzed as instances of VP-anaphora. Section 4.1.1 first discusses *do so*-substitution, and section 4.1.2 then turns to *do what*-pseudoclefting. Section 4.1.3 is intended to anticipate section 4.3, which argues in favor of A/AD-free analyses of both types of VP-anaphora.

4.1.1. *Do so*-substitution

There are two distinct ways in which *do so*-substitution can be analyzed as involving a VP-targeting operation. One option, originally proposed by Lakoff & Ross (1966, 1976), is that *do so* results from a syntactic *substitution operation* similar to deletion. Given two sentences where two sub-structures are syntactically parallel (according to parallelism conditions of some sort), one of the two sub-structures can be deleted and replaced by a pro-form. With *do so,* we would have situations like the following:

(35) a. Lee [$_{vP1}$ went on a hike], and Terry [$_{vP2}$ went on a hike] too.

b. $vP_1 \|_{parallel} vP_2$

c. Lee [$_{vP1}$ went on a hike], and Terry $\underbrace{[_{vP2}\ \sout{\text{went on a hike}}]}_{\text{did so}}$ too.

This was first proposed by Lakoff & Ross (1966, 1976) to explain why some dependents of V, such as *tomorrow* in (36a), can occur alongside *do so,* while others, such as *onto the wagon* in (36b), cannot.

(36) a. John took a trip last Tuesday, and I'm going to do so tomorrow.

b. * John loaded a sack onto the truck, and I did so onto the wagon.

By stipulating that *do so* must *substitute* for a complete VP (with substitution licensed by parallelism with an antecedent VP), Lakoff & Ross were able to deduce that temporal adverbials

like *tomorrow* must be syntactically "outside" the VP, while directional/goal PPs like *onto the wagon* must be syntactically "inside" the VP.[21]

I will refer to this kind of approach, which holds *do so* substitutes for a *v*P, the *substitution* approach. Another kind of approach treats *do so* as a base-generated pro-form. Instead of resulting from a substitution operation on previously-derived structure, *do so* is inserted directly into the derivation like a pronoun. The pro-verb *do so* would then find some verbal constituent in prior discourse to serve as its antecedent, giving the surface impression of substitution, just as with normal pronouns. The idea is that *do so* looks for a *syntactically* defined antecedent. Taking the structure in (34), the category targeted would be *v*P. This kind of approach will be referred to as the *syntactic-anaphora* approach.[22]

These analyses naturally set up *do so* as a type of VP-anaphora diagnostic (see Przepiórkowski 1999, p280 for a list of works from 1970 to 1999 making this connection). For example, assuming *v*P is the boundary predicted by the DAVD hypothesis between arguments and adjuncts, then we predict *do so* to be able to co-occur with adjuncts but not arguments. If *do so* involves substitution for *v*P, then any dependent which survives substitution must be *external* to *v*P, and therefore (by the DAVD hypothesis) must be adjuncts. Anything that cannot survive substitution must be *internal* to *v*P, and so must be an argument.

Similarly, if *do so* is a base-generated pro-form seeking a *v*P-constituent as its antecedent, then given a verb V with dependents $XP_1 \ldots XP_n$, the DAVD hypothesis predicts that the potential

[21] They situated this conclusion against the proposal of Chomsky (1965) that many kinds of "adverbs" (including PPs) are immediately dominated by VP, rather than being generated outside of VP. They argued that the behavior of *do so* indicated that many of the PPs Chomsky assumed to be generated within VP are in fact external to VP, concluding (p110) that "direct objects, indirect objects, and directional adverbs are inside the verb phrase," while most other adverbials are outside VP.

[22] The *syntactic*-anaphora approach can be contrasted with an alternative where *do so* seeks a *semantically*-defined entity as its antecedent (cf. Houser 2010 using the terms "deep" and "surface" anaphora from Hankamer & Sag 1976). The syntactic-anaphora approach is relevant here because it directly relates to the syntactic A/AD. On a *semantic*-anaphora approach, the syntactic A/AD would be relevant only indirectly. We would need to assume, in the first place, that there is in fact a semantic A/AD, and further, that this semantic A/AD correlates in some way with the syntactic A/AD. Specifically, *do so* would give us some information about whether certain elements are *semantic* adjuncts, and would take this information *by hypothesis* to tell us something about the syntactic structure of those elements. This is by no means a necessary stipulation; it would have to be supported by independent evidence for a syntactic A/AD. Thus, this kind of semantic account of *do so* has no *necessary* consequences for the syntactic A/AD. Because my focus in this section is on the *syntactic* A/AD, as discussed in section 2.1, I will focus my discussion of the anaphora approach on its *syntactic* implementation, and will not consider the logically dissociable problems for the *semantic* A/AD based on the *semantic*-anaphora approach to *do so* (though in many cases the problems are essentially the same).

antecedents of *do so* cannot exclude any of V's arguments XP_i. Instead, potential antecedents must consist of V and all its arguments XP_i, plus, optionally, any number of its adjuncts XP_k. Thus, any dependent of V which need not be included in *do so*'s interpretation would be an adjunct, and any dependent which has to be included in *do so*'s interpretation would be an argument.

The two approaches (the substitution vs. syntactic-anaphora approaches) need not be distinguished for the purposes of this dissertation; they make the same predictions about the data at hand because both depend critically upon the availability of an antecedent *v*P to either license deletion+replacement (on the substitution approach) or to serve as the interpretive antecedent (on the syntactic-anaphora approach). It is relevant to note, however, that the substitution approach has been definitively argued against by Jackendoff (1972, 109-111) and others (see e.g. Hankamer & Sag 1976, Houser 2010). Since the transformational, deletion-based approach to VP-anaphora and pronominals more generally is dispreferred based on their arguments, the discussion below focuses on the syntactic anaphora approach, and does not directly discuss the substitution approach.

4.1.2. *Do what*-pseudoclefting

Do what-pseudoclefting can be argued to involve a VP-targeting operation similar to that in *do so*-anaphora, with one difference. First, like *do so*-anaphora, some may hold that *do what* is a pro-verb, and hence that it will be compatible with dependents attaching outside of *v*P, but not with dependents which attach strictly within *v*P.

A difference is that, while the pro-verb *do so* finds its antecedent in discourse, the pro-verb *do what* finds its antecedent via reconstruction, namely via reconstruction of the counterweight into the free relative. The idea is that the free-relative subject (e.g. *what Lee did* in (37)) of the pseudocleft acts like a function seeking a *v*P.

(37) [What Lee did] was *go to the store*.

Assuming this function applies to the counterweight (*go to the store* in (37)), it requires that the counterweight be a *v*P. If we adopt the DAVD hypothesis, assuming that the minimal possible *v*P includes all the arguments of the verb, but excludes its adjuncts, as in (34), then we have an

explanation for why pseudoclefting can separate adjuncts but not arguments from the verb. That is, the counterweight must reconstruct into the *v*P position of the free relative.[23]

4.1.3. Preview of alternatives

Thus, both *do so*-substitution and *do what*-pseudoclefting can be considered instances of the VP-anaphora diagnostic. They therefore provide evidence for the syntactic A/AD if the dependents they can vs. cannot co-occur with align closely with the conventional A/AD (e.g. if the elements which can co-occur with *do so* are adjuncts, and the elements which cannot are arguments, then, by the DAVD hypothesis, this would support the syntactic A/AD). The next subsection (4.2) presents evidence suggesting that there is no such alignment; the dependents which can co-occur with *do so*/*do what* in fact *do not* closely align with the conventional A/AD. Section 4.3 then argues that VP-anaphora are better analyzed without reference to the A/AD, and hence cannot provide evidence for the DAVD hypothesis or for the A/AD more generally.

Looking ahead, throughout section 4.2 I contrast the A/AD-based approaches just described with the A/AD-free account I adopt in section 4.3. In summary, this alternative, based on Miller (1992), relates the ability of a PP to occur with *do so*/*do what* to that PP's independent compatibility with the lexical verb *do*: a PP can be separated from the verb under *do so*-substitution/*do what*-pseudoclefting if and only if that PP would be compatible with the lexical

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[23] I would like to point out another way *do what*-pseudoclefting has been argued to diagnose the A/AD. Specifically, Kim et al. (2019, p18) claim that *do* is an "expletive" verb devoid of argument-structural content. They write, for example, that "pseudoclefting a PP requires that its [=the PP's] contribution to the meaning of the sentence be compositional (typical characterization of adjuncts); then this contribution can be supplied even when the PP modifies the expletive verb *do*," (p9, brackets added). This idea relates to the *semantic* A/AD, and does not directly provide evidence for or against the *syntactic* A/AD. However, it should be noted that the assumption on which Kim et al.'s argumentation hangs, namely that *do* is an expletive verb, is incorrect. Instead, *do* has its own particular argument-structural properties (e.g., see Huddleston & Pullum 2002, p1529-1534). For example, *do* is compatible with patient-like *to*-phrases, as already discussed (section 3.2.1 above). These kinds of PPs are not compatible with just any verb, and therefore cannot be taken to be "compositional" in the relevant sense (cf. Koenig et al. 2003). *Do* is also compatible with theme-like *with*-phrases (e.g., see Culicover & Jackendoff 2005, p285), which pose the same kind of problem; they are not compatible with just any verb. Therefore, *do* cannot be treated as an expletive verb.

To push things a little further, Kim et al.'s reasoning is that *do* does not "select" any PPs in its argument structure. And if *do* doesn't select any PPs, then any PPs which are compatible with *do* must be "unselected," hence adjuncts in at least the semantic sense. But this reasoning is circular. *Do* is not the only verb which doesn't "select" a PP (in Kim et al.'s sense); a huge number of verbs have this property. The verb *eat* does not select a PP in the same sense. That being the case, *do* is no better suited to diagnose adjuncthood than *eat* is. But it would clearly be circular to argue that a PP's compatibility with *eat* constitutes evidence that the PP is an adjunct. This follows only if the conclusion (i.e. that the PPs compatible with *eat* are unselected, hence adjuncts) is granted *a priori*. It therefore does not follow that a PP being compatible with lexical *do* implies adjuncthood. All that it implies is that the PP is licensed by the semantic argument structure of lexical *do*.

verb *do* independently. This alternative explains the fact that, say, directionals like *into the sink* are incompatible with *do so*/*do what*, while locatives like *at home* are compatible with it, by appeal to the fact that these (in)compatibilities are reflected independently with the verb *do*, where no substitution operation is involved.

(38) a. Lee did so {*into the sink / at home}.

b. What Lee did {*into the sink / at home} was pour coffee.

c. Lee did something strange {*into the sink / at home}.

It should also be noted at this point that prior work already shows the A/AD-based analyses of *do so*-substitution and *do what*-pseudoclefting to be untenable. For *do so*-anaphora, it is known that *semantically*-based anaphora of some kind is required; analyses based on reference to syntactic constituents are ultimately inadequate. For example, Culicover & Jackendoff (2005) find that *do so* can refer to discontinuous material for which a constituent-source is difficult to identify (without recourse to unmotivated vacuous movements). This is illustrated in (39).

(39) a. Robin slept in the bunkbed for twelve hours, and Leslie did so on the futon.

b. Robin slept for twelve hours in the bunkbed, and Leslie did so for eight hours.

(adapted from Culicover & Jackendoff 2005, p125(31c))

Additionally, Kehler & Ward (1999) find that *do so* can refer to material split across clauses, such that it is not possible to identify the antecedent with a single constituent. This is illustrated in (40).

(40) a. What I am suggesting is that when we delay, or when we fail to act, we do so intentionally...

b. Fortunately, the first person to die in 1990 and the first couple to file for divorce in 1990 were allowed to do so anonymously.

(adapted from Kehler & Ward 1999, p13)

These data require a semantic account of *do so*-anaphora resolution. For more detailed discussion, see the cited sources of these data (see also discussion in Miller 1992, Przepiórkowski 1999, Houser 2010). Semantically-mediated anaphora is a feature of the A/AD-free analysis I develop

in section 5.1, but it contradicts the more traditional A/AD-based approaches discussed above and criticized in more detail in the following subsections.

Similarly, *do what*-pseudoclefting ultimately demands an alternative analysis, because of data like (41) illustrating the possibility of *overlap* between the weight and counterweight.

(41) [What we need to do] is *we need to go home*.

The possibility of overlap in these constructions has important consequences for how reconstruction in pseudoclefts works. Specifically, *do what*'s value cannot be supplied directly by the counterweight, as the A/AD-based approach requires. If the value of *do what* were supplied directly by the counterweight in (41), then the pseudocleft would incorrectly reconstruct to something like "We need to *we need to go home*." Examples like (41) thus suggest to Den Dikken et al. (2000) and O'Neill (2015) that the free relative is interpreted as a "concealed question," and that the counterweight must be a direct answer to that question, which may or may not involve ellipsis. As I discuss in more detail in section 5.2, with this question-answer analysis, there is no reason why adjuncts but not arguments should be able to appear in the free relative with *do*.

4.2. Behavior of different PPs under VP-anaphora

Do so and *do what* are compatible with certain kinds of PPs, and not others. This subsection considers the behavior of several different kinds of PPs under *do so*-substitution and *do what*-pseudoclefting, all of which pose problems of varying degrees for the A/AD-based approaches discussed in section 4.1. Specifically, these problems highlight misalignments between the observed data and the predictions from the conventional A/AD. I begin by discussing "patient-like *to*-phrases" in section 4.2.1, then benefactives, comitatives, and locatives in the following subsections. I conclude that these data cannot be captured by A/AD-based approaches, and so VP-anaphora fail the heuristic criterion.

4.2.1. Patient-like *to*-phrases

This subsection illustrates a problem for A/AD-based approaches to VP-anaphora, based on "patient-like *to*-phrases," such as that in (42) from Huddleston & Pullum (2002, p1533). When they occur with *do so*/*do what* (or *do that*, as in this example), patient-like *to*-phrases can

correspond to a conventional argument in *do so*/*do what*'s antecedent. For conciseness, I first focus the discussion on data involving *do so*, and later present the parallel data with *do what*.

(42) They questioned Jill for over an hour before letting her go: I hope they don't do that to me.

I refer to the *to*-phrases with *do so*/*do what* in these sentences as "*patient*-like *to*-phrases." As Huddleston & Pullum point out, in this sentence, the interpretation of the *do that*-clause in (42) is something like "question me for over an hour before letting me go," with the *to*-phrase *to me* corresponding to the patient participant *Jill* in the antecedent clause. The reason for the terminology "patient-*like*" is that there is no clear generalization on the type of thematic role associated with this constituent. In the attested examples in (43), the *to*-phrases correspond to patients in the antecedents, in (44), they correspond to themes, and in (45) to goals/recipients. All these elements are standardly considered arguments rather than adjuncts.[24]

(43) *Patients*:

a. I kicked you before you could do so to me.
(Adapted from Przepiórkowski 1999, p290, citing Miller 1992, p96-97)

b. It is so much more tragic when we control others through physical harm than by more passive means, and it is worst when we do so to our children. (CoCA)

c. And for the most part he did. In any case he had decided to, because an eruption of hardcore, coke-and-speed-headed paranoia could destroy them all. It had done so to many others. (CoCA)

(44) *Themes*:

a. It is no more unkind or inaccurate to typify teachers as losers than it is to do so to introverts. (CoCA)

[24] Whether patient-like *to*-phrases themselves are considered arguments or adjuncts is unclear. This ambiguity need not be addressed here, since the problem ultimately has to do with the argument-status of the corresponding dependents in the antecedent *v*P.

b. No country has officially been named a currency manipulator by the US since Bill Clinton's administration did so to China in 1994. (BBC: URL)

c. It's ok to make you both look like idiots, not so much to do so to your spouse alone. (CoCA)

(45) *Goals/recipients*:

a. Asian economies that previously exported predominantly to the United States, such as Japan, South Korea, and Taiwan, now do so to China. (CoCA)

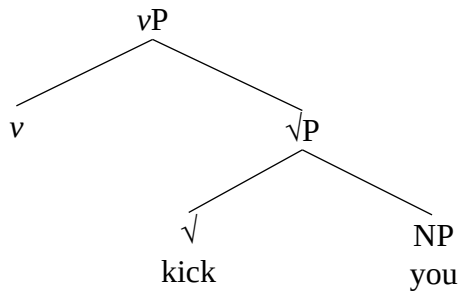
b. China doesn't just export cheap coal, labor and the lack of environmental protection to the US, it also does so to 3d world countries. (CoCA)

c. And though we may sometimes say hard things, as Christ did to the Capernaites, He nevertheless bestows a secret strength to bear it; at least He does so to the Souls whom He has chosen. (CoCA)

These data cannot be adequately analyzed by A/AD-based approaches. Specifically, if it is the case that the patients/themes/goals in (43)-(45) are arguments (which would have to be the case, if there were an A/AD at all), and if *do so* is analyzed as a *v*P-targeting operation (as A/AD-based approaches hold), then these data are not consistent with the DAVD hypothesis.

To illustrate, consider the syntactic-anaphora approach to *do so* as applied to (43a). If the DAVD hypothesis is correct, this means the antecedent *v*P must contain all of the verb's arguments. If *anything* counts as an argument, the patient direct object *you* counts an argument of *kick* in (43a). The *v*P in this sentence must therefore contain this patient NP, as shown in (46).

(46)



According to the syntactic-anaphora approach to *do so*, *do so* must find a complete *v*P as its antecedent.[25] Therefore, *do so*'s antecedent in (43a) must be the full *v*P in (46). However, if that's the case, then the value of *do so* is "kick you," including the patient *you*. This leads to an unacceptable interpretation for the *do so*-clause in (43a) as "kick you to me." The actual interpretation of the *do so*-clause is just "kick me." Therefore, given the assumptions required by the syntactic-anaphora approach, data such as (43a), and all the other examples in (43)-(45), cannot be captured.

In order to account for the data in (43)-(45), while maintaining *both* the DAVD hypothesis *and* the syntactic-anaphora approach to *do so* (and while also maintaining that patients/themes/goals are arguments), we would need to posit some way of resolving the overlap of patients which occurs when the full *v*P in (46) is treated as the antecedent for *do so* in (43a). We could assign a special interpretation to *do so*, such that it (i) takes the full *v*P *kick you* as its antecedent, (ii) detects the overlap between the patient in the antecedent (*you*) and the *to*-phrase patient in its own clause (*me*), and (iii) resolves the overlap by replacing *you* with *me*. The problem with this modified syntactic-anaphora approach is that it cannot be construed as *support* for the A/AD. If we allow *do so* to resolve overlap between thematic elements in its antecedent and thematic elements in its own clause, then overlap can be treated as the general case, even with canonical adjuncts. In (47), for instance, *do so* could take the full *v*P *sleep for an hour* as its antecedent, and handle the overlap in durational PPs in the same way as the overlap in patients is to be handled in (43)-(45).

(47) Lee slept for an hour, and Terry did so for two hours.

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[25] *Do so* cannot be allowed to substitute for just √P or √ by itself; if that were possible, the A/AD would immediately become irrelevant, as even arguments of the verb could be separated. For instance, if just the root √ were a possible target, then *do so* in (i) should be interpretable as just "eat," not specifying what was eaten.

(i) First, Terry ate pizza. Then, Lee did so too.

An additional empirical worry (specific to the √-analysis) involves nominals with inherent argument-structure. If √P could be targeted as the antecedent for *do so*, then nominals would presumably offer potential antecedents. But it is not clear this is the case. Consider such examples as (ii).

(ii) a. *The destruction of the artifacts upset Lee, who would never do so.
b. *The artifacts' destruction upset Lee, who would never do so.

Though Ward & Kehler (1995, 2005) find that some nominals can serve as the antecedent to *do so* (e.g. *The majority of **horse riders** do so purely for leisure and pleasure*), the examples in (ii) are certainly unacceptable. This is unexpected if *do so* can target √P, as the nominalizations in these examples would be expected to involve a √P resembling [$_{\sqrt{P}}$ *destr-* [$_{nP}$ *the city*]] (see e.g. Harley & Noyer 1998).

With this modification, we would no longer expect *do so* to treat arguments and adjuncts differently, and thus *do so* would not reflect empirical correlates of the A/AD. Therefore, this modification cannot be adopted without rejecting *do so*-substitution as evidence for the A/AD.

The data are similarly problematic for A/AD-based approaches to *do what*-pseudoclefting. As with *do so*-substitution, *do what*-pseudoclefting can separate a patient-like *to*-phrase from the verb, as in (48).

(48) a. [What they did to the children] was *chase them*.

b. [What you need to do to the evidence] is *destroy it*.

c. Essentially [what they are doing to our county] is throwing us bones while they're trying to destroy the Salton Sea. (CoCA)

Just as with *do so*, sentences such as (48) resist an A/AD-based analysis assuming both that direct objects are arguments, and that *do what*-pseudoclefting involves reconstruction of a complete *v*P. In (48a), for example, the full *v*P *chase them*, including the direct object argument *them*, would have to reconstruct into *v*P position in the pseudocleft *what they did to the children*. This yields an inappropriate interpretation *they chased them to the children*.

I conclude that patient-like *to*-phrases pose a heuristic problem for the VP-anaphora diagnostic; A/AD-based approaches to *do so*-substitution and *do what*-pseudoclefting are unable to adequately capture the patient-like *to*-phrase data. On the other hand, the behavior of patient-like *to*-phrases with both *do so*-substitution and *do what*-pseudoclefting is entirely natural under the alternative, A/AD-free analyses I adopt in section 4.3 (which hold that a PP's compatibility with *do so*/*do what* depends on its independent compatibility with lexical *do*) because lexical *do* can combine with a patient-like *to*-phase.

4.2.2. Benefactives

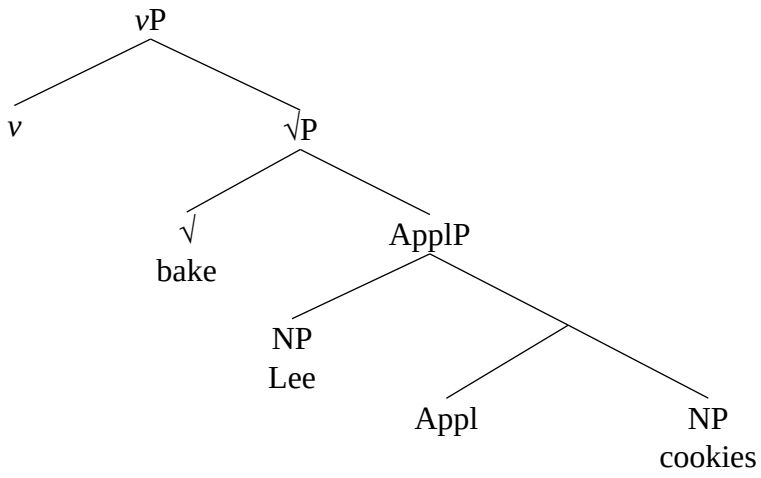
This subsection illustrates a further problem for A/AD-based accounts of VP-anaphora, based on the behavior of benefactives. I demonstrate, as in the previous subsection, that the data are inconsistent with the idea that VP-anaphora support the A/AD. To illustrate, we can begin by considering data with *do so* (I will return to the parallel pseudoclefting data). Observe that a

benefactive can appear with *do so* even when the antecedent *v*P contains a benefactive in double-object form.

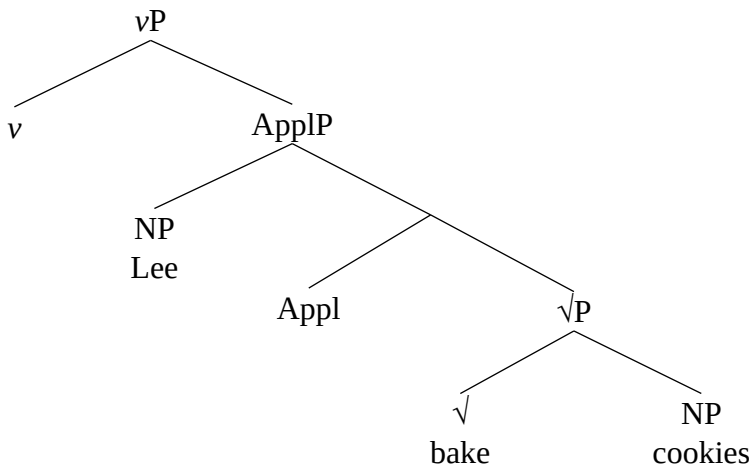
(49) I'd bake Lee cookies in a heartbeat, but I'd never do so for Terry.

This poses a major problem for the A/AD-based accounts of *do so* anaphora. Let us assume that double-object benefactives have a structure like either (50a) (based on Pylkkänen 2008) or (50b) (based on Bruening 2010, Bosse 2015).

(50) a.



b.



The A/AD-based approach to *do so* cannot accommodate data such as (49). The A/AD-based approach requires that *do so* find a complete *v*P as its antecedent. Neither of the options in (50) for the structure of the antecedent clause in (49) provides a valid *v*P antecedent. In both cases, the minimal *v*P contains the double-object beneficiary, *Lee*. Thus, if the antecedent *v*P is taken as the antecedent of *do so*, the value of *do so* is supplied as "bake Lee cookies." This creates an overlap

between the beneficiary specified in the antecedent clause and the beneficiary specified in the *do so*-clause; filling in this value for *do so* would yield "bake Lee cookies for Terry," which is incongruent with the intended interpretation of (49).

Therefore, the ability of *do so* to strand benefactive *for*-phrases as in (49) poses problems for the idea that *do so* supports the A/AD; the A/AD-based approach is unable to adequately capture these data.[26] The *do what*-pseudoclefting data reveal a parallel problem for A/AD-based approaches. Consider the possibility of overlap between the free relative and the counterweight.

(51) [What Lee did for the students] was *bake them cookies*.

The free relative in (51) involves a prepositional benefactive *for the students* which corresponds to an indirect object NP in the counterweight. This is problematic for reasons similar to those discussed for *do so*. If *do what*-pseudoclefting involved reconstruction of the counterweight into the free relative, then (51) would reconstruct to something like (52).

(52) %Lee baked the students$_1$ cookies for them$_1$.

This paraphrase is acceptable for some speakers, if the *for*-phrase is interpreted as a "deputative" benefactive (a benefactive *for*-phrase indicating that the event was carried out on someone else's behalf, in this case on behalf of the students, see Bosse 2015, p121-122). If reconstruction yields (52), it is predicted that the *for*-phrase in the free relative in (51) is interpreted as a deputative benefactive; thus, in addition to being the *recipient* of the cake, the students in this example should also be the party on whose behalf the baking was carried out. That does not seem to be the case, though. The pseudocleft in (51) does not seem to require an interpretation in which cookies were baked *on behalf of* the students; instead, it is possible to interpret (51) as simply saying that the cookies were baked for the students to eat. To the extent that *for the students* in (51) need not be interpreted as a deputative benefactive, it is a problem for the idea that the value of pro-*v*P *what* is supplied directly by the counterweight.

[26] As discussed in the previous subsection, it would be possible to modify the A/AD-based approach so that *do so* resolves the overlap between benefactives, but this would prevent *do so*-anaphora from being construed as support for the A/AD. Thus, it is not possible to capture data such as (49) in a manner consistent with the idea that *do so* supports the A/AD.

In contrast, the alternative A/AD-free analyses I describe in section 4.3 handle these data (including (49) and (51)) naturally. Since the compatibility of a PP with *do so* depends on the independent compatibility of the PP with lexical *do*, the ability of *do so* to occur with a benefactive PP follows straightforwardly: benefactives are independently compatible with lexical *do* (as discussed in section 4.3).

4.2.3. Locatives

This subsection reveals a problem posed by locative PPs for the idea that VP-anaphora supports the syntactic A/AD. Locatives are often separable from the verb under *do so*-substitution. However, it is possible to draw a distinction among locatives, distinguishing *subject* locatives, identifying the location of the subject, from *object* locatives, identifying the location of the object (Huddleston & Pullum 2002, p681). For illustration, consider the sentences in (53).

(53) a. Lee called Terry at home.
b. Lee overheard Terry on the fourth floor.

The sentence in (53a) is ambiguous.[27] One interpretation is that Terry was at home when Lee called. This reading does not imply that Lee was also at Terry's house. In this way, the locative PP *at home* can describe the object's location without describing the subject's location. The other reading is the opposite: Lee is at home when they call Terry. The sentence (53b) is ambiguous is the same way.

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[27] This is *not* an instance of standard PP-attachment ambiguity, as in something like *follow a turtle on the beach*, where one interpretation has the PP attached to NP [*a turtle on the beach*] and another has the PP attached to VP [*follow … on the beach*]. The reason is that NP attachment is not possible in these examples, which use proper name objects; PPs cannot normally attach to proper names in English. Therefore, the PPs here are not NP-dependents.

It is also important to point out that, while some cases of ostensible object locatives might be argued to involve small clauses, as with *see* in (i-a) or *find* in (i-b), object locatives can also occur outside the context of a small clause. This can be seen from the fact that indirect and oblique objects can license object locatives, as in (i-c) and (i-d). That is, a possible interpretation of (i-c) and (i-d) is that Terry was at home (and Lee was not).

(i) a. Lee saw Terry at home.
b. Lee found Terry at home.
c. Lee showed Terry *Pride and Prejudice* at home.
d. Lee talked to Terry at home.

It is unlikely that small clauses occur in the environments in (i-c) and (i-d). Hence object locatives can be considered as VP-level constituents. I will assume they attach somewhere in the VP roughly equipotent with other Participant PPs (borrowing Ernst's 2001 term for the set of instrumentals, comitatives, benefactives, and locatives).

Both object locatives and subject locatives are among the most prototypical adjuncts. It is perhaps surprising, therefore, to find that object locatives cannot be separated from the verb under *do so*-substitution, while subject locatives can be.

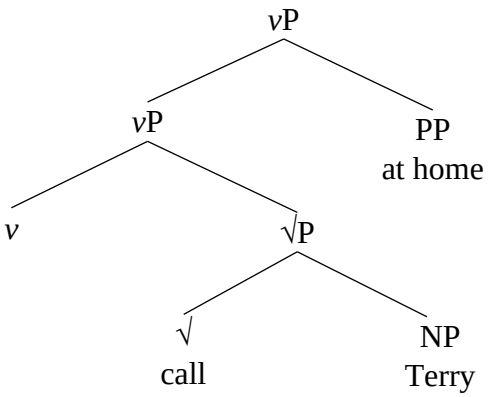
(54) a. Lee called Terry at home, and Casey did so at work.

b. Lee overheard Terry on the fourth floor, and Casey did so on the second floor.

The PPs in (54) resist interpretation as object locatives. The preferred interpretation in (54a), for example, is that Casey was at work when they called Terry. This is the subject-locative interpretation. The object-locative interpretation is unavailable. The interpretation of (54b) is similar; it seems to force the subject-locative interpretation that Lee was on the fourth floor, and that Casey was on the second, as opposed to the object-locative interpretation where Terry is in those places.

If object locatives are to be considered adjuncts, then the data in (54) are problematic for A/AD-based accounts of *do so*-anaphora. By the DAVD hypothesis, the object locatives would be predicted to occur outside the minimal *v*P constituent in (54), as (55) represents for (54a).

(55)



Since A/AD-based approaches hold that *do so*-anaphora seeks a *v*P-constituent antecedent, they predict the *v*P *call Terry*, excluding the locative, should be a possible target. The fact that this is not the case, as (54) illustrates, contradicts the A/AD-based prediction.

The same problem occurs with *do what*-pseudoclefting: subject locatives can be separated, but object locatives cannot. (Compare (56) with (54).)

(56) a. [What Lee did at home] was *call Terry*.

b. [What Lee did on the fourth floor] was *overhear Terry*.

The PPs in (56) cannot be interpreted as object-locatives. The sentence in (56a) does not have an interpretation in which Terry was at home and Lee was not, for example, nor does (56b) have an interpretation in which Lee was not on the fourth floor. Importantly, these readings can be obtained outside this context, as discussed with respect to example (53). This shows that subject-locatives but not object-locatives are compatible with *do what*.

If object locatives are to be considered adjuncts (as they would be if there were an A/AD), then the impossibility of separating object-locatives from the verb is *a priori* problematic for the A/AD-based approach to *do what*-pseudoclefting. That is, if locatives are adjuncts, and adjuncts are attached outside *v*P, then object locatives should be compatible with pseudoclefting; this prediction is contradicted in (56).

If, on the other hand, a PP's compatibility with *do so* is determined by its independent compatibility with lexical *do* (as proposed in section 4.3), all these facts are predicted naturally. The object of *do* is not an individual, and hence does not license an object locative. Its subject is an individual, though, and therefore *does* license a subject locative.

4.2.4. Comitatives

Finally, we can consider the behavior of comitatives, where two problems occur for A/AD-based accounts of VP-anaphora. As in the previous subsections, I first present the *do so* data before returning to the parallel data with *do what*. The first problem is related to that posed by locatives. Like locatives, comitatives can be subject oriented or object oriented, as (57) illustrates.

(57) a. Lee called Terry with Casey.
b. Lee photographed Terry with Casey.

On the subject-comitative interpretation of (57a), *Casey* is the subject *Lee*'s companion. On the object-comitative interpretation, on the other hand, *Casey* is the object *Terry*'s companion. The two readings can be teased apart by imagining that *Lee* is calling *Terry* over Zoom. The subject-comitative reading is one in which *Casey* is in the call on the same device as *Lee*, and the object-comitative reading is one in which *Casey* is in the call on the same device as *Terry*. Example (57b) is ambiguous in the same way.

Critically, when a comitative *with*-phrase occurs with *do so*, it can only receive a subject-comitative interpretation. Consider (58) for instance.

(58) a. Lee called Terry with Casey, and then Avery did so with Leslie.

b. Lee photographed Terry with Casey, and then Avery did so with Leslie.

The *do so*-clause of (58a) is unambiguous; it must be understood to mean that Avery called Terry while Avery was with Leslie. An object-comitative reading is unavailable. This can be demonstrated clearly by considering the Zoom context. (58a) could have a reading in which Lee and Terry, using the same device, call Casey over Zoom, and then Avery and Leslie, sharing a device, also call Casey. This is the subject-comitative reading. An object-comitative reading would involve Lee calling Terry over Zoom, and Avery also calling Terry over Zoom at a later time. On an object-comitative reading, Leslie would have to be on the same device as Terry, but such a reading is not possible in (58a). (58b) is unambiguous in this same way; only the subject-comitative reading is available.

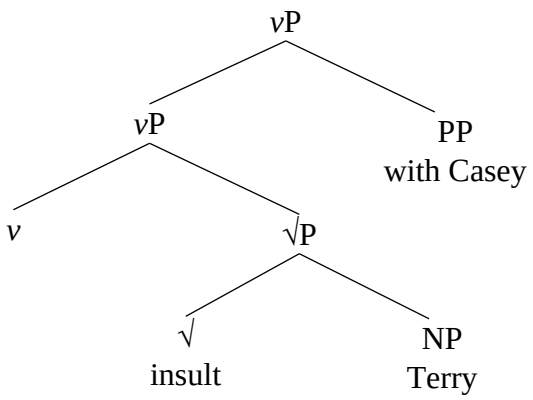
According to the DAVD hypothesis (critical to the A/AD-based account of *do so*-substitution), arguments are internal to *v*P, while adjuncts can be external. Assuming comitatives are normally adjuncts, then both subject and object comitatives would be external to *v*P.

(59) $[_{vP}\ [_{vP}\ v^0\ [_{\sqrt{P}}$ call Terry]]$[_{PP}$ with Casey]]

If *do so*-anaphora targets a complete *v*P containing all the arguments of the verb, as A/AD-based approaches hold, we would expect both subject comitatives and object comitatives to be separable with *do so*. On the syntactic anaphora approach, *do so* in (58a) would be able to target the *v*P *call Terry*, even on the object-oriented interpretation of the comitative. The A/AD-based account therefore makes incorrect predictions.

To defend the A/AD-based accounts, we might stipulate that object comitatives are exceptional adjuncts, attaching internally to the *v*P, while subject comitatives are external to the *v*P. Then the *subject*-comitative reading of (58a) would involve the structure in (64), but the *object*-comitative reading of (58a) would have a structure more like (65), where the comitative is attached strictly internally to *v*P. The A/AD-based approach to *do so* would then predict that object comitatives are not compatible with *do so*, on the assumption that *do so* must target a complete *v*P.

(60)



While this would maintain the idea that *do so* substitutes for a complete *v*P, it contradicts the DAVD hypothesis that adjuncts are always external to *v*P. If object comitatives are to be considered adjuncts, then this hypothesis is incompatible with the idea that they attach within *v*P.

A second problem comes from non-omissible comitatives. Some comitatives, such as those in (61), are non-omissible.

(61) a. Lee compared the apple *(with the orange).
b. Lee combined a jazz song *(with a pop song).
c. Lee made up *(with Terry).
d. Lee shook hands *(with Terry).

Non-omissibility (for reasons other than pragmatics) is one of the factors defining the conventional A/AD. For example, Huddleston & Pullum (2002, p221-222), Boeckx (2003, p96, citing Chametzky 2000), Patejuk & Przepiórkowski (2021, p4-5, esp. fn5), and numerous others take omissibility to be one of the defining features of adjuncts. For such authors, non-omissibility is enough to qualify a dependent as an argument.

That being the case, data like (61) pose a problem for A/AD-based accounts of VP-anaphora. Consider the examples in (62)-(63).

(62) a. *Lee compared the apple with the orange, and then Terry did so with the pear.
(intended: Terry compared the apple with the pear)

b * Lee combined jazz with pop, and then Terry did so with hip-hop.
(intended: Terry combined jazz with hip-hop)

(63) a. Lee made up with Terry, and then Leslie did so with Casey.
(intended: Leslie made up with Terry)

b. Lee shook hands with Terry, and then Leslie did so with Casey.
(intended: Leslie shook hands with Casey)

The examples in (62) involve object comitatives, while the examples in (63) involve subject comitatives. These examples show, then, that *do so* can occur with non-omissible subject comitatives, but not with non-omissible object comitatives.

Given that non-omissible subject comitatives are conventional arguments (given their syntactic non-omissibility), the facts in (63) represent a misalignment between the conventional A/AD and the A/AD diagnosed by *do so*. Conventionally, these subject comitative are arguments, but the VP-anaphora diagnostic predicts them to be adjuncts.

The same problems occur with *do what*-pseudoclefting. First, for subject- and object-comitatives which are omissible, it is possible to separate subject-comitatives but not object-comitatives from the verb. (Compare (64) with (58).)

(64) a. [What Lee did with Casey] was *insult Terry*.

b. [What Lee did with Casey] was *photograph Terry*.

The comitatives in (64) are unambiguous. The comitative in sentence (64a) must be interpreted to mean that Casey was with Lee. In a context where Lee was insulting Terry over Zoom, for example, Casey would have to be on the call on Lee's device, rather than on Terry's device. Notice that the object-comitative interpretation, unavailable here, is available outside the context of the pseudocleft, as discussed with respect to example (57a). The comitative in (64b) must also receive a subject-locative interpretation. This is a problem for the A/AD-based account of pseudoclefting, because these object comitatives are conventional adjuncts, not arguments. Thus, data like (64) represent a misalignment between the conventional A/AD and the predictions of the VP-anaphora diagnostic.

Second is the problem of non-omissible comitatives. Even though they are conventional adjuncts, subject comitatives like those in (66) can be separated from the verb under pseudoclefting. (Compare (65)/(66) with (62)/(63).)

(65) a. *[What Lee did with the orange] was *compare the apple*.

b. * [What Lee did with the pop song] was *combine the jazz song*.

(66) a. ?[What Lee did with Terry] was *make up*.

b. [What Lee did with Terry] was *shake hands*.

The reasons why this is potentially problematic are the same as with *do so* substitution. If the subject comitatives in (66) are conventional arguments, this is a heuristic problem for the VP-anaphora diagnostic.

On the other hand, if we assume that a PP's compatibility with *do so*/*do what* has to do with the PP's independent compatibility with lexical *do*, all these facts are unsurprising. As discussed in section 4.3 below, lexical *do* is compatible with subject comitatives (denoting a companion of the subject), but not with object comitatives (denoting a companion of the object). The reason is simply that *do* does not take an individual as its direct object, and hence the object of *do* cannot have a companion.

This subsection (section 4.2) has considered the behavior of patient-like *to*-phrases, benefactives, comitatives, and locatives with *do so* and *do what*. In each case, relevant data pose problems for the core idea behind traditional A/AD-based approaches to VP-anaphora, i.e. the idea that separability under *do so*-anaphora/*do what*-pseudoclefting is determined by the DAVD hypothesis. I conclude that VP-anaphora do not provide motivation for the syntactic A/AD. The following subsection (section 4.3) develops alternative analyses for *do so*-anaphora and *do what*-pseudoclefting which make no reference to the A/AD in any form.

4.3. A/AD-free analyses of VP-anaphora

4.3.1. *Do so*-substitution

The previous subsection presented problems for the idea that *do so* in some way fills in for a syntactic domain including arguments but not necessarily adjuncts. Specifically, the behavior of patient-like *to*-phrases, benefactives, locatives, and comitatives poses difficulties for the idea that *do so* can separate adjuncts but not arguments from the verb. Also, as discussed in section 4.1.3, there are a variety of reasons why *do so*-anaphora resolution must be treated as a semantic rather

than as a syntactic process (Przepiórkowski 1999, Kehler & Ward 1999, Culicover & Jackendoff 2005, Houser 2010).

Given these results, how can *do so* be analyzed? An adequate account of *do so*-anaphora must deal with two questions.[28] First, where do the (in)compatibilities with different PPs (such as those described in section 4.2) come from, if not from the A/AD? Second, how is the value of the antecedent determined (if not by reference to a *v*P constituent)? I begin here with the first question and return to the second.

Instead of being determined by the A/AD, the ability of a PP to occur with *do so* depends on that PP's independent compatibility with the lexical verb *do*. Lexical *do*, like any verb, has restrictions on the kinds of PPs it can combine with. *Do* is compatible with locatives, comitatives, benefactives, and patient-like *to*-phrases, but it is *in*compatible with directionals, recipient *to*-phrases, and *about*-phrases (see footnote 31 for the idiomatic *do something about*).

(67) a. Lee did things at home.
b. Lee did things with Terry.
c. Lee did things for Terry.
d. Lee did things $to_{patient}$ the piñata.

(68) a. *Lee did things into the sink.
b. *Lee did things $to_{recipient}$ Terry.
c. *Lee did things about syntax.

Miller (1992) pointed out that a PP's compatibility with *do so* mirrors exactly the PP's compatibility with the lexical verb *do*. This is what explains which PPs can occur with *do so*; *do so* contains lexical *do*, and has the selectional properties of lexical *do*. Thus, any PP which is compatible with lexical *do* can occur with *do so*, and any PP which cannot occur with lexical *do* cannot occur with *do so*. This explains why benefactives and patient-like *to*-phrases are compatible with *do so*; they are compatible with lexical *do*. It also explains why comitatives and locatives must be subject-oriented with *do so;* this is also a requirement of lexical *do*.

(69) a. Lee is doing something at home. (→ Lee is at home, subject-locative)
b. Lee is doing something with Terry. (→ Lee is with Terry, subject-comitative)

[28] See Bruening (2019) for some discussion of other issues in the analysis of *do so* not directly relevant here.

This then answers the first question: what accounts for a PP's (in)ability to occur with *do so*? The restrictions can be attributed to the selectional properties of lexical *do*.

Turning to the second question, I assume (following Culicover & Jackendoff 2005, Houser 2010, and Bruening 2019) that the value of *do so*'s antecedent is determined by discourse-mediated mechanisms of anaphora resolution, with the special stipulations that the antecedent must be a *doing event* which is *discourse-old* and *salient* (Kehler & Ward 1999). This means that the set of potential antecedents for *do so* includes non-stative events which are entailed[29] by the immediate linguistic context. The value of *do so*'s antecedent is then determined as the maximal[30] potential antecedent which avoids a contradiction.

For illustration, consider the discourse in (70).

(70) A_1: How's the batter coming along?
B_1: I'm about to put it in the pan.
A_2: You should mix it with a whisk.
B_2: I (already) did so with a spoon.

B's second response must be interpreted as "I already mixed the batter with a spoon," where *do so* denotes *mix the batter*. This follows because the salient VP in this context is *mix the batter with a whisk* (A_2), from which *mix the batter* is entailed (given a neo-Davidsonian event semantics for these VPs). It also follows that B's second response cannot be interpreted in any of the ways specified in (71).

[29] For this analysis, I assume neo-Davidsonian event representations, following Parsons (1990), such that a VP denoting a predicate *p* with participants $\theta_1 \ldots \theta_n$ entails *p* with participants $\theta_1 \ldots \theta_{n-1}$ via conjunction elimination, as in (74) below (cf. Parsons 1990, p13-14, also Davidson 1967, p119). Alternatively, Ezra Keshet (p.c.) points out we could adopt Schwarzchild's (1999) generalized notion of entailment predicated on existential type shifting – then *do so* would require an antecedent entailed by the immediate linguistic context *modulo existential type shifting* (cf. Schwarzschild 1999, p151, ex25).

[30] I intend *maximal* here with respect to the discourse relation holding between the antecedent and the *do so*-clause. In the case of (70), the relevant relation is contrast. The *do so*-clause contrasts more with the antecedent the more of the antecedent VP *do so* denotes. In another context, e.g. where A_2 is "You need to mix it first," the relevant relation would be parallelism, in which case the parallelism between A_2 and B_2 is also greater the more of A_2 *do so* refers to.

(71) a. mix the batter with a whisk
b. mix (something, not necessarily the batter)
c. put the batter in the pan
d. incorporate air into the batter

First, the full VP *mix the batter with a whisk* cannot serve as the antecedent for *do so* in B_2, because that would lead to a contradiction, as (72) illustrates.

(72) *I already mixed it with a whisk with a spoon.

Second, the version in (71b), where B_2's response would mean something like "I already did some mixing with a spoon," not necessarily entailing that *the batter* is what was mixed, is not possible, because it is not the maximal possible antecedent: *mix the batter*, which specifies more thematic information and thus is more contrastive, is also available.

Third, the option (71c), where *do so* would be anaphoric to B's earlier sentence B_1, is blocked by Kehler & Ward's (1999) *saliency* requirement; by the time of B_2's utterance, B_1 is superseded by the more salient A_2.

Finally, take option (71d), where B_2 *infers* that A_2's whisking directive really has the goal of aeration. *Do so* would then be anaphoric to this inferred aeration event, not to the event of A_2's actual utterance. This option is ruled out by Kehler & Ward's stipulation that the antecedent be *discourse-old*. For them, this means that the antecedent must have been "explicitly (that is, linguistically) introduced into the discourse," (p3). Since (71d) was never linguistically introduced, but merely inferred, it is not a valid antecedent for *do so*.

This shows how *do so* can be interpreted in a typical case with an instrumental adjunct. The interpretive procedure applies in the same way to the data considered in section 4.2. Take (73), with a patient-like *to*-phrase.

(73) The Romans subjugated the Carthaginians before doing so to the Gauls.

The antecedent for *do so* here is *subjugate*. This is possible, because, assuming a representation like (74a) for the antecedent VP *subjugate the Carthaginians*, the required referent *subjugate* is entailed, as in (74b).

(74) a. ∃e. subjugate(e) & patient(e, Carthaginians)

b. ∃e. subjugate(e)

Because *do so* occurs with the patient-like *to*-phrase *to the Gauls*, (74b) is the maximal possible antecedent, because inclusion of the antecedent's patient *the Carthaginians* would lead to a contradiction in the *do so*-clause, as in (75).

(75) *The Romans subjugated the Carthaginians before subjugating the Carthaginians to the Gauls.

This theory does not predict the syntactic A/AD to play a role in *do so*-anaphora. First, the A/AD does not factor into determining which PPs can occur in the *do so*-clause; that is instead determined by the A/AD-independent selectional properties of lexical *do*. Second, the A/AD does not constrain the set of potential antecedents for *do so*. Instead, *do so* can take any semantic event as its antecedent – as long as it is salient and discourse-old in the required senses (Kehler & Ward 1999), and as long as it is compatible with the participants specified in the *do so*-clause – even if the antecedent excludes what would have been considered an argumental element in the original syntactic VP.

4.3.2. *Do what*-pseudoclefting

The problems for A/AD-based accounts of *do so*-anaphora also occur for A/AD-based accounts of *do what*-pseudoclefting. Specifically, the behavior of patient-like *to*-phrases, benefactives, comitatives, and locatives all raise problems of varying degrees for the idea that a PP's ability to be separated from the verb in *do what*-pseudoclefting correlates with that PP's adjuncthood. This subsection describes in more detail how the question-answer pair analysis mentioned in section 4.1.3 resolves these issues, without drawing on the A/AD.

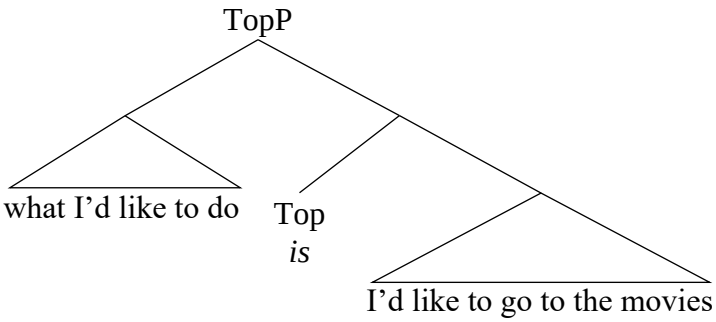
This alternative analysis adopts the idea that a PP can be separated in pseudoclefting if and only if that PP can occur with the lexical verb *do* independently; just as with *do so*, this is what explains which PPs can be "separated" under *do what*-pseudoclefting, and which cannot.

In addition, the counterweight of the pseudocleft does not reconstruct syntactically into the gap site in the free relative. Instead, the free relative is interpreted on its own and related to the counterweight in the manner of a question-answer pair (as proposed by Den Dikken et al. 2000, drawing on Ross 1997). The ability of a PP to occur with *do* in a question like *what did you do* is

determined by the selectional properties of the lexical verb *do*; therefore this is also what determines a PP's ability to be separated from the verb under pseudoclefting; the A/AD is not needed.

As alluded to above, this analysis is independently necessitated by the existence of pseudoclefts with overlap between the weight and counterweight, as in sentences like (41) above. In these types of pseudoclefts, called "amalgam pseudoclefts" by O'Neill (2015), the counterweight cannot syntactically reconstruct into the gap site of the free relative; another mechanism is needed to explain how these sentences are interpreted. Den Dikken et al. (2000) propose that pseudoclefts of this sort comprise a topic-comment structure mediated by a TopP projection. The *wh*-clause subject of the pseudocleft occupies Spec-TopP, and the counterweight occupies Comp-TopP.

(76)



This structure is claimed to be present even when overlap between the *wh*-clause and the counterweight is not overt; in these cases, Den Dikken et al. (citing Ross 1997 as precedent) argue extensively that overlapping material in the counterweight is elided.

(77) a. [$_{\text{TopP}}$ [What I'd like to do] [$_{\text{Top'}}$ is [~~*I'd like to*~~ *go to the movies*]]].

b. [$_{\text{TopP}}$ [What you've done] [$_{\text{Top'}}$ is [~~*you've*~~ *gotten us in trouble*]]].

c. [$_{\text{TopP}}$ [What we need] [$_{\text{Top'}}$ is [~~*we need*~~ *more rice*]]].

This analysis applies to the *do what*-pseudoclefting data considered in this subsection. A pseudocleft like (78a) would be analyzed with the structure in (78b). The counterweight is underlyingly a complete clause, with deletion applying to the parts that overlap with the *wh*-clause. Thus, the reconstruction account of pseudoclefting is inapplicable.

(78) a. [What I'm doing with my friends] is *shopping*.

b. [$_{TopP}$ [What I'm doing with my friends] [$_{Top'}$ is [~~*I am*~~ *shopping* ~~*with them*~~]]].

Den Dikken et al. propose that, rather than involving syntactic reconstruction, such sentences are interpreted in the manner of question-answer pairs like (79), which can similarly involve overlap between the question and the answer.

(79) Q: What would I like to do?

A: (I'd like to) go to the movies.

It is clear that the ability of a PP to occur in the *wh*-question is determined by the selectional properties of the verb *do*, not the A/AD. As shown in (67)-(69) above, *do* is compatible with certain PPs (like benefactives, (subject) comitatives, patient-like *to*-phrases, etc.) but not others (like directionals, recipients, *about*-phrases, etc.). These same restrictions are reflected in question-answer pairs, as (80)-(81) illustrate.[31]

(80) a. Q: What would you like to do for your friends?

A: I'd like to bake cookies for them.

b. Q: What would you like to do with your friends?

A: I'd like to go to the movies with them.

c. Q: What would you like to do to your friends?

A: I'd like to pull a prank on them.

(81) a. Q: What would you like to do (*into the street)?

A: I'd like to run into it.

b. Q: What would you like to do (*to this address)?

A: I'd like to send letters to it.

c. Q: What would you like to do (*about your friends)?

A: I'd like to talk to people about them.

[31] Note that the expression *do something about* has an idiomatic interpretation, which Merriam-Webster defines as "to take some sort of action to correct (a situation)." The interpretation intended here is different; the *about*-phrase is intended as a genuine "aboutness" phrase, as would occur in *talk about* or *think about* or *write about*, etc. This sort of interpretation is not available for the *about*-phrase in *do something about*.

These restrictions are also mirrored in the corresponding pseudocleft constructions.

(82) a. [What I did for my friends] is *I baked cookies for them*.
b. [What I did with my friends] is *I went to the movies with them*.
c. [What I did to my friends] is *I pulled a prank on them*.

(83) a. *[What I did into the street] is *I ran into it*.
b. *[What I did to that address] is *I sent letters to it*.
c. *[What I did about my friends] is *I talked to people about them*.

Therefore, the A/AD is not needed to explain what can co-occur with *do* in the *wh*-clause. Instead, the ability of a PP to occur in a *do what*-pseudocleft depends on that PP's compatibility with the lexical verb *do*. This account naturally resolves all the problems discussed in section 4.2. For example, the overlap which occurs with patient-like *to*-phrases and some benefactives, as discussed in sections 4.1 and 4.2 respectively, works by the same mechanisms as when overlap occurs in pseudoclefts or question-answer pairs generally, as in (80) or (81).

As for locative and comitatives, why are object locatives and object comitatives incompatible with *do what*-pseudoclefts? The reason is that they are incompatible with lexical *do*, as discussed with respect to *do so* in section 4.3.1. See (69), which illustrates that locatives and comitatives must relate to the subject with *do*.

4.4. Conclusions on VP-anaphora

This section evaluated the VP-anaphora diagnostic for argumenthood by the two criteria discussed in section 2 of this chapter. Traditionally, the main idea relating VP-anaphora and the A/AD is the DAVD hypothesis, the idea that arguments are strictly internal to the *v*P, while adjuncts are external to the *v*P. Under this hypothesis, the diagnostic classifies dependents which can co-occur with VP-anaphora (including *do so* and *do what*) as adjuncts, and dependents which cannot co-occur with VP-anaphora as arguments. Therefore, the VP-anaphora would meet the heuristic criterion if the distinction it identified aligned with the conventional A/AD, and it would meet the no-independent-motivation criterion if its behavior required reference to the A/AD in the form of the DAVD hypothesis. The diagnostic would provide support for the syntactic A/AD if it met both criteria.

However, I showed (i) that conventional argumenthood does *not* in fact correlate well with the distinction drawn by VP-anaphora, and (ii) that alternative accounts which do *not* draw on the A/AD (instead drawing on selectional properties of lexical *do*) better account for the behavior of patient-like *to*-phrases, benefactives, locatives, and comitatives. On *do so*, I conclude (along with Miller 1992, Przepiórkowski 1999, and Houser 2010) that *do so*-anaphora treats arguments and adjuncts equally; *do so* provides no evidence for the internal structure of the antecedent *v*P. Consequently, it also does not support the idea that arguments and adjuncts are attached at structurally distinct levels in the *v*P. I draw the same conclusion for *do what*-pseudoclefting: *do what*-pseudoclefting does not require reference to the DAVD hypothesis or to the A/AD in any other form.

I conclude, therefore, that the VP-anaphora diagnostic is not successful in motivating the syntactic A/AD.

5. VP-fronting

This section evaluates the VP-fronting diagnostic for argumenthood by the two criteria laid out in section 2 of this chapter. When a VP is fronted, some of its dependents can be left behind at the extraction site. Importantly, some dependents are easier to strand than others. This is illustrated in (84).

(84) a. *Eat, Lee did __ [$_{NP}$ a sandwich].
↑_____|

b. Eat, Lee did __ [$_{PP}$ at the very first opportunity].
↑_____|

The VP-fronting diagnostic for argumenthood claims that only adjuncts can be stranded. All the arguments of a fronted verb must occur along with the verb itself in fronted position. This explains the contrast in (84) if we assume that the direct object *a sandwich* is an argument of *eat*, while the temporal *at the very first occasion* is an adjunct.

The logic underlying this diagnostic is related to that of VP-anaphora. The DAVD hypothesis is critical. Imagine that VP-fronting involves Internal Merge applying to the *v*P. If that were the case, then we would expect adjuncts but not arguments to be strandable, because of the DAVD hypothesis. All the arguments would have to occur *within* the moved constituent, and hence

would have to be carried along to the landing site, while adjuncts could occur outside the moved constituent, and hence could be stranded.

This section argues against this picture of things. My argument consists of two parts. First, I show that the VP-fronting diagnostic fails to meet the heuristic criterion; the patterns of strandable vs. non-strandable dependents under VP-fronting do not align closely with what would be expected given the conventional A/AD. Instead, there are many divergences. Second, I show that VP-fronting can be analyzed without reference to the A/AD. In fact, I argue that such analyses would be preferable to one which does invoke the A/AD. For this reason, the VP-fronting diagnostic also fails to meet the no-independent-motivation criterion.

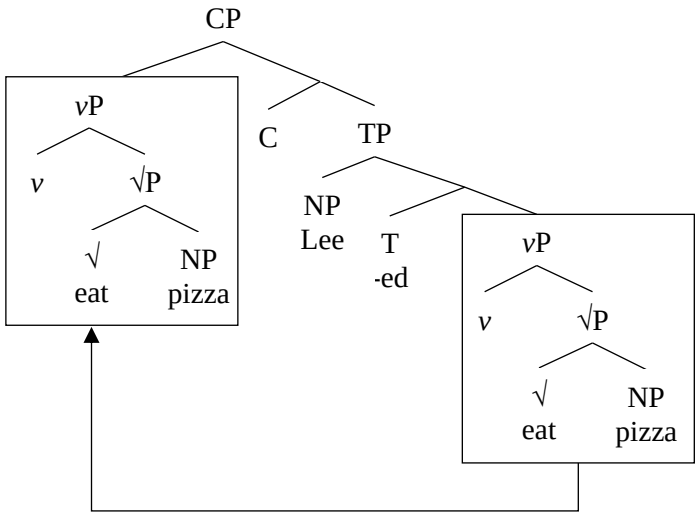
The section is structured as follows. I first discuss analyses of VP-fronting which have been used to support the A/AD in subsection 5.1. Then, in section 5.2, I consider data from prior literature which pose problems for A/AD-based approaches to VP-fronting. Finally, section 5.3 explains how an A/AD-free analysis could account for stranding under VP-fronting.

5.1. A/AD-based analyses of VP-fronting

5.1.1. Movement targets *v*P

VP-fronting is traditionally analyzed as movement (Internal Merge) of a verb phrase. Adopting the structure of the verb phrase from Harley (2007, 2013) as described in section 4.1, which implements *v*P as the relevant domain for the DAVD hypothesis, and simplifying irrelevant details (like *v*P-internal subjects, and √-to-*v* raising), a movement analysis would therefore derive VP-topicalization as in (85).

(85)



Under the DAVD hypothesis, the *v*P must contain all the arguments of the verb, but need not contain all the adjuncts to the verb. Thus, movement targeting *v*P necessarily targets all the arguments of the verb, meaning all the arguments must be fronted along with the verb. Because the adjuncts to the verb don't necessarily have to be included in *v*P, movement targeting *v*P doesn't necessarily need to bring along the adjuncts.

According to this analysis of VP-fronting, *any* instance of Internal Merge targeting *v*P, not just VP-topicalization, represents VP-fronting. Therefore, VP-fronting in *though*-preposing can also be considered as relevant data, as it has been in prior literature (see, e.g., Phillips 2003, p77, fn33; Baltin 2006, 2017; Landau 2007; Janke & Neeleman 2012; Bruening 2018; Culicover & Winkler 2019; Thoms & Walkden 2019). For example, the fact that (86b) is acceptable with the same interpretation as (86a) would be taken to indicate that the durational PP *throughout the entire day* is an adjunct of *eat*.

(86) a. Though Lee will [$_{vP}$ [$_{vP}$ <u>eat pizza</u>] throughout the entire day], it won't be enough.

b. [$_{vP}$ <u>Eat pizza</u>] though Lee will [$_{vP}$ __ throughout the entire day], it won't be enough.

In principle, *if*-preposing as in (87) could also be used, although I will not do so in this chapter.

(87) a. Mark finished his thesis late, if [$_{vP}$ <u>finish it</u>] he did __.

b. It's strange that Joseph objected, if [$_{vP}$ <u>object</u>] he did __.

(Adapted from Ward 1990, p757(31))

5.1.2. *v*P-operator

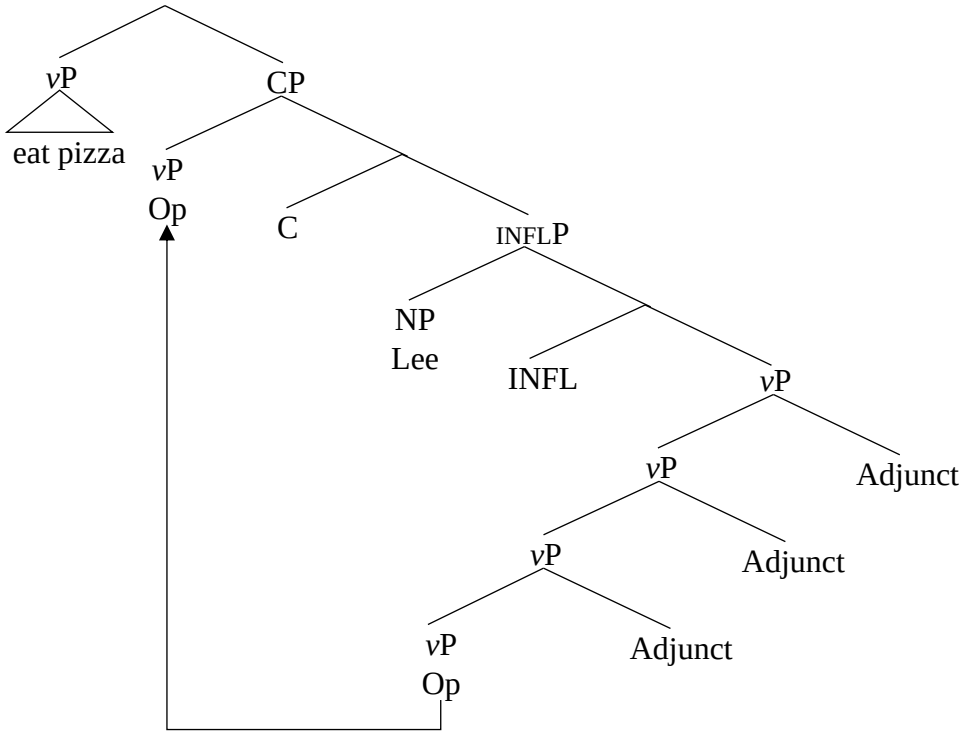
An alternative analysis making the same relevant predictions is Ott's (2018) proposal that VP-topicalization involves left-dislocation and operator-movement in the host. This analysis reduces VP-topicalization to a kind of substitution. Simplifying certain details, the idea is that the topicalized *v*P does not actually undergo movement. Instead, it is base-generated in the left periphery, and is linked to a *v*P-operator (i.e., an operator whose effect is to abstract over *v*P). The structure of a sentence like (88a) would thus be analyzed along the lines in (88b).

(88) a. … and eat pizza, Lee will.

b. … and $[_{vP}$ eat pizza$]_1$, $[_{CP}$ Op$_1$ $[_{TP}$ Lee will Op$_1]]$.

In order to produce an account of separability which predicts adjuncts but not arguments can be separated from the verb, we would have to assume that the *v*P-operator can merge with adjuncts but not arguments. Then it would fall out that adjuncts could be separated in structures like (89), while there would be no structure available to accommodate separated arguments.

(89)



Ott does not discuss how VP-fronting would work in *though*-preposing (cf. his footnote 23, p269). I will assume for the purposes of argumentation that these would work through the same mechanism, and hence that the operator analysis makes the same predictions for *though*-preposing.

Thus, there are at least two distinct ways in which VP-fronting might be predicted to diagnose the distinction between arguments and adjuncts. The movement approach predicts this straightforwardly from the DAVD hypothesis, and the *v*P-operator analysis makes the same prediction. I will treat these two analyses (movement and *v*P-operator) as equivalent for the purposes of this chapter, since they make the same predictions regarding the A/AD. For simplicity and conciseness, I will focus the discussion around the movement analysis.

5.1.3. On the acceptability of VP-topicalization data

The next subsection (5.2) examines how the A/AD-based predictions fare against data from prior literature. Before this, however, it is important to be clear on the context of evaluation for sentences involving VP-fronting, especially VP-topicalization.[32]

The acceptability of VP-topicalization is notoriously context-dependent. Out of the blue, some speakers are likely to judge a sentence like (90) as marginal, or even unacceptable.

(90) ?? Eat pizza, Lee will.

Despite this, such sentences are generally considered grammatical. The reason is that (90), and other sentences with VP-topicalization, improve markedly in an appropriate context. Consider (91), for example.

(91) Lee said they would eat pizza, and
eat pizza they will.

As previous literature (e.g. Phillips 2003, Landau 2007) has noted, the context required to license VP-topicalization often involves repetition of (part of) the fronted VP. The example in (91), for instance, repeats the same VP *eat pizza* in both the context and in the target sentence. Unfortunately, this can lead to confusion regarding the context in which sentences with VP-topicalization are to be evaluated. The context given in (91) is the *licensing* context. It is the context in which the target sentence is produced, which in this case happens to be necessary to license fronting.

[32] This discussion must be included here, because I have encountered anonymous reviewers whose misunderstanding of these issues led to severe misinterpretations of the data presented in section 5.2.

The licensing context should not be confused with the *standard of comparison,* as would be used in a constituency test. The standard of comparison in a constituency test is the utterance, ideally fully acceptable, against which the result of the constituency test is compared. With ordinary topicalization, for instance, the standard of comparison is the same sentence without topicalization, as shown in (92).

(92) Standard of comparison: Lee ate pizza.
Target: ?Pizza, Lee ate.

Out of the blue, the target sentence of (92) is certainly less acceptable than the standard of comparison. However, in context, the sentence improves to full acceptability. When context is added to the target sentence, it must also be added to the standard of comparison, as in (93).

(93) Standard of comparison: Lee didn't eat salad, nor chips, nor soup. But they did eat pizza.
Target: Lee didn't eat salad, nor chips, nor soup. But pizza, they ate.

The standard of comparison for a sentence like (91) would therefore be (94). The standard of comparison is not the licensing context. The licensing context is part of both the target sentence and the standard of comparison.

(94) Lee said they would eat pizza, and
they will eat pizza.

The data presented in section 5.2 should therefore be *judged* in the required licensing context (which I will generally provide), but should be *compared* to a parallel utterance lacking VP-fronting *in the same context*.

5.2. Behavior of different PPs

This subsection reports data which are problematic for the idea that the A/AD is required to account for patterns of stranding under VP-fronting. Specifically, previous work has demonstrated that, in fact, many elements which would conventionally be considered arguments can be stranded under VP-fronting (Phillips 2003, Landau 2007, Janke & Neeleman 2012, Culicover & Winkler 2019). This is a major problem for the A/AD-based analyses of VP-fronting, which predict that only conventional adjuncts should be strandable.

Prior literature abounds with examples in which elements that would conventionally be considered arguments can be stranded under VP-fronting. There is no thematic generalization on the types of elements that can be stranded. To give a non-exhaustive sampling of the possibilities documented in prior literature,[33] addressee/experiencer PPs can be stranded,

(95) a. ?John said he would talk to someone, and
talk he did [$_{vP}$ __ to the first woman to walk into the room].
(Adapted from Drummond 2009, p12(27d))

b. He wanted to read a sonnet to someone famous,
so *read a sonnet* he did [$_{vP}$ __ to Salman Rushdie] (yesterday).
(Adapted from Janke & Neeleman 2012, p158(15b))

c. *Complain* though he will [$_{vP}$ __ to anyone who will listen]…
(Adapted from Bruening 2018, p382(43a))

d. *Hint* though she might [$_{vP}$ __ to all her superiors that she deserves a raise]…
(Adapted from Bruening 2018, p382(43b))

as can recipients,

(96) a. He said he would send a telegram, and
send a telegram he did [$_{vP}$ __ to the queen on her 70th birthday].
(Adapted from Phillips 2003, p75(90e))

b. He said he wouldn't give money, but
give money he did [$_{vP}$ __ to politicians in secret before elections].
(Adapted from Phillips 2003, p55(31d))

c. I wanted to give a book to someone interesting, and
give the book I did [$_{vP}$ __ to MARY].
(Adapted from Janke & Neeleman 2012, p184(120a))

[33] Note that the supporting context in these examples is *not* the standard of comparison. The sentence (95a) would be judged, for example, in comparison to a sentence like (i), without fronting.
(i) John said he would talk to someone, and he did talk to the first woman to walk into the room.

as well as goals,

(97) a. He said he would spill the milk, and
spill the milk he did [$_{vP}$ __ on the table at the party].
(Adapted from Phillips 2003, p74(85g))

b. *Nail the diploma* though he did [$_{vP}$ __ to the wall on the weekend] …
(Adapted from Phillips 2003, p77fn33(iv))

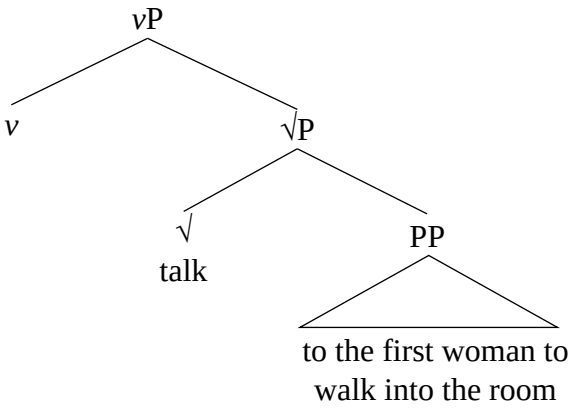
c. *Dash* though he may [$_{vP}$ __ into the schoolyard], it won't matter.
(Adapted from Baltin 2006, p762(86))

and certain *of*-phrases.

(98) ? John said he would take pictures of someone, and
take pictures he did [$_{vP}$ __ of Bill].
(Adapted from Drummond 2009, p12(27e))

To the extent that any of these PPs are to be considered arguments (as they all normally are, see e.g. Huddleston & Pullum 2002, Ch4), it poses a problem for the idea that VP-fronting cannot strand arguments of the verb. If we assume, following the DAVD hypothesis, that arguments are complements to $\sqrt{}^0$, then the *v*P in, say, (95a) would have a structure along the lines of (99).

(99)



If VP-fronting targets *v*P, as the A/AD-based accounts hold, then there is no way to separate the *to*-phrase with this structure. We could stipulate that the *to*-phrase is first extraposed to a position external to *v*P, with VP-fronting then targeting the remnant *v*P (cf. Lechner 2003), but such a move would make it possible for VP-fronting to strand anything that can be extraposed, including

arguments.[34] VP-fronting would not then be expected to treat arguments differently from adjuncts, and would not logically provide support for the A/AD.

These data have influenced work on VP-fronting such that many existing accounts of VP-fronting in English already assume no role for the A/AD. For conciseness, I will not discuss each such approach in detail, but will briefly summarize several relevant proposals. (For consistency, I use the label '*v*P' for what these authors call 'VP.')

(i) Phillips (2003) and Landau (2007) develop analyses according to which all *omissible* dependents of the verb can be separated from it, whether those dependents would be considered arguments or adjuncts. In (95a), for example, even though the *to*-phrase would be considered an argument, it is *omissible* from the *v*P. Thus, topicalization of a *v*P projection of *talk,* as in (95a), can strand the *to*-phrase.

This generalization cross-cuts the A/AD in crucial ways, because it identifies separability under VP-fronting with *omissibility*. Omissibility is often taken to be related to the A/AD, such that arguments are typically non-omissible and adjuncts are always omissible. However, as many have noted, many (maybe *most*) canonical arguments are omissible, and many canonical adjuncts are non-omissible. Thus, omissibility does not precisely track the A/AD. See section 3 of this chapter. Phillips's and Landau's generalization refers to the actual property of omissibility, including its divergences from the A/AD.

(ii) Janke & Neeleman (2012) argue that Phillips's and Landau's generalization about "potentially complete *v*Ps" is incorrect. They argue instead that any *v*P constituent can be fronted, including *v*P constituents that do not contain all the verb's arguments, omissible or non-omissible. Example (96c) illustrates this, for instance, since the separated PP could not normally be omitted from the *v*P. They assume the fronted string *give the book* forms a *v*P constituent to the exclusion of the PP argument *to Mary*. This allows fronting of *give the book*, stranding the PP. They argue the requisite structure occurs for argument PPs and adjunct PPs alike; the A/AD does not have a role to play in VP-fronting on this analysis.

[34] This is in fact assumed by Janke & Neeleman 2012 and Culicover & Winkler 2019. For these authors, both conventional arguments and conventional adjuncts can be stranded under VP-fronting.

(iii) Culicover & Winkler (2019) claim that any projection of the verb at all (even V^0 alone) can be fronted, and hence that any dependent(s) of the verb can be separated, arguments and adjuncts alike.

I conclude that there is a serious heuristic problem for the VP-fronting diagnostic. Data from VP-fronting do not support the hypothesis that adjuncts attach externally to the *v*P while arguments attach internally to the *v*P, nor that the A/AD otherwise plays a role in determining which PPs that VP-fronting can separate from the verb.

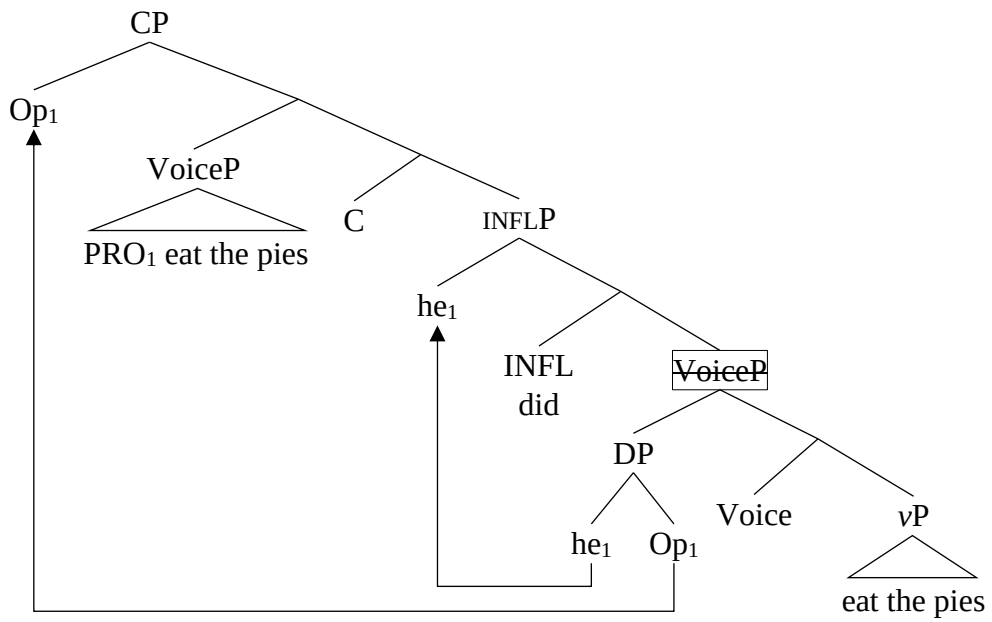
5.3. An A/AD-free account of VP-fronting

As I mentioned in the previous subsection, many analyses of English VP-fronting do not assume that the A/AD constrains separability. I will not attempt to adjudicate between the various options, which would require discussion of a vast literature, including the work cited above (e.g. Phillips 2003, Landau 2007, Janke & Neeleman 2012, Culicover & Winkler 2019) and more. Instead, in this subsection, I will consider one state-of-the-art analysis of English VP-fronting (that of Thoms & Walkden 2019), showing that within this analysis, the A/AD cannot parsimoniously be invoked to account for the possibilities of stranding. Instead, with a minor extension, this analysis more parsimoniously accounts for the possibilities of stranding *without* reference to the A/AD.

Thoms & Walkden (2019) propose that VP-fronting does not involve movement of a verb phrase at all, but instead involves base generation of a VoiceP[35] in fronted position. The fronted VoiceP is linked to the "extraction site" via ellipsis plus operator movement. Their proposed analysis is exemplified in (100) for a sentence like *eat the pies he did*. In this example, VoiceP is elided, as indicated by strikethrough on the VoiceP node.

[35] Thoms & Walkden's (p163) diagram of their analysis shows *v*P as the base-generated verbal constituent in fronted position. However, as discussed below, it is important that the fronted constituent is larger than *v*P, specifically to include Voice. See their p173.

(100)



According to Thoms & Walkden, the subject of the lower VoiceP is merged with an operator Op forming a complex DP. The operator, co-indexed with the subject of the lower VoiceP, moves to Spec-CP, where it binds the PRO subject of the (base-generated) fronted VoiceP (ensuring the subject of the fronted VoiceP covaries with the subject of the lower VoiceP). Thoms & Walkden argue that connectivity effects between the VoiceP in fronted position and the lower VoiceP arise through identity requirements on "high predicate ellipsis," i.e. ellipsis which applies relatively "high" in the verbal domain. They assume the relevant domain is VoiceP, as (100) indicates.

This analysis has a variety of advantages. Specifically, Thoms & Walkden show that their analysis enables an account of (i) the restricted licensing conditions on VP-fronting, (ii) the possibilities of morphological mismatch between the fronted VP and the elided VP, and (iii) the restricted set of connectivity effects occurring with VP-fronting. However, Thoms & Walkden do not consider the way their proposal deals with the instances of stranding considered in this subsection, such as (101).

(101) They said Lee would win,
and win Lee did by an absolutely enormous margin.

I argue that, according to Thoms & Walkden's proposal for VP-fronting, examples like (101) cannot be treated as *stranding* involving the A/AD, but are better treated as involving extraposition from the fronted *v*P (ignoring the A/AD).

To see why examples like (101) cannot be derived by stranding, consider Thoms & Walkden's critical diagnostic for high VPE: retorts and question tags. VPE in these constructions must be "high" because voice mismatches are not possible.

(102) A: John didn't penalize Molly unfairly
B: *She was TOO ~~penalized unfairly~~!

(Adapted from Den Dikken 2018, p6, ex21)

(103) *We have solved the problem, hasn't it ~~been solved~~?

This suggests that retorts and question tags involve ellipsis of Voice (cf. Merchant 2013). Thoms & Walkden, following Sailor (2014) take the target of deletion in these constructions to be (the maximal projection) VoiceP. They argue that VP-fronting involves high VPE because, for instance, the possibilities of morphological mismatch in VP-fronting mirror those in high VPE (see Thoms & Walkden 2019 section 2.3).

High VPE cannot strand dependents of the verb. According to Sailor (2014), high VPE preferentially occurs in coordination of parallel matrix VPs, as in (104) (i.e., high VPE is preferred to low VPE in this context).

(104) Jordy carefully reviewed the book, and then Kiley did.

(adapted from Sailor 2014, p25 ex21)

Sailor notes that the interpretation of (104) preferentially includes the manner adverb *carefully*, so that the interpretation of the ellipsis clause is "carefully review the book" rather than just "review the book (not necessarily carefully)." Sailor thus assumes that the adverbial is contained in the minimal projection targeted by high VPE.

The idea that manner adverbs are contained within the minimal target of high VPE is supported by their behavior with retorts and question tags.

(105) A: John won't penalize Molly unfairly.
B: Yes he will!

(106) Jordy carefully reviewed the book, didn't he?

The retort of (105) seems to necessarily include the *unfairly* part of the antecedent; it asserts that, in fact, John *will* penalize Molly unfairly. The question tag of (106) seems to include the *carefully* part of the matrix clause; the answer would be "no" if Jordy had in fact reviewed the book *carelessly*. Thus, because retorts and question tags involve high VPE, (105)-(106) suggest that the domain of high VPE includes manner adverbials.

The same diagnostics can be applied to various other "adjuncts" to the verb, suggesting that all kinds of verbal dependents are included in the domain of high VPE. (107)-(108) illustrate with benefactives, comitatives, and temporals, all typically considered adjuncts.

(107) A: I won't buy cookies $\left\{\begin{array}{c}\text{for you}\\ \text{with you}\\ \text{on Tuesday}\end{array}\right\}$.

B: Yes you will!

(108) You're going to buy cookies $\left\{\begin{array}{c}\text{for me}\\ \text{with me}\\ \text{on Tuesday}\end{array}\right\}$, aren't you?

The interpretation of the retort in (107) and the question tag in (108) necessarily includes the "adjuncts" in their antecedents. The retort in (107), for instance, asserts that "you will buy cookies *for me*/*with me*/*on Tuesday*." The question in (108) would be answered "no" if the buying didn't take place "*for me*/*with me*/*on Tuesday*." Thus, we should conclude, based on the diagnostics from Sailor (2014) and Thoms & Walkden (2019), that adjuncts of various kinds are contained in the domain of high VPE.

Because Thoms & Walkden argue that VP-fronting involves high VPE in the "extraction site," this predicts that arguments and adjuncts cannot be stranded *in situ* by VP-fronting. That is, the arguments and adjuncts in the lower VoiceP are necessarily contained in the domain of high VPE, as (107)-(108) show; they are therefore necessarily deleted. Thus, a representation like (109b) could not be derived for (109a) by high VPE.

(109) a. They said Lee would win,
and win Lee did by an absolutely enormous margin.

b. [$_{\text{VoiceP}}$ win] Lee did [$_{\text{VoiceP}}$ [$_{v\text{P}}$ ~~win~~] by an absolutely enormous margin]

Such sentences are acceptable, however, as illustrated many times in section 5.2 above. How can these sentences be derived on Thoms & Walkden's analysis? The A/AD-based hypothesis that arguments are attached within the *v*P while adjuncts are attached outside it is of little help here. The domain of high VPE seems to cover arguments and adjuncts alike. Attachment height of arguments vs. adjuncts thus can't be used to explain what can be stranded and what can't be.

I propose here that separation of dependents from the verb under VP-fronting can be derived via extraposition from the higher VoiceP. That is, an instance of VP-fronting like (109a) would be analyzed as in (110). Both the fronted VoiceP and the lower VoiceP contain the separated PP. High VPE deletes the PP in the lower VoiceP, and the PP in the fronted VoiceP is extraposed from Spec-CP.[36]

(110) [$_{CP}$ [$_{VoiceP}$ win __] Lee did [$_{VoiceP}$ ~~win by~~ …]] [$_{PP}$ by an absolutely enormous margin]
|_____|_____↑

Note there is independent evidence that extraposition can take place from Spec-CP in English. Consider (111)-(112).

(111) I asked [$_{CP1}$ [which book __] you bought] [$_{CP2}$ that you had seen in the library]
|_____↑

(Adapted from Reeve 2012, p77fn19(i))

(112) [$_{CP1}$ [How many girls __] did he invite to the party] [$_{CP2}$ that John had dated in high school]
|_____↑

(Adapted from Culicover & Rochemont 1990, p43(50))

In fact, the idea that dependents "stranded" from a fronted *v*P are actually extraposed is suggested by Baltin (2017, p242). Baltin suggests specifically that the apparently stranded dependents in (113) are separated from the *v*P via extraposition.

(113) a. Believe though I may that Fred is crazy, it doesn't matter.
b. Talk to Sally though I may about Martha, it won't matter.

[36] Ott (2018, p267-268, fn21) suggests a potential alternative such that the postposed constituents are parenthetical afterthoughts. However, this analysis predicts the fronted VP must be a complete constituent (i.e. satisfying all subcategorization requirements), but examples from Culicover & Winkler (2019) and Janke & Neeleman (2012) show this is not always the case. Consider (96c) or (114c), for instance.

This analysis is supported by the observation of Culicover & Winkler (2019) that constituents which can be extraposed can also be "stranded" by VP-fronting. PP dependents of the verb, arguments and adjuncts alike, can be extraposed, explaining core examples like those in (95)-(98). It also explains why CP and TP complements to the verb can be separated from the verb, as illustrated in (114a) and (114b) respectively. Strikingly, it also explains why heavy NPs can be separated, while their light counterparts cannot (Janke & Neeleman 2012, Culicover & Winkler 2019). That is, heavy NPs can be extraposed, but light NPs cannot, as depicted in (115).

(114) a. (…) and [$_{VP}$ *claim* __] Fritz did [$_{CP}$ that the future of the human race itself was at stake]

b. However, [$_{VP}$ *try* __] though he might [$_{TP}$ to just get along with everyone], he still drives her craaaaazy.

c. (…) and [$_{VP}$ *give* __ *to John*] she did, [$_{NP}$ a painting that she found at the art fair].

(Adapted from Culicover & Winkler 2019)

(115) a. ? John wanted to read carefully some part of the Bible,
so [$_{VP}$ read __ carefully] he did [$_{NP}$ the entire Song of Solomon].

(Adapted from Janke & Neeleman 2012, p186(126a))

b. I was very hungry and wanted to eat.
* So [$_{VP}$ eat __] I did [$_{NP}$ the haggis].

(Adapted from Janke & Neeleman 2012, p186(124a))

With this extension (i.e. allowing extraposition from the fronted *v*P), Thoms & Walkden's analysis of VP-fronting can accommodate possibilities of separation without the DAVD hypothesis. Since both arguments and adjuncts of different kinds can be extraposed, there is no expectation that VP-fronting should be sensitive to the A/AD.

5.4. Conclusions on VP-fronting

The VP-fronting diagnostic for argumenthood provides evidence for the A/AD to the extent that it meets both the heuristic criterion and the no-independent-motivation criterion. To meet the heuristic criterion, it must draw a distinction between verbal dependents which aligns closely with the conventional A/AD. To meet the no-independent-motivation criterion, the A/AD must play an

important role in the analysis of VP-fronting – the A/AD must play a role in *explaining* the relevant data.

In this section, I showed that VP-fronting does not meet either criterion. A/AD-based accounts of VP-fronting hold that VP-fronting is movement of *v*P (or a *v*P-operator). Given the DAVD hypothesis, this predicts that VP-fronting can strand adjuncts but not arguments. However, I showed in section 5.2 that this prediction is contradicted by a vast number of counterexamples from prior literature. These counterexamples demonstrate that conventional arguments of many different kinds (addressees/experiencers, goals, recipients, even CP, TPs, and heavy NP complements) can be stranded. The distinction among verbal dependents drawn by the VP-fronting diagnostic therefore does not closely resemble the A/AD.

Beyond this, many existing analyses already leave no role for the A/AD. In section 5.3, I specifically explored how Thoms & Walkden's (2019) analysis of VP-fronting could account for the possibilities of stranding under VP-fronting without reference to the A/AD. I proposed that under their analysis, apparent stranding can be reanalyzed as extraposition from the fronted VP. This accounts for the fact that PPs, TPs, CP, and heavy NPs can be separated, but light NPs cannot. The reason is that the former set of dependents can be extraposed, but light NPs cannot.

For these reasons, the VP-fronting diagnostic fails to meet both criteria. I conclude that VP-fronting does not provide evidence for a syntactic distinction between arguments and adjuncts within VP.

6. Islandhood

This section considers the *islandhood* diagnostic for argumenthood. Since at least Huang (1982), it has been common to attribute to adjuncts the property of opacity. That is, it is often held that extraction of a constituent from an adjunct-*internal* position to an adjunct-*external* position is impossible. This makes adjuncts syntactic islands. This idea is used to explain contrasts such as that in (116).

(116) a. Which option is Spencer concerned [$_{CP}$ that Bailey might have decided on __]?

b. * Which option is Spencer concerned [$_{PP}$ because Bailey might have decided on __]?

In (116a), the *wh*-phrase *which option* undergoes extraction from a position within the complement CP to the specifier of the matrix CP. In (116b), the same phrase moves to the same position, but from within the *because*-phrase. The A/AD-based account of this contrast attributes the unacceptability of (116b) to adjuncthood of the *because*-phrase. If adjuncts are islands, then (assuming *because*-phrases are adjuncts) extraction out of the PP should be blocked in (116b).

This section uses the two criteria of section 2 to evaluate the diagnostic from islandhood. The diagnostic identifies two classes of constituents (i.e. the class of constituents from which extraction can take place and the class of constituents from which extraction cannot take place). It can be taken to support the syntactic A/AD to the extent that it meets both the heuristic criterion and the no-independent-motivation criterion. To meet the first criterion, the distinction identified by islandhood must align with the conventional A/AD. For example, it should generally be the case that, if a constituent would conventionally be considered an adjunct, then it should be opaque to extraction. To meet the second criterion, an implementation of the syntactic A/AD must play a role in explaining which constituents are opaque and which are not.

This section argues that the islandhood diagnostic does not meet either criterion. With respect to the heuristic criterion, there are many exceptions in both directions. That is, many conventional adjuncts, which should be opaque, are in fact transparent, and many conventional arguments, which should be transparent, are in fact opaque.

With respect to the no-independent-motivation criterion, I argue that the data indicate that islandhood of PP derives from the internal configuration of PP, rather than from the way the PP connects up to the rest of the sentence. That is, whether or not a given PP is an island depends on that PP's internal structure, not on its argumenthood.

To show this, I analyze three sets of PPs separately, according to their internal structure. First, section 6.1 considers *simple* PPs (i.e. PPs whose complements are NPs). I find that the general pattern with simple PPs is that they are *not* islands. Second, in section 6.2 I show that *tensed clausal* PPs (i.e. PPs whose complements are tensed clauses) resist extraction regardless of their status as conventional arguments vs. adjuncts; tensed clausal PP *arguments* are islands, just as tensed clausal PP *adjuncts* are. Third, section 6.3 focuses on *gerundive* PPs (i.e. PPs whose complements are gerundive clauses). While extraction from gerundive PPs depends strongly upon semantico-pragmatic context (as argued by Truswell 2011, Ernst 2021), I demonstrate that such

PPs are consistently *weak* islands. Critically, this is just as true for gerundive PPs which would be considered conventional arguments as for gerundive PPs which would be considered conventional adjuncts. Breaking up the data in this way naturally reveals the heuristic problems for the islandhood diagnostic. It also shows that the islandhood diagnostic does not meet the no-independent-motivation criterion, as I discuss in more detail in section 6.4.

6.1. PPs with NP complements are not islands

6.1.1. The general pattern

This subsection examines extraction from simple PPs, including conventional argument and conventional adjunct PPs of this type. It goes without saying that conventional arguments of this type are typically not islands (certain exceptions are discussed below). I find that the same generalization applies to adjunct PPs of this type. The set of conventional adjunct PPs includes benefactives, comitatives, instrumentals, durationals, locatives, temporals, passive *by*-phrases, sources, and certain manner PPs.[37] All of these freely allow subextraction, as (117) shows.[38] Further examples along these lines can be found in Takami 1988, 1992.

(117)	a.	Who are you waiting in line [for __]?	(benefactive)
	b.	Who did you go to the store [with __]?	(comitative)
	c.	What did you clean the oven [with __]?	(instrument)
	d.	How long have you been working [for __]?	(durational)
	e.	Which room did you read the newspaper [in __]?	(locative)
	f.	What time should we meet [at __]?	(temporal)
	g.	Who was this house designed [by __]?	(passive *by*-phrase)
	h.	Which window can you see into the garden [from __]?	(source)
	i.	Which shoes are easiest to run [in __]?	(manner)

Still, the applicability of this generalization to simple PP adjuncts may be controversial. As Truswell (2011, p7) points out (citing Cattell 1976 *inter alia*), it has been a mainstream assumption for some time that such extractions as (117) are *exceptions* to a general ban on extraction from

[37] The PP *in which shoes* in (117i) contributes *manner* rather than proper *locative* information. See Maienborn's (2001) discussion of "internal locatives."

[38] Certain temporals pose an exception, such as those in (i). I return to this issue later in this section.

(i) ??Which party did you get upset after/before?

adjuncts. Huddleston & Pullum (2002, p631, italics added) give an illustrative characterization: "Stranding occurs most readily when the PP is functioning as complement; with adjunct PPs stranding is often prohibited or of doubtful acceptability, *though there are certainly some cases where it is permitted*." This framing makes islandhood the general case, with "some" exceptions to this here and there.

The examples in (117) would constitute exceptions in this sense; something sets them apart as circumventing the ban. Hornstein & Weinberg (1981), for example, proposed that, in cases where extraction from an adjunct PP seems acceptable, there must be *reanalysis* of the head P with the verb, so that a complex verbal predicate V+P is formed, and the complement of the PP is treated as the complement to this predicate. Under this analysis, a sentence like, say, (117f), would have a structure like (118). Here, the extracted *what time* is not contained in an adjunct, but is the direct object of the complex verb *meet at* which is created through the reanalysis transformation.

(118) … [$_{VP}$ [$_{V}$ meet at] [$_{NP}$ what time]]

Yet this sort of analysis makes certain predictions which surely should not be admitted (Takami 1988, Newmeyer 2005). It will have to be the case that *wait in line for*, *go to the store with*, *clean the oven with*, and so on, are all complex predicates in (117). The set of complex predicates of this sort will have to also include unwieldy amalgamations such as the underlined strings in (119).

(119) a. Which room did you <u>hear Lee arguing with Terry in</u>?
b. Who did you <u>offer to wash Lee's car for</u>?
c. How long have you been <u>preaching about the apocalypse on college campuses for</u>?

The only plausible analysis of such sentences is that they involve extraction from PPs, in this case from adjunct PPs.

6.1.2. *Aspects*'s *decide on* example

Therefore, data like (117) indicate that there is no *necessary* implication from adjuncthood to islandhood. Nevertheless, there are certain high-profile examples which have been argued in prior literature to necessitate such an implication. A classic example is (120), originally from Chomsky (1965, p101-102), which also plays an important role in Chomsky et al. (2019, p249).

(120) a. John decided on the boat.

b. What did John decide on?

The statement in (120a) is ambiguous. It can mean that John made some decision *with respect to* the boat (e.g., perhaps he was deciding whether to buy the boat or something else). Call this *reading 1*. On the other hand, it can also mean that John made some decision *while he was physically located on* the boat. Call this *reading 2*. Crucially, only reading 1 survives in (120b). This is traditionally attributed to the argument/adjunct status of the PP on the two readings. In reading 1, the PP is a complement of *decide*; hence extraction from the PP is fine on the first reading. But in reading 2, the PP is an adjunct. This is taken to illustrate that adjuncts are opaque to extraction; if adjuncts were not islands, then we would expect extraction to be possible from the locative adjunct PP, so reading 2 should be available in (120b). Thus, data such as (120) are taken to show that adjuncts are islands after all.

This analysis of (120) appears to conflict with the pattern of (117). On one hand, (120) seems to suggest that some simple PP adjuncts may be islands, while (117) suggests that such PPs are generally not islands. Do we take (120) as definitive evidence for an adjunct island condition, in which case we need to come up with some way around the apparently vast array of counterexamples such as (117)? Or do we take (120) *itself* as a counterexample (warranting an independent explanation) to the general pattern that such adjuncts are *not* necessarily islands. I adopt the latter strategy. The data in (117) are maintained as evidence of extraction from adjunct PPs, and the apparent impossibility of such extraction in (120b) is exceptional.

In order to explain the exceptionality of (120b), I first present (121) from Newmeyer (2005, p116).

(121) Which floor did John decide on the boat on?

This example makes it clear that extraction from a locative *on*-phrase adjunct is actually possible. The *on*-phrase here is interpreted as indicating the location of the *deciding*-event (or at least *John*'s location within this event). It is thus an adjunct in the same sense as in reading 2 of (120b). But this example (121) is plainly acceptable, especially in a context where we understand that John is pondering his decision about the boat while meandering the floors of some building.

Furthermore, an example like (122) is also acceptable, particularly when placed in an appropriate context. Consider the context in which John is touring boats at the harbor with his family, at the same time ruminating on which college to attend. He makes his decision some time during the tour, and later reveals his decision to his family. Curious about the circumstances of his decision, they ask (122).

(122) Which boat did you decide on?

Data such as (121)-(122) provide unequivocal evidence that the problem with reading 2 in (120b) is *not* the adjuncthood of the PP. These are clear cases where the very same PP allows extraction.

What, then, is responsible for the contrast in (120b)? I argue it has to do with the exceptional nature of extracting *what* from certain locative PPs. The same oddness occurs with *argument* locatives, as (123) illustrates.

(123) a. {??What / Which floor} are you located on?

b. {??What / Which street} do you live on?

c. {??What / Which shelf} did the book remain on?

The PPs in (123) denote locations which, for some pragmatic reason or another, are odd to question with *what*. Yet they are easily questioned with more specific *wh*-phrases, such as *which floor, which street*, or *which shelf*. The same is true for the *on*-phrase in (120b). It is odd to question the location with *what*, but (121)-(122) show that questions using more specific *wh*-phrases are perfectly unremarkable. The precise reason for this oddness, in both (120b) and (123), falls in the realm of pragmatics, and so I cannot offer a full account of it here. For present purposes I speculate that the oddness of extracting *what* from a locative occurs when the scale of the question is too broad.[39] For example, in (123a), it is not clear at what scale the question should be answered – is the question asking for *any* location? Could one answer "on the Earth?" What about "on the grass"

[39] This effect could also be related to d-linking. It could also be that locative *what*-questions in some instances are precluded by the availability of *where*, though this alternative faces the difficulty that such questions are not always blocked (e.g. *What did you pack your lunch in*).

or “on my feet” or “nothing?” It could be that more specific *wh*-phrases are needed to limit the scope to a feasible level.

6.1.3. Lexical exceptions

There are also genuine exceptions to the general rule (that simple PPs, conventional arguments and adjuncts alike, are not islands). However, these exceptions are lexically based, and thus serve to strengthen the general claim of this section that islandhood follows from the *internal* properties of PPs, not from argumenthood. That is, some prepositions do not permit extraction of their complements; this holds for *specific prepositions*, regardless of whether or not the PPs they project are used as conventional arguments or adjuncts.

For example, certain temporals (e.g. with *during*, *before*/*after*, *until*) tend to resist stranding (though as Takami (1988), Truswell (2011), and others note, this is by no means an absolute ban).

(124) a. ?This is a movie that I always fall asleep [during __].
b. ?This is an activity that you’ll need to finish your homework [before/after __].
c. ?April 21st you can sign up [until __]. (attested in COCA)

Other prepositions which resist extraction include *despite*, *because of*, *regarding*, and *via* (see Culicover 1999, Takami 1988, 1992 for additional cases).

(125) a. ??This is the problem that we came out ok [despite __].
b. ??This is the kind of weather that school usually lets out early [because of __].
c. ??This is the kind of behavior that a preacher would rebuke you [regarding __].
d. ??This is a path that I’d like not to proceed [via __].

That these exceptions are related to the particular preposition being used, and not to the PP’s status as an adjunct, can be seen by the fact that such prepositions resist p-stranding even when used as predicates, i.e. as the complement to *be*. PPs used in this way are conventionally considered arguments (see e.g. Huddleston & Pullum 2002), and normally permit extraction (cf. “Which box is it inside of,” “Who is this for,” etc.).

Take *because of*. It can be used as a predicate as in (126a), but even in this situation it is resistant to extraction.[40]

(126) a. Their anger is probably [because of the rent increase].
b. ??What is their anger [because of __]?

We see the same pattern with temporals like *before*/*after*.

(127) a. The party is [before/after the show].
b. ?Which show is the party [before/after __]?

Such cases are best treated as learned exceptions to the general pattern. They may be represented by reference to individual lexical prepositions, or to classes of prepositions (e.g. with temporals). In either case, islandhood derives from the preposition used, not its function *as an adjunct*.

Thus, I conclude that the *general* situation is represented by benefactives, comitatives, etc., as in (117); most simple PPs (consisting of a P head and an NP complement) are not islands. Some apparent exceptions, such as the *decide on* example in (120), have been misanalyzed, as I showed. Other genuine exceptions are lexically-based; in these cases, resistance to extraction reflects lexical properties of the preposition used, not its role as an adjunct.

6.2. Tensed clausal PPs are strong islands as adjuncts and as arguments

The previous subsection focused on simple PPs, like benefactives, locatives, comitatives, etc. It was shown that these are generally not islands, even when they are canonically considered adjuncts. However, these kinds of PPs are typically not used as evidence for the idea that adjunct PPs are islands (the *decide on* example (120) being a notable exception). Instead, *clausal* PPs, particularly *tensed* clausal PPs, comprise the standard evidence in this area (as in Huang 1982,

[40] Note that this is a predicative rather than a specificational use of *because of*. This matters, because specificational phrases are typically islands for independent reasons (Moro 1997, Den Dikken 2006a). This is illustrated in the contrast between (i) and (ii). In (i), the NP *a depiction of who* is used predicatively and is transparent for extraction, while in (ii) it is used specificationally and resists extraction.

(i) Who did you say this painting is [a depiction of __]?
(ii) *Who did you say your prize possession is [a depiction of __]?

The *because*-phrase in (126) is used predicatively, and thus is not expected to be subject to the principles which block extraction in (ii).

Chomsky 1986, and much subsequent work). Take (128), which Truswell (2011, p11, fn4) notes as a prominent canonical example.

(128) *Who did Mary cry [after John hit __]? (Huang 1982, p503)

Truswell finds that these tensed clausal PPs are generally resistant to extraction, as illustrated in (129).[41]

(129) a. *Who did John go home [before he talked to __]?
b. * Who did John go home [after he talked to __]?
c. *Who did John fall asleep [while he was talking to __]?
d. * What is John talking to Mary [so that she will understand __]?

The main empirical contribution of the present section is to point out that such PPs are *always* islands, whether they occur as adjuncts or as arguments. The data in (128)-(129) show that tensed clausal PPs are islands when they occur as adjuncts. But these kinds of PPs are not restricted to adjunct roles; tensed temporal PPs, as with *after* or *before*, and tensed durational PPs, as with *while* or *until*, can be used as arguments in certain contexts. Consider the PPs in (130), for instance.

(130) a. The detective placed the murder [before Lee visited Terry].
b. The party lasted [until Lee insulted Terry].

The *before*-phrase in (130a), which specifies the time at which the murder is supposed to have taken place, is a conventional argument of the verb *place*, not a conventional adjunct. The verb *place* is typically treated as taking three arguments, an agent, a theme, and a goal, as in (131).

(131) [AGENT Lee] placed [THEME the book] [GOAL on the shelf].

The term "goal" may not be appropriate for the temporal use of the verb in (130a) – Huddleston & Pullum (2002, p691) prefer to label its thematic role "temporal extent." Nevertheless, the point stands. The *before*-phrase in (130a) has a function parallel to that of the goal in (131), and any of the reasons to consider the goal of (131) an argument will also apply in (130a). One could argue

[41] It's not quite right to say that they *categorically* resist extraction. There are some exceptions (e.g. Truswell 2011, p175, fn1, Chaves 2021, p690-691), as with islands of all kinds. See also Cinque 1990 for relevant discussion.

that the goal PP in (131) is an argument because it is non-omissible, for example. The same holds of the *before*-phrase in (130a).

The *until*-phrase in (130b) is also a conventional argument. Notice that the sentence is unacceptable without it. Non-omissibility is a defining characteristic of conventional arguments (e.g. Huddleston & Pullum 2002, p221-222, Boeckx 2003, p96, Patejuk & Przepiórkowski 2021, p4-5, esp. fn5). The idea that *last* takes a temporal argument is also adopted by Jackendoff (2002, p134, fn63), Huddleston & Pullum (2002, p703), and Needham & Toivonen (2011, p4).

Critically for present purposes, even though the clausal PPs in (130b) are conventional arguments, they are still islands, as can be seen in (132).

(132) a. *Who did the detective place the murder [before Lee visited __]?
b. * Who did the party last [until Lee insulted __]?

The unacceptability of extraction from tensed clausal PPs has traditionally been attributed to their status as adjuncts. This account may apply to the data in (128)-(129), where the PPs play the role of adjunct, but it does not work for (132). If there is a distinction between arguments and adjuncts, the PPs in (132) would be expected to fall on the argument side of the divide. It is therefore unlikely that the islandhood of these constituents follows from an adjunct island condition.

Further evidence towards this conclusion comes from contrasts between PP clauses and *if*-clauses. Notice that finite *if*-clauses permit extraction much more readily than tensed clausal PPs. This is best known for *if*-clauses in complement positions.

(133) a. Who did you ask [if you could talk to __]?
b. Which car do you want to know [if you can drive __]?
c. That's the article that I couldn't find out [if anyone had cited __].

But it also holds for adjunct *if*-clauses; these permit extraction in many cases, as (134) attests.

(134) a. How many books would you be surprised [if I could read __ in a single night]?
b. Who do you think your parents would worry [if you hung out with __]?
c. Some things, I get sick [if I eat __].

Assuming *if*-clauses are CPs, rather than PPs, the contrast between *if*-clauses and tensed clausal PPs suggests an important role for the internal structure of PP.

6.3. Gerundive PPs are weak islands as adjuncts and as arguments

Tensed clausal PPs tend to be *strong* islands, in the sense that they resist extraction under most circumstances (cf. footnote 41). The examples in the previous section demonstrate this. However, *gerundive* PP adjuncts are not strong islands; it has long been noted that gerundive PPs can be extracted from, as (135) illustrates.[42]

(135) a. He is the person who they left [before speaking to __].
(Chomsky 1986:32)

b. This is the man (who) John went away [without saying goodbye to __].
(Cinque 1990:101, parenthetical added)

c. Which speech did John make his point [by reciting __]?
(Truswell 2011:136, reported with '%' in the original)

Truswell (2011) characterizes such PPs as *weak* islands, as they allow extraction of certain NPs, but generally not PPs or any other kind of constituent.[43] To illustrate, consider the contrast between (136) and (137). In (136), it is possible to form a relative clause by extracting an NP (yielding p-stranding). But in (137), relativization by extraction of a PP (i.e. pied-piping) yields unacceptability.

(136) a. Lee is the kind of advisor who I always feel optimistic [after talking to __].
b. He's the kind of guy who you should think twice [before moving in with __].
c. This is a grant that you'd be committing fraud [by applying for __].

(137) a. *Lee is the kind of advisor to whom I always feel optimistic [after talking __].
b. *He's the kind of guy with whom you should think twice [before moving in __].
c. *This is a grant for which you'd be committing fraud [by applying __].

The weak island property of these domains can also be illustrated by paradigms like (138), which show that it is not possible to form a *why*-question into the PP-clause. In (138a), for example, the

[42] Gerundive PPs show *gradient* resistance (as weak islands) to extraction of NP in different cases; I follow the arguments of Truswell (2011) and Ernst (2021), among others, that the reasons for this are semantic. See Truswell's "Single Event-Grouping Condition," for example.
[43] This is the traditional characterization of weak islands. It differs from Cinque's (1990) characterization, where a "weak island" is one that allows extraction of PPs, in addition to NPs (cf. Szabolcsi 2006).

question would be acceptable if it were interpreted as asking "What's the reason *x* such that, after getting in trouble, you cried because of *x*?" But it is not acceptable with the interpretation indicated in the example, with *why* extracted from the embedded clause.

(138) a. *Why did you cry [after getting in trouble __]?
- intended: What's the reason *x* such that when you cried was after getting in trouble for *x*?
- intended answer: (I cried after getting in trouble) for jaywalking.

b. *Why did you get nervous [before robbing the bank __]?
- intended: What's the reason *x* such that it was before robbing the bank for *x* that you got nervous?
- intended answer: (I got nervous before robbing the bank) to pay my bills.

c. *Why did you tell jokes [by insulting people __]?
- intended: What's the reason *x* such that it was by insulting people over *x* that you told jokes?
- intended answer: (I told jokes by insulting people) over their silly mistakes.

The reason why these PPs are weak islands has traditionally been associated with their status as adjuncts. However, it has not previously been noticed (as far as I am aware) that structurally similar PPs in conventional *argument* roles are weak islands too. Take the PPs in (139). Landau (2022) argues these are arguments, rather than adjuncts.[44]

(139) a. They tricked me [into talking to Lee].
b. They warned me [against moving in with Lee].
c. I opted out [of applying for that grant].

Even though these gerundive PPs are conventional arguments rather than adjuncts, they exhibit the same weak islands properties that the conventional adjunct PPs in (136)-(137) do. For example,

[44] Many of these types of PPs are syntactically non-omissible, as with *opt out of*. They also co-vary with other elements readily categorized as arguments, cf. *They warned me of something (*against doing something)*.) I consider these to be conventional arguments for these reasons.

while certain NPs can be extracted from these domains, parallel PP-extraction leads to unacceptability. This is illustrated in (140)-(141).[45]

(140) a. That's the professor who they tricked me [into talking to __].
b. Lee is the one who they warned me [against moving in with __].
c. That's the grant which I opted out [of applying for __].

(141) a. *That's the professor to whom they tricked me [into talking __].
b. *Lee is the one with whom they warned me [against moving in __].
c. *That's the grant for which I opted out [of applying __].

We can also see the weak island property in the unavailability of *why*-questions into these PP-clauses. In (142a), for example, it is possible to interpret the question as asking "What's the reason *x* such that the reason they charged you with insulting people is *x*?" But it cannot be interpreted as asking about the reason for your *insulting* people, as indicated in the example.

(142) a. *Why did they charge you [with insulting people __]?
- intended: what is the reason *x* such that what they charged you with was insulting people because of *x*?
- intended answer: (They charged me with insulting people) to feel better about myself.

b. *Why did they accuse you [of robbing the bank __]?
- intended: what is the reason *x* such that what they accused you of was robbing the bank because of *x*?
- intended answer: (They accused me of robbing the bank) to pay my rent.

c. *Why did you warn him [against going to college __]?
- intended: what is the reason *x* such that what you warned him against was going to college because of *x*?
- intended answer: (I warned him against going to college) just to party.

[45] This comparison hinges on the presupposition that both NP- and PP-extraction are permissible in other contexts. For example, *That's the professor to whom I'd like to talk* or *That's the professor who I'd like to talk to*, which are both acceptable for most speakers.

These data demonstrate the generalization that gerundive PPs are weak islands, and they also show that it holds both for conventional adjuncts and for conventional arguments.

6.4. Islandhood and the no-independent-motivation criterion

I have shown (i) that PPs with NP complements tend not to be islands, (ii) that tensed clausal PPs tend to be strong islands, and (iii) that gerundive PPs tend to be weak islands. In all three cases, the generalization covers conventional argument and conventional adjunct PPs alike. This represents a heuristic problem for the islandhood diagnostic: the distinctions identified by islandhood do not align well with the conventional A/AD. In other words, conventional argumenthood is not a reliable predictor for whether or not a given PP will be an island.

I conclude that the islandhood diagnostic does not meet the heuristic criterion. What about the no-independent-motivation criterion? In order to meet the no-independent-motivation criterion, a diagnostic for argumenthood must involve a phenomenon which is not expected on the basis of independent principles, but instead requires reference to the A/AD. Do the islandhood facts require such an analysis? If not, what independent principles are involved?

This section will not provide an analysis of PP islandhood. Instead, for the purposes of this chapter, it suffices to show that, whatever the precise analysis of this phenomenon is, it is not likely to involve reference to the A/AD. This conclusion can be reached by first considering the case of finite clausal PPs. I reason as follows. First, for the sake of argument, suppose that there are two logical possibilities, (i) finite clausal PPs are islands when they occur in argument positions, and (ii) finite clausal PPs are islands when they occur in adjunct positions. Admitting this, let's take each case separately, beginning with the argument case, with examples like (143).

(143) a. *Who did the detective place the murder [before Lee visited __]?
b. *Who did the party last [until Lee insulted __]?

We need some way of capturing the island status of the PPs in this example. If we assume that these PPs are arguments, then our analysis must exploit aspects of the internal structure of these domains. That is, since finite clausal complements are normally *not* islands, there must be something about finite clausal *PP* complements which makes them exceptional.

In this case, we can assume that the internal structure of a PP is unaffected by the particular position in which it occurs. Therefore, whatever it is about PPs that makes them islands in *complement* position will also be present when they occur in *adjunct* position. When we return to the examples of finite clausal PP *adjuncts*, then, islandhood would be expected for the same reasons as with complement PPs.[46] Thus, it is not the *position* of these PPs in the clause – the role they play (argument vs. adjunct), or the operation which introduces them (set-merge or pair-merge) – but some aspect of their *internal construction* which renders them opaque for extraction.

This same reasoning applies to gerundive PPs. Even if we stipulate that gerundive PPs can be either arguments or adjuncts, this distinction will not be able to explain why both types of gerundive PPs are weak islands: we would need an explanation based on the internal structure of gerundive PPs to explain why gerundive PP arguments are weak islands, and this same analysis would apply for gerundive PP adjuncts.

For these reasons, the islandhood diagnostic does not meet the no-independent-motivation criterion. The islandhood data do not require appeal to the A/AD. Instead, the islandhood data demand an analysis based on the independently motivated internal structural differences between different types of PPs.

6.5. Conclusions on islandhood

I have argued that the islandhood of PPs depends upon their internal structural properties rather than on their status as arguments vs. adjuncts. If this conclusion is correct, it demonstrates that the islandhood diagnostic for argumenthood does not meet the no-independent-motivation criterion; it means that the analysis of islandhood in these instances does not need to refer to special syntactic mechanisms, but can instead be built upon the independently motivated internal structural differences between PPs.

In addition, by dividing up the PP islandhood data according to complement type (i.e. considering separate classes of simple PPs, tensed clausal PPs, and gerundive PPs), I showed that

[46] Of course, we cannot rule out a complex analysis where argument PPs (like those in (132)) are islands for one reason, and adjunct PPs (like those in (129)) are islands for a distinct reason. This sort of analysis cannot be ruled out in principle. Even for, say, complex-NP islands, it *could* be that some are islands for one reason, and others are islands for another. Perhaps complex NPs in object position are islands for reasons entirely distinct from those that make oblique complex NPs islands.

there are severe mismatches between the set of PPs identified as islands and those which would be conventionally considered adjuncts. The islandhood diagnostic therefore fails to meet the heuristic criterion, because the distinction among PPs drawn by islandhood does not align well with the conventional A/AD.

For these reasons, I conclude that islandhood does not provide evidence to motivate the syntactic A/AD.

7. Iterability

Now consider the *iterability* diagnostic, which states that adjuncts of the same type can be repeatedly iterated, while arguments of the same type cannot. Example (144) gives a typical contrast which might be used to illustrate the diagnostic.

(144) a. Lee sang in the city (at the big theater) (on the main stage).
b. Lee sang to a big crowd (*to all their friends) (*to Terry and Casey).

Iterability says that the locative PPs in (144a) can be iterated because they are adjuncts, while the PPs in (144b) cannot be iterated because they are arguments.

This property is widely cited as supporting the syntactic A/AD (e.g. the references in (2d)). However, this section evaluates the iterability diagnostic by the two criteria of section 2 and concludes that iterability does not in fact provide evidence in favor of the A/AD. First, the iterability diagnostic fails to meet the heuristic criterion because the distinction it draws does not align well with the conventional A/AD, and second, it fails to meet the no-independent-motivation criterion because the distinction between iterable and non-iterable dependents can be related to a distinction required independently of the A/AD.

To demonstrate this, the section is split into three subsections. The first subsection (7.1) considers the behavior of conventional adjuncts, and the second (7.2) considers the behavior of conventional arguments. Both subsections conclude that the possibility of iteration is restricted to locatives and temporals, irrespective of argumenthood. The third subsection explains how these results demonstrate that iterability does not motivate the syntactic A/AD.

7.1. Iterability of conventional adjuncts

For the purposes of this discussion, I will adopt Zyman (2020, p1) description of iterability as in (145).[47]

(145) *Iteration*:

To a [host + adjunct] structure, another adjunct of the same type can typically be added.

The iterability diagnostic is thus sensitive to whether or not a given verbal dependent can be iterated. If it can, it is classified as an adjunct, and if it cannot, it is classified as an argument.

However, while the iterability diagnostic holds that adjuncts as a class should be iterable, data appear to be inconsistent with this prediction. For example, chapter 2 of this dissertation argued that the Theta Criterion applies to conventional adjunct PPs just as it applies to conventional argument PPs. This is illustrated in (146), for example.

(146) a. *I thought [PP about Lee] [PP about Terry].

b. *I sailed [PP to the island] [PP to the shore].

c. *I built it [PP with my tools] [PP with a hammer].

d. *I went to the Halloween party [PP as a pirate] [PP as a zombie].

e. *The house was built [PP by amateurs] [PP by my cousins].

The subject-matter PPs in (146a) and the goal PPs in (146b) are examples of conventional arguments. As such, the iterability diagnostic correctly predicts that they cannot be iterated. But the same applies to conventional adjuncts, such as the instrumental *with*-phrases in (146c), the *as*-phrases in (146d), and the agentive *by*-phrases in (146e). While these PPs would both be considered conventional adjuncts, they are non-iterable.

Chapter 2 (section 3) also discussed in detail sentences containing more than one benefactive/comitative. Ernst (2002, p134) notes that sentences like this can be acceptable (if marginal); this is illustrated in (147).

(147) a. ?I baked it [for you] [for your parents].

b. ??The children are hiking [with the dog] [with their teacher].

[47] Roeper & Oseki (2018) use the term *Direct Structured Recursion* to refer to this phenomenon.

Importantly, I pointed out in chapter 2 that sentences exceeding two benefactives/comitatives are sharply degraded. Compare (147) with (148).

(148) a. ?*I baked it [for you] [for your parents] [for a friend].

b. *The children are hiking [with the dog] [with their teacher] [with their parents].

A critical feature of iteration as characterized in (145) is that it is unbounded. Once iteration applies once, it can apply again. This is clearly illustrated with iteration of locatives and temporals. As discussed in chapter 2, there is no limit to the number of locatives/temporals which can occur in a given sentence. (149) demonstrates this with locatives.

(149) I left it [in Ohio] [near Columbus] [at the library] [in the back room] [under the desk] …

The fact that the number of benefactives/comitatives is limited implies that they are not subject to iteration.

To add further support to the idea that benefactives/comitatives cannot be iterated, I argued in chapter 2 that the two *for*-phrases in (147a) instantiate two distinct types of benefactives. This is evidenced by the fact that the two oblique objects (*you* and *your parents*) cannot both be interpreted as recipients of the baked goods; in fact, the first *for*-phrase (*for you*) must be interpreted as a recipient benefactive, and the second *for*-phrase (*for your parents*) as a plain benefactive. This arguably explains the marginality of (147a) as well as the unacceptability of (148a). The sentence in (147a) is acceptable because the two *for*-phrases *can* be interpreted with distinct thematic roles, but it is marginal because the required interpretation involves a very precise context.

Chapter 2 suggested that the same analysis applies to the case of comitatives in (147b)/(148b). If this is correct, it means that the sentences in (147) are not the result of iteration, but simply involve the presence of two thematically distinct PPs.

While most conventional adjuncts, as demonstrated above, cannot be iterated, locatives and temporals can be iterated. Example (150) provides examples of iteration with temporals (150a), external locatives (150b), and internal locatives (150c).

(150) a. Terry laughed [last week] [on Monday] [at noon] …

b. Terry cried [at home] [in their bedroom] [in the closet] …

c. Terry boiled the eggs [on the stove] [in a big pot] [in salty water] …

I therefore conclude, in agreement with Ernst (2002, p134ff), that, in comparison to other conventional adjuncts, locatives and temporals display distinct behavior with respect to iterability. Among the conventional adjuncts, locatives and temporals are the only ones that clearly allow unbounded iteration.[48]

7.2. Iterability of conventional arguments

We can now consider the iterability of conventional argument PPs. Like conventional adjuncts, and as predicted by the iterability diagnostic, most conventional arguments appear to be non-iterable. This is illustrated in (151).

(151) a. Terry laughed at Lee (*at Lee's hair).

b. Terry talked to the students (*to Lee's friends).

c. Terry wrote about the war (*about the treaty).

d. Terry seems like a chef (*like an expert).

Critically, however, locatives and temporals are an exception: conventional argument locatives/temporals can be freely iterated. The sentences in (152) illustrate iterability with conventional argument locatives.

(152) a. Terry kept the book [in the library] [on the shelf] [next to *Aspects*] …

b. Terry lives [in France] [near a large city] [in a small cottage] …

c. The book is [under the tree] [next to the trunk] [in front of the hollow] …

---

[48] As discussed in chapter 2, some speakers accept sentences which may appear to contain more than one instrument, such as (i) from Thomas Ernst (personal correspondence) or (ii) from Schutze (1995, p130).

(i) %I built the shelves [with my drill] [with the new drill bits].

(ii) %Mary wrote the essay [with her right hand] [with a pencil].

However, just like the examples with benefactives/comitatives discussed above, the appearance of iteration seems to be illusory. For example, similar sentences, like (iii), with more than two apparent instrumentals are sharply degraded.

(iii) *I built the shelves [with my right hand] [with my drill] [with the new drill bits].

See Schutze (1995, p130-131) for further arguments that instrumentals are in fact non-iterable.

Directional PPs can also be iterated, even when these would canonically be considered arguments, as (153) illustrates.

(153) a. … he could see [through the window] [over the fence] [into Mr Dawkin's japanese-style garden].
(Retrieved from Google, July 9, 2020. URL)

b. Will Noack '16 passes [along the baseline] [under the hoop] [towards a teammate].
(Retrieved from Google, July 9, 2020. URL)

c. I drove [into the street], [around the corner], [through the intersection], [over the bridge], [onto the highway].
(Retrieved from Google, July 9, 2020. URL)

7.3. Conclusions on iterability

This section presented data from conventional argument PPs and conventional adjunct PPs, and argued that the only PPs which allow unbounded iteration are locatives and temporals. Critically, locatives and temporals can be iterated regardless of whether they would be considered conventional arguments or conventional adjuncts; both types of locatives/temporals can be iterated freely. Together, the fact that many canonical argument PPs can be iterated and the fact that many canonical adjunct PPs cannot be iterated demonstrate a severe misalignment between the results of the iterability diagnostic and the predictions from the conventional A/AD. *Iterability* therefore fails the heuristic criterion.

Iterability also fails the no-independent-motivation criterion; the distinctions it draws among PPs are better accounted for without reference to the A/AD. Whether or not a given type of PP can be iterated depends on the semantic properties of that type of PP, not on its status as an argument or an adjunct. That is, locatives/temporals have semantic representations distinct from that of other types of thematic elements. It is in terms of this difference that iterability should be analyzed.

This same conclusion is reached by Ernst (2002, p135) to explain the behavior of conventional adjuncts. He suggests that iterability of locatives and temporals follows from their being conceived of as "spaces" which can be geometrically nested within each other. Non-iterable

PPs, like recipients and benefactors, are not readily conceived of in geometrical terms, and therefore lack the property of nestability. Though Ernst applies this analysis only for locatives/temporals in conventional adjunct roles, the same reasoning can be extended to the examples with conventional arguments.[49]

I conclude that iterability fails both the heuristic criterion and the no-independent-motivation criterion, and as such does not provide motivation for the syntactic A/AD.

8. Extractability (from weak islands)

It is sometimes claimed that arguments can be extracted from weak islands, while adjuncts cannot. The contrast in (154) is a typical example with *wh*-islands.

(154) a. ?What$_i$ did you ask [whether you could paint __$_i$ with watercolors]?

b. *How$_i$ did you ask [whether you could paint a self-portrait __$_i$]?

In (154a), the extraction site (object of *paint*) is a typical argument position. In (154b), the extraction site is a typical adjunct position instead. In each case, extraction crosses an embedded question, a weak island. The idea is that movement can cross a weak island only if the extraction site is an argument position; thus (154a) should be acceptable (or at least not terrible) and (154b) should be impossible.

The generalization that weak islands allow extraction of arguments but not adjuncts naturally offers itself as a diagnostic for argumenthood. Applied to PPs within the VP, the extractability diagnostic holds that a PP which can be extracted out of a weak island is an argument, and a PP which cannot be extracted out of a weak island is an adjunct. This sort of diagnostic is employed by Schütze (1995, p115-116), Schütze & Gibson (1999, p427-428), Schütze (2012, p8-9), and Toivonen (2016, p2).

However, prior literature on weak islands has found this A/AD-based characterization of extractability to be problematic (e.g. Hukari & Levine 1995, Starke 2001, Szabolcsi 2006, Miliorini 2019). The validity of the A/AD-based characterization is the primary focus of Miliorini

[49] Goldberg (2006, p37fn15) reaches a similar conclusion. However, she suggests it only applies to adjuncts, and that among adjuncts, it applies to benefactives in addition to locatives. I argued against both these ideas here; conventional arguments *can* be freely iterated (as long as they are locatives or temporals), and benefactives *cannot* be freely iterated.

(2019). After a careful review of relevant literature, she concludes that the A/AD-based characterization is inappropriate; across the board, approaches to extraction from weak islands which do not rely upon the A/AD are better able to account for the data. This result "entails that the argument/adjunct distinction no longer has an explanatory role in the treatment of the extraction from wh-islands and negative islands." Hukari & Levine (1995, p201) give a similar assessment, going so far as to say that "sensitivity to weak island contexts runs orthogonal […] to the distinction between adjuncts and arguments."

The problems with the extractability diagnostic have also been acknowledged by its proponents. For example, consider the following quotation from Schütze (1995), where extractability is applied as a diagnostic for argumenthood:

> "There is also an asymmetry under extraction from weak islands, though again certain modifiers pattern like arguments under this test. The contrast seems crisper under pied piping, but can be quite subtle even there. Therefore, I suggest that weak island extractions be used only as confirmation for other tests; a negative result can be taken to support nonargumenthood, but a positive result could be misleading."
>
> (Schütze 1995, p117)

Schütze acknowledges that judgments are "quite subtle," and further, that there are certain canonical adjuncts which, unexpectedly according to the test, *can* be extracted out of weak islands. He concludes that the extractability diagnostic can be used to support the results of other tests, but that it does not provide evidence in favor of the A/AD on its own.

This section reviews the literature on extraction from weak islands in three parts. First, subsection 8.1 shows the array of examples which appear to show successful extraction of conventional adjuncts from weak islands. Then, subsection 8.2 shows contradictions of the A/AD-based characterization of extractability in the opposite direction, i.e. cases in which conventional arguments fail to be extracted from weak islands. Subsection 8.3 describes how such examples have motivated analyses of weak islands which do not assume that the A/AD plays a role in extractability; these alternatives explain the data by appeal to entirely independent mechanisms, such as semantic referentiality or presupposition oddity. I conclude that the extractability diagnostic does not meet the criteria of evaluation laid out in section 2, and therefore that the A/AD is not supported by this diagnostic.

8.1. Extraction of conventional adjuncts

Prior literature has shown that there are numerous cases in which conventional adjuncts can be extracted out of weak islands (contrary to what the extractability diagnostic predicts). For example, it is generally agreed that locative PPs like *where* can be extracted out of *wh*-islands (an observation which in fact goes back to Huang 1982, p528-530). Discussing the A/AD characterization of extraction out of weak islands, Szabolcsi (2006) writes that "*Where* [i.e. a locative PP] does not fit the picture very well because its WI-sensitivity [i.e. weak island-sensitivity] does not depend much on whether it is subcategorized for (as with *put*) or not (as with *read*)," (p495, brackets added).

(155) a. ?Where$_i$ did John ask [whether to put this book $___i$] ?

b. ?Where$_i$ did John ask [whether to read this book $___i$] ?

(Adapted from Szabolcsi 2006, p495)

Starke (2001) makes the same generalization in considering the acceptability of extraction of various *wh*-words. He notes a clear distinction between extraction from *wh*-islands of locatives and of temporals, as illustrated in (156). As he puts it, "… there is a main main cut-off point is between the locative *where* and the temporal *when* … This split does not correspond to argumenthood," (Starke 2001, p87, ellipses added).

(156) a. ?Where$_i$ do you wonder [whether they cook this kind of things $___i$] ?

b. ?*When$_i$ do you wonder [whether they cook this kind of things $___i$]

(Adapted from Starke 2001, p87)

Baker (1988:365) notes, in addition to locatives, that instrumentals and benefactives are among the canonical adjuncts which allow extraction out of a *wh*-island. Baker's examples are in (157).

(157) a. ?[In which chair]$_i$ do you know [how to sit $___i$ comfortably]?

b. ?[With which key]$_i$ do you always forget [how to open doors $___i$]?

c. ?[For which of your friends]$_i$ do you know [how to bake a cake that they will enjoy $___i$]?

(Adapted from Baker 1988, p365)

For Baker, "this implies that the traces of the PPs are in fact properly governed … This implies that they are theta marked by the lower verb," (Baker 1988, p365, ellipsis added). In other words,

according to Baker, in order to preserve the A/AD-characterization of weak island extractability, locatives, instrumentals, and benefactives must be syntactic arguments, despite their canonical categorization as adjuncts.

Further examples are noted by Pollard & Sag (1994), as shown in (158). Note that these examples involve topicalization of temporal "adjuncts" out of negative islands, another type of weak island.

(158) a. [When their parents are in town next week]$_i$ I doubt [that the twins will attend any lectures $__{}_i$].

b. [When their parents are in town next week]$_i$ I don't for a moment think [that the twins will attend any lectures $__{}_i$].

c. [When he was president]$_i$ Reagan denies [that he ever received kickbacks from the PLO $__{}_i$].

d. [During my term as University President]$_i$ I deny [there were any illegitimate appropriations of government money $__{}_i$].

(Adapted from Pollard & Sag 1994, p180-181)

Hukari & Levine (1995) give several further examples, as in (159), showing that some further types of canonical adjuncts can be topicalized out of a negative island.

(159) a. [With nothing but a crowbar and a ballpeen hammer]$_i$ I very much doubt [that Terry will be able to repair the Vax in our office $__{}_i$].

b. [Without their earmuffs, scarves, mittens, and parkas]$_i$ I don't think for a moment [that the twins will be venturing forth on a night like this $__{}_i$].

c. [Besides getting themselves charged with forgery]$_i$ I doubt [that Robin and Pat will accomplish anything notable during their sabbatical year at Cambridge $__{}_i$].

d. [Apart from getting themselves convicted of forgery]$_i$ Leslie denied [that Robin and Pat had done anything wrong during their sabbatical year at Cambridge $__{}_i$].

(Adapted from Hukari & Levine 1995, p201)

As already mentioned, these facts suggest to Hukari & Levine (1995, p201) that "sensitivity to weak island contexts runs orthogonal […] to the distinction between adjuncts and arguments."

What's more, Starke (2001) and Szabolcsi (2006) find that many examples of apparently impossible adjunct extraction can be significantly improved simply by being situated in an appropriate pragmatic context. Starke's particular characterization of an "appropriate" context is one in which the adjunct is presuppositional. As he says, "controlling for presuppositionality, it turns out that adjuncts are extractable: it is a known fact that 'adjuncts' fare much better in eWI [= extraction from a weak island] when presuppositional, in fact roughly at the level of 'arguments'. The simplest test are the so-called 'checklist' contexts:" (Starke 2001:93, brackets added).

(160) a. When$_i$ did you want to know [whether we will go to the mountains __$_i$]: for the snow vacations or for the cow-herding in the summer?

b. How$_i$ [didn't he want to eat the dish __$_i$]: with a fork or with Chinese sticks?

(Adapted from Starke 2001, p93)

(161) One can solve the problem by method A, method B, or method C.
How$_i$ are you wondering [whether to solve the problem __$_i$] ?

(Adapted from Szabolcsi 2006, p496, context added)

There is therefore an overwhelming number of exceptions to the generalization that adjuncts cannot be extracted out of weak islands. Further, given the degree to which pragmatic context improves such extractions, it seems implausible that the relevant restrictions could be purely syntactic in nature.

8.2. Failures of conventional-argument extraction

There are also numerous exceptions to the generalization that arguments *can* be extracted from weak islands. For example, as mentioned in section 6.3, PPs are known to resist extraction from island contexts in general (Cinque 1990, Szabolcsi 2006). This applies to PPs which are conventionally considered arguments and to PPs which are conventionally considered adjuncts.

It is also well-known that *how much*-phrases generally fail to extract out of weak islands, as in (162). As NPs, *how much*-phrases are canonical arguments. *How much gravy* is in Comp-VP, a canonical argument position, in both (162a) and (162b).

(162) a. *[How much gravy]$_i$ did Terry wonder [whether to order __$_i$] ?

b. *[How much gravy]$_i$ did Terry deny [that they ordered __$_i$] ?

This pattern extends also to canonical argument PPs. If the complement of a PP is a *how much*-phrase, that PP resists extraction from weak islands, even if that PP is a canonical argument. The PPs in (163) are all canonically arguments, and can be extracted from non-islands (e.g. *with how much gravy should we cook?*), yet they resist extraction from weak islands.

(163) a. *[With how much gravy]$_i$ did Terry wonder [whether to cook __$_i$] ?

b. *[For how much gravy]$_i$ did Terry wonder [whether to pay __$_i$] ?

c. *[In how much nonsense]$_i$ does Terry doubt [that anyone believes __$_i$] ?

d. *[Through how much pain]$_i$ does Terry deny [that they've been __$_i$] ?

Non-referential *how many*-phrases also resist extraction, as in (164).[50]

(164) a. *[How many books] are you wondering [whether to write next year __$_i$] ?

b. *[How many points] are you wondering [whether to earn __$_i$] ?

(Adapted from Szabolcsi 2006, p496)

Again, the pattern extends to PPs. If a PP contains a non-referential *how many*-phrase, the PP resists extraction, even if that PP is a canonical argument. The PPs in (165) are all arguments canonically, yet they resist extraction.

(165) a. *[To how many people] did Terry wonder [whether to talk __$_i$] ?

b. *[For how many paintings] did Terry wonder [whether to look __$_i$] ?

c. *[In how many conspiracy theories] does Terry doubt [that anyone believes __$_i$] ?

d. *[With how many people] does Terry deny [that they work __$_i$] ?

It is also known that non-D-linked *what* tends to resist extraction. The data in (166) from Villata et al. (2016, p76-77) illustrate this sharply.

[50] Compare with (i) and (ii), also from Szabolcsi 2006, with referential (or D-linked) *how many*-phrases.

(i) How many books on the list are they wondering whether to publish next year?

(ii) How many points are the jurors debating whether to take off?

(166) a. ?? Which problem do you wonder whether John could solve__ (in this way)?

b. * What do you wonder whether John could solve __ (in this way)?

c. *How do you wonder whether John could solve the problem __?

Here, extraction (out of the blue) of the D-linked *wh*-phrase *which problem* is acceptable (if marginal), while extraction of the non-D-linked *what* has acceptability comparable to that of "the most robust case of weak island violation […] represented by the extraction of an adjunct (as in [166b])," (Villata et al. 2016, p77, brackets added). See also Pesetsky (1987), Kroch (1998), and Miliorini (2019).

8.3. Alternative characterizations of extractability

The data presented in the previous two subsections represents a severe mismatch between the predictions of the extractability diagnostic and the conventional A/AD. That is, the diagnostic predicts that arguments but not adjuncts can be extracted, but the data show both that there are many conventional arguments that *cannot* be extracted and that there are many conventional adjuncts that *can* be extracted. I conclude that the distinction drawn by the extractability diagnostic does not align well with the conventional A/AD. This diagnostic therefore does not meet the heuristic criterion.

In addition, previous work on extraction from weak islands suggests that the extractability diagnostic does not meet the no-independent-motivation criterion either. That is, many authors have advocated analyses which do not attribute extractability to the A/AD. As reviewed by Szabolcsi (2006) and Miliorini (2019), there are many different approaches with this property. Evaluating the benefits and drawbacks of the various approaches falls outside the scope of this dissertation, so I will not attempt to present an exhaustive, evaluative review in this chapter. Instead, I will briefly describe the approach of Kroch (1998), which Miliorini (2019) argues to be the most promising of the available alternatives.

Kroch (1998) argues that degraded *wh*-questions involving extraction from weak islands can be explained in terms of *odd presuppositions*. *Wh*-questions normally involve an existential presupposition. A sentence like (167a) presupposes something along the lines of (167b), for instance.

(167) a. Which problem are you talking about?

b. There is a problem *x* such that you are talking about *x*.

Such presuppositions can be entirely natural, or entirely unnatural. Take the sentence in (168a). It makes the presupposition (168b), which, to use Kroch's (1998:28) terms, is "semantically well-formed but odd," i.e. "unusable under most discourse circumstances."

(168) a. ?? Which ear do you have?

b. There is a specific ear *x* such that you have *x*.

This particular presupposition is "odd" in several ways, one of which is that it assumes the addressee has only one ear (out of the contextually salient set of ears). Normally this is not the case, making the sentence odd under most discourse circumstances (assuming most people have two ears). That doesn't mean the sentence is ungrammatical, though, for there are certainly contexts in which the presupposition makes sense. Consider a context in which the addressee has lost an ear (or, worse, has recently taken an ear from someone else).

Kroch argues that similarly odd presuppositions explain why extraction of non-referential elements from weak islands is degraded. As he points out, the presuppositions with non-referential *wh*-phrases have a slightly different form than those with referential *wh*-phrases. A sentence like (169a) makes the presupposition (169b) when the *wh*-phrase *how many books* gets a referential interpretation, and makes the presupposition (169c) with a non-referential interpretation.

(169) a. How many books did the editor decide to publish this year?

b. There is a set *x* of books such that the editor published *x* this year.

c. This is an amount *x* of books such that the editor published *x* this year.

According to Kroch, this difference interacts with the semantic context of weak islands to yield odd presuppositions in some cases. For a sentence like (170a), the required presupposition (170b) might not be odd. But the alternative (171a) from Szabolcsi (2006), with extraction from a weak island, does have an arguably odd presupposition, and consequently has lower acceptability.[51]

(170) a. How many points did you say you want to earn?

[51] Szabolcsi (2006, p496) points out that there are at least two different candidates for what makes (171b) odd. Kroch's version is that existential presuppositions about amounts need to be licensed by context; since (171a) fails to provide a plausible such context, the presupposition is odd. But Szabolcsi considers an alternative whereby context is needed to establish the contextually relevant set of amounts from which the answer is to be selected.

b. There is a quantity *x* of points such that you said you wanted to earn *x* points.

(171) a. ?? How many points are you wondering whether to earn?

b. There is a sum *x* of points such that you are wondering whether to earn *x*.

(Adapted from Szabolcsi 2006, p496)

Critically, whether or not the presupposition is odd depends on context. Thus, a similar sentence like (172a) makes a similar presupposition (172b), but this one is not odd (if we assume that debating about quantities of points is something that jurors may be expected to do).

(172) a. How many points are the jurors debating whether to take off?

b. There is a quantity *x* of points such that the jurors are debating whether to take off *x* points.

(Adapted from Szabolcsi 2006, p496; Kroch 1998, p29)

Miliorini (2019) argues that this same account extends to extraction of conventional adjuncts, explaining both the cases where extraction appears to be degraded, and the specific contexts in which acceptability improves sharply. Examples like (173a) are of decreased acceptability because, like in (171), the required presupposition (173b) is not accommodated in ordinary contexts. Examples like (174) are not degraded in this way because the added context makes the required presupposition more plausible.

(173) a. *Over what campus did you wonder whether the Campanile towers _?

b. There is a specific campus *x* such that you wonder whether the Campanile towers over *x*.

(Adapted from Miliorini 2019, p51)

(174) Given that John is somewhat strange, in what town were you wondering whether John would be most comfortable?

(Adapted from Miliorini 2019, p52)

Thus, according to Miliorini (2019), Kroch's approach to extractability need not rely on the A/AD, but can explain patterns of (un)acceptable extraction from weak islands entirely in terms of independent factors.

8.4. Conclusions on extractability

The extractability diagnostic holds that arguments can be extracted out of weak islands, but adjuncts cannot. This section noted that prior literature has revealed problems for this diagnostic with respect to both the criteria outlined in section 2 above. With respect to the heuristic criterion, extractability fails because there are many examples both of canonical adjuncts which can be extracted out of a weak island (see examples (155)-(161)), and of canonical arguments which cannot be extracted out of a weak island (see examples (162)-(165)).

The extractability diagnostic also fails to meet the no-independent-motivation criterion, requiring that diagnostics make a distinction among PPs which is not expected independently of the syntactic A/AD. To the extent that weak islands (e.g. *wh*-islands) allow extraction of PPs, the conditions allowing/blocking such extraction are unlikely to involve the syntactic A/AD. Instead, the fact that pragmatic context has a significant ameliorating effect on certain extractions, like those in (160) and (161), and that extraction is sensitive to "referentiality" as in (162)-(165), suggests that the relevant principles are semantic/pragmatic in nature.

I conclude that extractability does not serve to motivate a syntactic distinction between arguments and adjuncts.

9. Reconstruction (for Condition C)

A further domain where the A/AD is often invoked involves Condition C reconstruction. Some fronted constituents trigger Condition C violations, while other fronted constituents do not. Compare the Strong Crossover effect in (175a), which we can analyze as reconstruction for Condition C, with the absence of such an effect in (175b).

(175) a. *Who$_1$ did she$_1$ say that Lee likes __$_1$?

b. Which picture that Mary$_1$ took did she$_1$ say that Lee likes __$_1$?

It has been suggested since Lebeaux (2000 [1988]) that the relevant difference is that arguments reconstruct for Condition C, while adjuncts do not. Consider the following contrast, which Lebeaux (2000, p110) proposes to analyze in just this way.

(176) a. ?* Which pictures of John$_1$ did he$_1$ destroy __$_1$?

b. Which pictures near John$_1$ did he$_1$ destroy __$_1$?

(Lebeaux 2000, p103(29))

According to Lebeaux, (176a) is unacceptable, and this is due to the fact that the fronted copy of *John* is contained in an argument (of *pictures*). Therefore, when the fronted NP reconstructs to object position, there is a Condition C violation. Because *John* is contained in an argument, it reconstructs, and when it does, it is c-commanded by *he*. However, in (176b), *John* is contained in an adjunct. Therefore, when the fronted NP reconstructs to object position, *John* does *not* reconstruct to this position; all that reconstructs is the unmodified NP *which pictures*. Since *John* does not reconstruct in (176b), there is no Condition C violation.

Lebeaux proposed to apply the same analysis to the purported contrast in (177), which involves PPs within the VP, and is therefore relevant for this paper. According to Lebeaux, because *under John* is an adjunct in (177a), it will not reconstruct and thus will not violate Condition C. But *under John* is an argument in (177b), so it will reconstruct and violate Condition C.

(177) a. ? Under John$_1$, he$_1$ noticed that a general hubbub was occurring __$_1$.

b. *Under John$_1$, he$_1$ placed a blanket __$_1$.

(Lebeaux 2000, p110(45))

Lebeaux's analysis has been highly influential. Relevant for this chapter, it has been cited as evidence for the syntactic A/AD. Specifically, the purported absence of Condition C reconstruction observed with adjuncts has been attributed to a property of *lateness*. Adjuncts, according to this view, can be introduced into the derivation "late" (i.e. countercyclically), while arguments cannot.

However, subsequent work has shown that Condition C reconstruction does not neatly track the A/AD. First, Speas (1990, p51-54) noticed that a subset of adjunct PPs do appear to reconstruct for Condition C (those that Ernst 2001 terms "participant PPs"). Consider the case in (178).

(178) * Near Dan$_1$, he$_1$ saw a snake __$_1$.

(Speas 1990, p51(56a), citing Reinhart 1983b, p35)

Reinhart's and Speas's judgments on (178) appear to contradict Lebeaux's judgment on the analogous (177a). Experimental work later vindicated this finding, and deepened the problem. Bruening & Al-Khalaf (2019) performed an experiment which confirmed Reinhart's and Speas's judgments on sentences like (178).

Additionally, Bruening & Al-Khalaf performed experiments to test the original contrast of (176). They found no reconstruction asymmetry. Adger et al.'s (2017) experiments delivered the same result: Lebeaux's (176a) is acceptable, just like (176b). These experimental results demonstrate that there is no argumenthood asymmetry in Condition C reconstruction.

While the A/AD does not condition reconstruction for Condition C, there are genuine asymmetries. Bruening & Al-Khalaf summarize the patterns of reconstruction as in (179).

(179) *Reconstruction for Binding Condition C* (Bruening & Al-Khalaf 2019, p16)

Where a phrase XP with head X occupies the head of an A-bar chain:

(a) if X is category V, P, or A, X reconstructs along with the head Y of its complement YP;

(b) if X is category N, only X reconstructs, none of its arguments or adjuncts do.

According to them, the presence of Condition C effects under reconstruction depends on a categorial distinction. When a noun phrase undergoes movement, none of its dependents reconstruct for Condition C. In contrast, the dependents of other categories do reconstruct. Adger et al. found, for example, that reconstruction is robust with fronted adjective phrases.

(180) *[How proud of Elizabeth$_1$] does Philip think she$_1$ is __ ?

Summarizing this section, the reconstruction diagnostic holds that arguments reconstruct for Condition C, while adjuncts do not. However, the judgments used to construct this generalization have been contradicted experimentally. Bruening & Al-Khalaf found that reconstruction asymmetries lie not in the A/AD, but in the category of the reconstructed phrase. NPs do not internally reconstruct for Condition C, but VPs, PPs, and APs do. Therefore, the reconstruction diagnostic does not meet the criteria of section 2 necessary to lend support to the A/AD. First, it fails to meet the heuristic criterion, as Bruening & Al-Khalaf show experimentally. Second, the diagnostic also does not meet the no-independent-motivation criterion, because it fails to draw a

distinction within categories; Bruening & Al-Khalaf show it only draws a distinction between NPs and other lexical categories. I conclude that reconstruction for Condition C does not provide evidence in favor of the syntactic A/AD.

10. Variability (of head preposition)

A further diagnostic cited as evidence for the A/AD involves the phenomenon of L-selection already discussed in section 3.1.1. I define this diagnostic as in (181), repeated from (2g) above.

(181) Variability (of head preposition):
The head of an argument PP can be invariable, while adjunct PPs can be headed by a variety of prepositions.
(Huddleston & Pullum 2002, p220; Needham & Toivonen 2011, p5; Zyman 2020, p1)

Zyman (2020, p1) characterizes this property of the A/AD in terms of L-selection: "a head H can L-select the head of a phrase XP if XP is an argument of H, but not if XP is an adjunct." Needham & Toivonen (2011, p5) offer the similar statement that "if the verb asks for a specific preposition, the PP is an argument."[52] Similarly, Huddleston & Pullum (2002, p220) say of the A/AD that "PPs functioning as non-core complement [i.e. as arguments] often have the preposition specified by the verb," (brackets added). The basic idea expressed by each of these sets of authors is (181): if a verb V has to co-occur with a particular preposition P, the constituent which P heads is an argument of V.

Notice that this diagnostic is a strictly one-way implication. If a preposition is variable, we can conclude neither that it heads an argument nor that it heads an adjunct;[53] it is only when a preposition is *in*variable that (181) predicts it to be an argument. Thus, just like the other one-way diagnostics discussed in this chapter, variability cannot *directly* support the A/AD. It does provide direct support for *L-selection* (i.e. idiomaticity), but it can only support the A/AD if there are reasons to draw a connection between L-selection and the A/AD (as motivated by other

[52] Needham & Toivonen call this principle the "fixed preposition" diagnostic, which they distinguish from the "prepositional content" diagnostic. I take both principles to be variants of the *variability* diagnostic, the former dealing more narrowly with examples like (182a), and the latter with cases like (182b).
[53] Otherwise the diagnostic would identify a vast number of conventional arguments as adjuncts.

diagnostics). This section argues that there is no reason to connect L-selection to the A/AD in the necessary way.

Recall from section 3.1.1 that L-selection (part of Zyman's characterization of the variability diagnostic) is a special case of idiomaticity (Pesetsky 1995, p135). Consider also Huddleston & Pullum's (2002, p220) identification of "specified" prepositions as those that "are not replaceable without loss of grammaticality […] or an unsystematic change in the meaning." Under this definition, (182) illustrates prepositions which are invariable. In (182a), the preposition must be *to*; any other preposition is ungrammatical. And in (182b), the preposition must be *into*, or else the meaning changes in a non-systematic way (i.e. in a way not derivable from the difference in preposition alone).

(182) a. Lee referred $\left\{\begin{array}{c}\text{to}\\ \text{*on}\\ \text{*of}\\ \vdots\end{array}\right\}$ the passage.

b. Terry looked $\left\{\begin{array}{c}\text{into}\\ \text{\#next to}\\ \text{\#beside}\\ \vdots\end{array}\right\}$ the accusation.

This characterization of (182b) amounts to the observation that *look into* is an idiom. Since the meaning of an idiom is not decomposable into the meanings of its parts, changing the preposition will change the meaning of the entire predicate. In fact (182a) can be characterized in the same way. The verb + preposition combination *refer to* is idiomatic, just as the combination *look into* is in (182b). The difference between *refer to* and *look into* is that the verb *look* has a use independent of the idiomatic *look into*. In its non-idiomatic use, *look* is a verb of attention compatible with locative and directional PPs; thus the combinations *look next to* and *look beside* are possible, but with a different interpretation of *look*. *Refer* is different in that it lacks a non-idiomatic use, which means *refer* always must co-occur with the preposition *to*; the *to*-phrase is *obligatory*.[54]

The *variability* diagnostic can thus be restated in terms of idiomaticity, as in (183).

[54] See section 3.1.1 for additional relevant discussion.

(183) Given a verb V with dependent PP headed by P, PP is an argument of V if V and P are part of an idiom.

However, there is no reason to believe "arguments" should be able to participate in idioms but "adjuncts" should not. In fact, there are numerous clear cases of conventional adjunct PPs that participate in VP idioms, such as the PPs in (184), which consequently are invariable. Further examples can be found in Bruening 2020, where it is explicitly presupposed that conventional adjunct PPs frequently do participate in idioms with the verb (see Bruening 2020, p17).

(184) a. hit the nail [on the head].
b. touch X [with a ten foot pole].
c. sell [like hot cakes].
d. cut the tension [with a knife].
e. nip X [in the bud].

Notice that the PPs in (184), despite being conventional *adjuncts*, are classified as *arguments* by the *variability* diagnostic. That is, we cannot change the preposition without a non-systematic change in meaning. The VP (184a), with the preposition *on*, means 'get something exactly right.' But if we change the preposition to *next to*, the meaning changes to the literal 'hit the nail (in the physical location) next to the head.' The prepositions in (184) are therefore invariable *by virtue of their participation in an idiom*, not by their argumenthood.

There are also idioms consisting of a verb plus a preposition, just like *look into* in (182b), which clearly involve what would canonically be considered an adjunct PP.

(185) a. Terry arrived at the conclusion. (*arrive at* = 'determine')
b. Terry stood for the reforms. (*stand for* = 'support')
c. Terry grew on Lee. (*grow on* = 'become appealing to')
d. Terry looked after the accounts. (*look after* = 'maintain')

In their non-idiomatic uses, the *at*-phrase with *arrive* as in (185a) is a locative, the *for*-phrase with *stand* as in (185b) is a benefactive, the *on*-phrase with *grow* as in (185c) is a locative, and the *after*-phrase with *look* as in (185d) is a temporal. These are all canonical adjuncts in their non-idiomatic uses. If we accept the *variability* diagnostic, then we will be forced to say that in their idiomatic use these PPs are arguments, even though they would be considered adjuncts otherwise.

It is therefore not plausible that the property of variability is related to argumenthood. Whether or not a given PP dependent of a verb has a variable head reflects idiomaticity: the head will be invariable if it participates in an idiom with the verb, and will be variable otherwise. Since there is no reason to believe that arguments but not adjuncts can be part of idioms, there is no reason to believe that variability of head preposition reflects the A/AD.

11. Permutability

The final diagnostic I will consider in this chapter is *permutability*. Very roughly speaking, the idea is that argument PPs and adjunct PPs can be distinguished by flexibility of word order, with greater flexibility exhibited by adjunct PPs. So, the question from the perspective of this chapter is, does permutability correlate in meaningful ways with the A/AD, and could it be taken as motivation for a syntactic implementation of the A/AD?

Permutability of PPs is addressed in greater detail in chapter 4, so the discussion for the purposes of this chapter will be kept relatively brief. To assess the relevance for the A/AD of permutability, it is critical to first note that views differ radically on what principles are responsible for the preferences when they arise. I divide the general stances into four types.[55]

(186) a. *Syntactic rigidity*:
The syntax determines a preferred order for all PPs (regardless of argumenthood).
(Cinque 2006, see especially p148-152)

b. *Rigid arguments/flexible adjuncts*:
The syntax determines a preferred order for argument PPs, but the order of adjunct PPs is syntactically flexible.
(Hornstein & Weinberg 1981; Huddleston & Pullum 2002, p225(e); Mihalicek & Wilson 2011, p206)

[55] Many further sources refer to permutability as a diagnostic for the A/AD but are not clear as to whether they assume view (186c) or view (186d). See e.g. Radford 1988, p235; Hornstein & Nunes 2008, p75. See also Toivonen 2016.

c. *Flexible but non-mingling arguments and adjuncts*:
The order of PPs is syntactically flexible within but not across classes (arguments permutable with arguments, adjuncts permutable with adjuncts, but not arguments with adjuncts).
(Culicover & Jackendoff 2005, p130-131; Schütze 2012, p4-5)

d. *Syntactic flexibility*:
The order of all PPs (regardless of argumenthood) is syntactically flexible.
(Hawkins 2000, p246-248; Wasow 2002)

I will now review how each stance pertains to the A/AD. First, take the strongest stance on PP permutability, position (186a). This view holds that both arguments and adjuncts are strictly ordered hierarchically. This is the view of Cinque and others working along strict cartographic lines, with the assumption that both argument PPs and adjunct PPs are merged as part of an ordered functional hierarchy. Notice that on this approach, argumenthood is in fact irrelevant to determining the relative order of VP-internal PPs. Instead, every PP (arguments and adjuncts alike) will be merged in a dedicated extended verbal position, so some syntactic rearrangement will be required for any permutation of the single default order.

The slightly weaker view (186b) holds that arguments are strictly ordered among themselves, while adjuncts are not, and that in general arguments must appear closer to the verb than adjuncts. This is perhaps the most mainstream assumption, appearing in Hornstein & Weinberg (1981), Huddleston & Pullum (2002), Mihalicek & Wilson (2011) and others. Here, argumenthood is claimed to play an important role; argument PPs must precede adjunct PPs. We could then take *permutability* to distinguish arguments from adjuncts: if two PPs can be permuted, they are adjuncts. If not, either they are both arguments, or the one closest to the verb is an argument.

The yet weaker view (186c) agrees with (186b) that arguments must appear closer to the verb than adjuncts, but does not agree that arguments are strictly ordered. Instead, arguments can be ordered freely, just as adjuncts can, as long as all the arguments end up closer to the verb than all the adjuncts. This is the position of Culicover & Jackendoff (2005) and Schütze (2012). Again, argumenthood is thought to matter here, but in a somewhat weaker way than in (186b). According

to view (186c), the A/AD property of *permutability* would refer to the prediction that if two PPs cannot be permuted, then the leftmost one is an argument and the rightmost one an adjunct.

The weakest position in this regard is (186d), holding that the ordering of arguments and adjuncts is not determined by syntactic principles at all, but is subject entirely to independent principles like prosodic weight, information structure, and ease of processing. Argumenthood would play no role on this view, as its proponents explicitly acknowledge (e.g. Hawkins 2000, p246-248).

Given this, permutability would only be expected to be relevant for the A/AD if we adopt view (186b) or view (186c). Both approaches assume that arguments cannot be permuted with adjuncts.

As mentioned, the issue of PP-permutability is discussed in greater detail in chapter 4. One major point of that discussion is that there do seem to be syntactically determined preferences for permutation of PPs (some PPs being more easily permutable than others). What I will point out here is that the A/AD-based characterization of PP-permutability is too coarse. Instead, PPs form a number of permutation classes crosscutting the canonical A/AD classifications. To illustrate this, we can consider examples of prototypical adjunct PPs being freely permuted with prototypical argument PPs, as in (187)-(190).

(187) a. Terry argued [$_{\text{Adjunct}}$ for hours] [$_{\text{Argument}}$ with Lee].
b. Terry argued [$_{\text{Argument}}$ with Lee] [$_{\text{Adjunct}}$ for hours].

(188) a. Terry talked [$_{\text{Adjunct}}$ like an expert] [$_{\text{Argument}}$ about the race].
b. Terry talked [$_{\text{Argument}}$ about the race] [$_{\text{Adjunct}}$ like an expert].

(189) a. Terry blew $100 [$_{\text{Adjunct}}$ at the casino] [$_{\text{Argument}}$ on blackjack].
b. Terry blew $100 [$_{\text{Argument}}$ on blackjack] [$_{\text{Adjunct}}$ at the casino].

(190) a. Terry went [$_{\text{Adjunct}}$ with Lee] [$_{\text{Argument}}$ to the store].
b. Terry went [$_{\text{Argument}}$ to the store] [$_{\text{Adjunct}}$ with Lee].

Chapter 4 returns to the issue of permutation classes in greater detail. For the purposes of this chapter, I take data like (187)-(190) to indicate a potential misalignment between the conventional A/AD and the predictions of the A/AD-based approaches to permutability (186b) and (186c). This

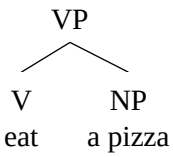
would pose a problem for the permutability diagnostic from the perspective of the heuristic criterion.

Additionally, the existence of permutation classes creates a problem for the A/AD-based accounts of permutability (186b) and (186c), from the perspective of the no-independent-motivation criterion: even if the permutation classes did not cross-cut the conventional A/AD, we would still then need an *A/AD-independent* explanation for permutation constraints *within argument-type*. I.e., there would need to be some way of explaining why some adjunct PPs cannot be permuted with other adjunct PPs, and why some argument PPs cannot be permuted with other argument PPs. This would obscure any contribution of the A/AD. The idea that the syntactic A/AD is needed to predict possible and impossible permutations of VP-internal PPs is therefore dubious.

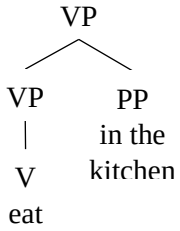
12. Against adjunction in syntax

Adjunction mechanisms in syntax bear a burden of proof. Consider the implementation of the syntactic A/AD in classic X-bar Theory, as in (191).

(191) a. *Argument*:



b. *Adjunct*:



This analysis takes the adjuncts to VP to attach outside VP, projecting another VP, while the arguments to VP are either complements or specifiers (i.e. strictly internal to VP). This classic analysis assigns several distinct syntactic properties to arguments vs. adjuncts. For one, the arguments of a head X^0 *constitute* the category XP projected by X^0, while adjuncts merely *extend* XP. As such, arguments must be *licensed*, i.e. for an argument to appear, there must be an argument position available to host it. In contrast, adjuncts are *self-licensing*.

If arguments and adjuncts have different properties like these, there should be evidence of the differences. The classic analysis just described is formulated to predict several types of empirical evidence. Since arguments *constitute* the projection, they might be expected to be obligatory, and since adjuncts *extend* the projection, they might be expected to be optional. For the same reasons, we would expect arguments and adjuncts to be treated differently by syntactic

operations of anaphora or movement. Assuming that arguments *constitute* XP, then any operation (like anaphora or movement) targeting the level XP would have to apply to the arguments which constitute XP. But such operations would not have to apply to adjuncts, which are merely tacked on at the edge as extensions of XP. Similarly, since arguments must be licensed but adjuncts are self-licensing, we might expect the number of potential arguments to be limited, while the number of adjuncts would be unlimited.

Later GB-Theory attributed further distinct properties to argument vs. adjunct positions. For example, argument positions are *governed*, while adjunct positions are *ungoverned*. This difference was formulated so as to predict that adjuncts would fail to be extracted from weak islands, and would constitute island domains themselves. Some held further that adjuncts could be introduced into syntactic derivations *late* (i.e. counter-cyclically), predicting that they might fail to reconstruct for the purposes of Condition C.

(192) a. Arguments must be licensed; adjuncts are self-licensing.
b. Arguments constitute a projection; adjuncts extend it.
c. Arguments are governed; adjuncts are ungoverned.
d. Arguments are introduced cyclically; adjuncts can be introduced counter-cyclically.

Each of the properties assigned to the distinction between position types is a hypothesis. Specifically, each property is a deviation from the null hypothesis, which holds that there is no difference between argument- and adjunct-position types. As such, each property should be rejected in the absence of evidence that the null hypothesis is inadequate. And if none of the properties are motivated, then the theoretical mechanism (of distinct position types) to which the properties are attributed should be rejected as well.

The same holds for the reformulation of the X-bar analysis in Minimalist terms. Chomsky (2004) proposed that adjuncts are introduced by Pair-Merge, as opposed to Set-Merge for arguments. This proposal reassigns the properties (192) of distinct *position types* to the properties of the distinct *operation types*. Chomsky assumes that Set-Merge applies to check features, for instance (and hence must be licensed), but that Pair-Merge does not check features. Similarly, Pair-Merge of X to Y does not produce a new maximal projection {X, Y}; instead it forms an asymmetric pair <X, Y>, which has the properties of Y, not X. Further, while the notion of government is eliminated in Minimalism, Chomsky (2008, p146-147) argued that a property of

Pair-Merge is *opacity*. Finally, Chomsky assumes that Pair-Merge operates counter-cyclically, in opposition to Set-Merge which obeys Strict Cyclicity. Like the distinction between position types in X-bar Theory, the distinction between Set-Merge and Pair-Merge in Minimalism is a deviation from the null hypothesis, which holds that there is just *one* structure-building operation. Therefore, Pair-Merge should only be adopted if it can be shown that it is motivated by data that Set-Merge alone cannot capture.

The previous eight sections of this chapter (sections 3-10) argued that traditional evidence fails to motivate theoretical distinctions like those in (192) along the lines of the A/AD. Thus, at least among PPs within the VP, evidence fails to support a syntactically-implemented A/AD. Instead, the imminent conclusion is that VP-internal PPs should have essentially the same external syntax, all connecting up with the VP by the same mechanisms. There is not sufficient motivation to adopt the theoretical mechanism of distinct position types as in X-bar Theory, nor is there motivation to adopt two distinct operations for structure building, Set-Merge for arguments and Pair-Merge for adjuncts.

This conclusion is desirable from a Minimalist point of view. The Pair-Merge approach, for instance, involves the stipulation of a syntactic operation beyond "conceptual necessity" (i.e. beyond simplest Merge). The stipulation of such additional mechanisms is antithetical to the goals of the Minimalist Program, which, according to Chomsky et al. (2019), seeks to rise to the challenges of learnability and evolvability. Only relatively poor linguistic data is available to child learners, suggesting (at least some) aspects of syntactic knowledge are not "learned" (the challenge from learnability, i.e. the Poverty of Stimulus argument). At the same time, given the relative recency of Language in the evolutionary record, it is implausible that much (if any) linguistic knowledge is the "hard-wired" product of evolution (the challenge from evolvability). The Minimalist answer to these two problems is the *Strong Minimalist Thesis*, that computational machinery minimal enough to meet both challenges (i.e. simplest Merge) is sufficient to achieve descriptive adequacy. The Pair-Merge approach to adjuncts is a radical deviation from this paradigm. This is explicitly acknowledged by Chametzky (2003, p205-207), Boeckx (2003), Milway (2019, p92-93), and Bode (2020), as well as by Chomsky et al. (2019, p249), who write that "PAIR-MERGE is a formally distinct operation from simplest MERGE, hence raises problems of evolvability. Ideally, it could be shown to be dispensable."

From a strictly conceptual perspective, then, the elimination of the A/AD from syntax is desirable. The simplest answer to the question "what syntactic mechanisms beyond simplest Merge do we need in order to accurately describe adjuncts" is "none." At the same time, the A/AD and the special mechanisms associated with it play a key role in how conventional adjuncts are analyzed. Without adjunction mechanisms like Pair-Merge, it may not be clear how to analyze constructions previously described as adjunction structures. For example, how do conventional adjunct and argument PPs attach to the VP? If there is no A/AD, there need not be two distinct configurations as in (191). But if that's the case, do both conventional arguments and conventional adjuncts attach as in (191a), do both attach as in (191b), or do they attach in some other way? The remaining chapters of this dissertation consider the consequences of eliminating the A/AD in this area and in other domains.

CHAPTER 4

VP Structure without Adjunction

1. Introduction

In the previous chapter, I argued that the conventional A/AD lacks a syntactic correlate. Instead, properties traditionally associated with the syntactic A/AD are independent of each other. I therefore reject the hypothesis that canonical adjuncts are incorporated into syntactic structure differently than canonical arguments are. The kinds of elements canonically considered arguments participate in the structure in the same way as the kinds of elements canonically considered adjuncts.[1]

If correct, this conclusion has numerous theoretical and analytical consequences. Though I cannot discuss them all in this dissertation, the remaining three chapters explore the consequences in several different domains. Of broad relevance to syntactic theory is the non-existence of special syntactic apparatus for adjunction, whether that be the existence of "adjunct positions" as in Government and Binding Theory, "adjunction operations" as in some current approaches to Minimalism (e.g. Pair Merge in Chomsky 2004 or Late Merge in Fox & Nissenbaum 1999), or "adjunct constructions" as in some versions of construction grammar (e.g. Goldberg 2006). These kinds of apparatus are not necessitated by conventional argument/adjunct properties. If the A/AD plays a role in motivating such apparatus (i.e. if the A/AD is part of the evidence for adjunct positions or adjunction operations), then these concepts are undermined by the results of the previous chapter.

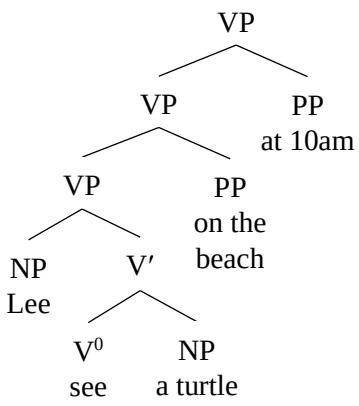
[1] This conclusion does not immediately imply that all dependents have exactly the same structure. It could be that some elements participate differently than others; it's just that this difference does not reflect argumenthood.

The rejection of the A/AD also has consequences for the basic structure of the clause, e.g. with respect to the way that verbal dependents (what would conventionally be considered "arguments" or "adjuncts" of the verb) participate in that structure. For instance, consider a sentence like (1).

(1) Lee [$_{VP}$ saw [$_{NP}$ a turtle] [$_{PP}$ on the beach] [$_{PP}$ at 10am]].

The verb phrase in this sentence contains a canonical argument (*a turtle*) and two canonical adjuncts (*on the beach* and *at 10am*). A configurational distinction between arguments and adjuncts has traditionally been crucial to the analysis of such sentences. The Government and Binding Theoretic analysis, for example, would be something like (2).[2]

(2)



This chapter is concerned with the configurational properties of PPs within the VP. Specifically, the chapter asks, for any given PP dependent of V, such as those depicted in (1), in what position does PP occur relative to V? For example, (2) places the direct object *a turtle* and the VP-internal subject *Lee* in normal A-positions (complement and specifier), and the locative and temporal PPs in right-adjoined positions. As a result, the rightmost adjunct (*at 10am*) is the highest constituent

[2] Here, the "adjuncts" are attached to the double-bar or XP level. Alternatively, adjuncts might be attached to the single-bar or X′ level. This difference is not relevant for present purposes. I adopt the XP-adjunction structure because I see it as more natural. Also, the X′-adjunction analysis faces theory-internal problems which seem not to have been adequately recognized. Operations uniformly target the XP level, not the X′ level. Yet if adjuncts adjoin to X′, then the traditional A/AD-based analysis of VP would require operations target X′. In VP-fronting, for example, V′ would have to be targeted by movement, and in *do so*-substitution, V′ would have to be targeted by substitution. This is all resolved by assuming adjunction to XP, not X′. Thus, there are negative arguments against X′-adjunction and in favor of XP-adjunction. The reasons why X′-adjunction was often assumed are not clear to me.

in the structure; it asymmetrically c-commands the other adjunct as well as the direct object. The leftmost adjunct (*on the beach*) is the next highest constituent in the structure, asymmetrically c-commanding the direct object but not the other adjunct. And the direct object, the closest post-verbal constituent to the verb, is the *lowest* constituent in the structure.

These specific configurational distinctions cannot be maintained if we discard the difference between argument and adjunct positions (as I argue we should). If there is not a configurational distinction between arguments and adjuncts, then we cannot adopt structures that categorically place "adjuncts" in different positions (e.g. right-adjoined positions) than "arguments." If not, what is the right analysis? This is the question with which this chapter is primarily concerned.

In its attempt to address this question, the chapter takes the following form. In section 2, I review a number of previous proposals concerning the structure of the VP. This section does two things. First, it provides background for the following sections, which explore aspects of VP-structure in more detail. Second, it shows that, while the plurality position may carve up the VP into argument vs. adjunct positions, many approaches are compatible with the idea that all post-verbal PPs participate in the structure in essentially the same way (e.g. some hold that all PPs attach to the VP as specifiers of VP, some hold that all PPs attach as right-adjuncts, etc.).

Section 3 then introduces the Labeling Theory of Chomsky (2013, 2015, 2020), and shows how many of the analyses mentioned in section 2 are problematic within this context. Section 3 goes on to develop a new proposal (by adapting an older one), adopting a version of *n*-ary structure building (specifically following Chomsky 2021a, 2021b). Crucially from the perspective of this section, the *n*-ary analysis is compatible with core assumptions of Labeling Theory. Section 4 discusses some further consequences of the new analysis,

N-ary structure is often viewed as undesirable in the context of Minimalism. The reason is partly empirical; numerous phenomena (like quantifier binding, coordination, etc.) have been analyzed in such a way as to imply uniform binary branching in the VP. Section 5 aims to show that an *n*-ary-branching VP could plausibly be compatible with this potentially problematic data set.

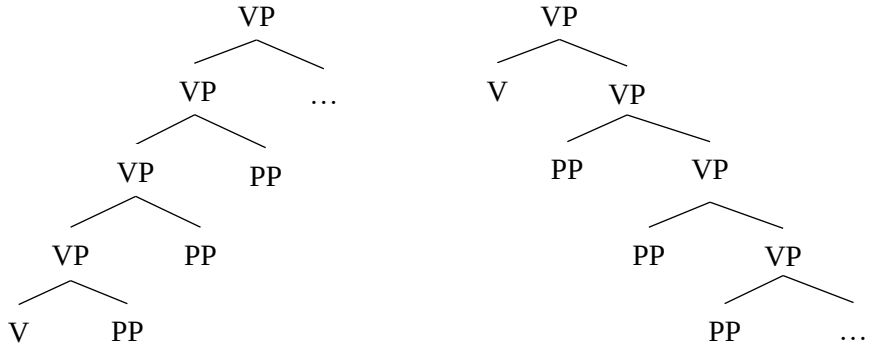
2. Previous accounts

There are a variety of mutually incompatible proposals for the configurational structure of PP dependents within VP. The plurality position seems to be that *arguments* are attached in a rightward-*ascending* fashion, while *adjuncts* are attached in a rightward-*descending* fashion. However, given the results of chapters 2 and 3, there does not appear to be good reason to believe canonical argument PPs and canonical adjunct PPs participate differently in the structure. If there is no A/AD, canonical arguments and canonical adjuncts should participate in the structure in essentially the same way. But now the question arises what exactly the structure looks like. Do all PPs, even canonical *adjunct* PPs, attach in a uniformly rightward-*descending* fashion? Do all PPs, including canonical *argument* PPs, attach in a uniformly rightward-*ascending* fashion? Is the right structure a compromise between these two extremes? Or is it something else entirely, perhaps involving flat structures, or multidimensionality?

It will be useful at this point to comment on the terminology I adapt from Janke & Neeleman (2012). First, I will use the terms *rightward-ascending* and *rightward-descending* to refer to structures traditionally called *left-branching* and *right-branching* respectively. A rightward-ascending/left-branching structure is depicted in (3a), and a rightward-descending/right-branching one in (3b). In the rightward-ascending structure, constituents are structurally higher up the further to the right they are located. For this reason, I adopt Janke & Neeleman's (2012) term *ascending* to describe the left-branching configuration (I prefix the word *rightward* to indicate that the structure is ascended by moving rightward, cf. Larson 2014). Conversely, in the right-branching structure, constituents are structurally *lower* in the tree the further to the right they are located. I therefore adopt Janke & Neeleman's (2012) term *descending* to describe the right-branching structure (also appending the word *rightward*). My feeling is that the *ascending*/*descending* terminology is more transparent than the *right*-/*left*-branching terminology.[3]

[3] Note the different assumptions of the two approaches regarding linearization of syntactic structures. Rightward-descending analyses may adopt an approach based on c-command, e.g. Kayne's (1994) Linear Correspondence Axiom. Advocates of rightward-descending structure must make different assumptions to ensure that PPs are linearized to the right of the verb.

(3) a. *Rightward-ascending VP*: b. *Rightward-descending VP*:[4]



One goal of this section is to demonstrate that, despite the plurality A/AD-based position, many existing analyses already do not depend on the A/AD. In some proposals, PPs (canonical arguments and canonical adjuncts alike) are consistently analyzed as attached to the VP in a uniformly rightward-descending fashion. Some hold the opposite; all PPs attach in a rightward-ascending fashion. Other proposals feature different mixed analyses, where the VP is *both* rightward-ascending *and* rightward-descending. Yet others propose the VP has a flat structure.

(4) a. Rightward-ascending structure for arguments, rightward-descending for adjuncts
(Ernst 1994, 2002; Bruening 2014; Harley 2014)

b. Rightward-descending structure for arguments and adjuncts
(Larson 1988, 1990, Larson 2014, Larson et al. 2019)

c. Rightward-ascending structure for arguments and adjuncts
(Janke & Neeleman 2012; Neeleman 2017; Neeleman & Payne 2020)

d. Rightward-ascending and -descending arguments and adjuncts: roll-up movement
(Kayne 2002, 2004; Schweikert 2005; Cinque 2006)

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[4] The rightward-descending structure normally uses a version of VP-shells (Larson 1988), e.g. (i).

(i) $[_{VP}$ V $[_{VP}$ PP V $[_{VP}$ PP V $[_{VP}$ PP V $[_{VP}$ …

This is not reflected in the diagram (3b), which abstracts away from the issue of projection in these structures. Instead, (3b) is intended to convey the crucial contrast between rightward-ascending vs. -descending structures: in the rightward-descending structures, what's crucial is that the PPs are structurally lower the further they are to the right of the verb. Theories may differ in how that's implemented (e.g. with VP-shells).

e. Rightward-ascending and -descending arguments and adjuncts: dual-structures (Pesetsky 1995, Phillips 2003)

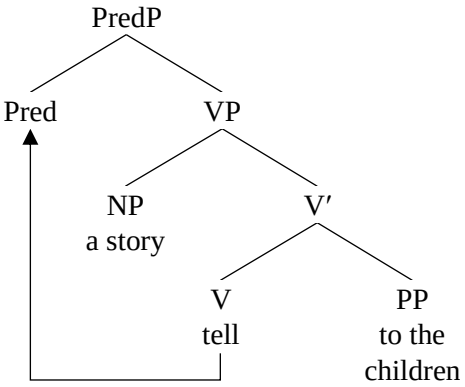
f. Flat structure for arguments and adjuncts (Culicover & Jackendoff 2005)

I will now discuss relevant aspects of these previous analyses in more detail; all but the explicitly A/AD-based position (4a) are technically neutral with respect to the A/AD. The rightward-descending, rightward-ascending, and flat-structure analyses (4b), (4c), and (4f) are given further attention in later sections, where I consider what configuration best describes VP-PP constructions.

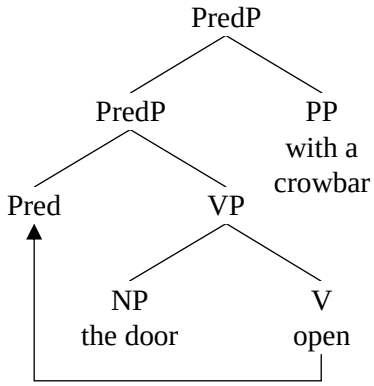
2.1. A/AD-based structures

Naturally, we should begin by reviewing the plurality position that arguments and adjuncts attach to the VP in distinct ways. As one example, Ernst (2002) holds that *argument* PPs attach to the VP in a rightward-descending fashion, while *adjunct* PPs attach in a rightward-ascending fashion. Compare the structure he assigns to *tell a story to the children*, shown in (5) (from his p211), with the structure he assigns to canonical adjunct PPs such as instrumentals, as shown in (6) (cf. his p289ff).

(5)



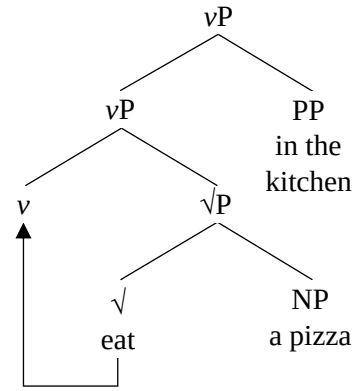
(6)



We see that the PP *to the children*, considered a canonical argument, enters the structure a complement to V in (5). In contrast, the canonical adjunct *with a crowbar* in (6) attaches as sister to PredP.

Another approach comes from Harley (2007, 2014). As already discussed in chapter 3, on Harley's view, arguments are introduced below *v*, while adjuncts are introduced above *v*. (7) illustrates with a typical argument of *eat* (*a pizza*) and a typical adjunct to it (*in the kitchen*).

(7)



This approach could be said to share with Ernst's the property (4a) – rightward-descending structure for arguments, rightward-ascending structure for adjuncts. This is because Harley takes additional arguments to be introduced as specifiers of dedicated functional projections.

This is exactly the sort of dichotomy which I reject based on the results of chapters 2 and 3. Since the classical diagnostics for argumenthood fail to identify a distinction between argument PPs and adjunct PPs, the motivation for a configurational dichotomy like this is poor. We must

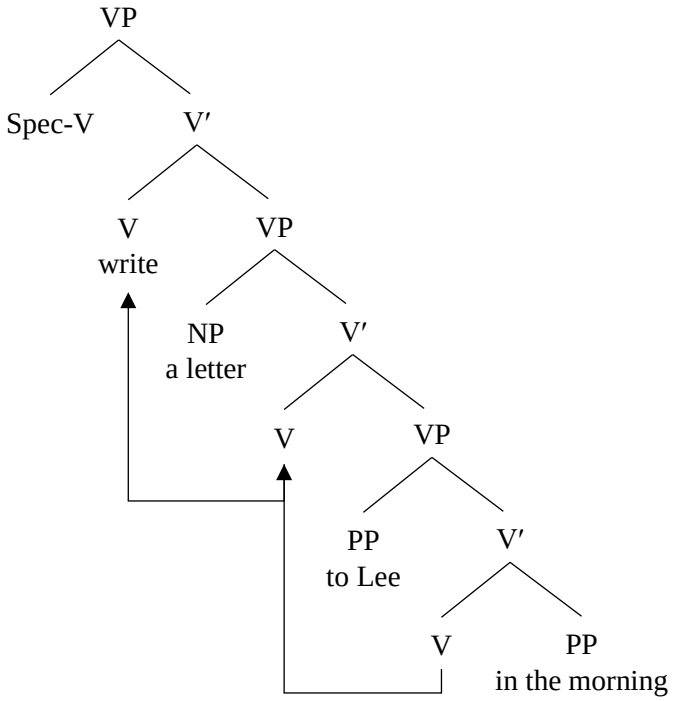
therefore stick to the null hypothesis that PPs (conventional arguments and adjuncts alike) all participate in the structure in the same way.

I will therefore reject the idea that argument PPs attach in a rightward-descending fashion and adjunct PPs in a rightward-ascending fashion. Instead, an adequate analysis of VP structure does not make a distinction in the attachment sites of different PPs in terms of argumenthood. The remaining analyses I discuss in this section (sections 3.2-3.6) are all compatible with this idea.

2.2. Uniform rightward-descending structures

One alternative to A/AD-based structure comes from Larson (1988), who first proposed that all PPs attach to the VP in a rightward-descending fashion. He argued that many constituents traditionally analyzed as *complements* to V are in fact *specifiers* of V. Any time more than one "complement" is present, all but the rightmost one are specifiers in a recursive VP-shell. Thus, VP-final adjuncts (which are analyzed as the structurally *highest* elements in the VP on the traditional analysis) are treated as "innermost complements." The structure in (8) illustrates how Larson's VP-shell analysis accommodates canonical arguments and canonical adjuncts in the same way; both are specifiers of V.

(8) *VP-shell structure (Adapted from Larson 1988, p346, fn11)*:



An important aspect of Larson's approach, from the perspective of this chapter, is that it treats canonical adjuncts the same way as canonical arguments. Even if adjuncts are stipulated to attach lower than complements in the VP shell, there is no qualitative difference in the way they participate in the structure when compared to argument PPs. Strikingly, Jackendoff (1990, p452) *criticized* Larson's treatment of adjuncts on just these grounds; as he said, Larson's approach "completely neutralizes the structural distinction between arguments and modifiers." In other words, the VP-shell proposal eliminates the syntactic A/AD. Jackendoff at the time saw this as a drawback of the proposal. However, given the evidence in chapters 2 and 3, this aspect of the proposal can be construed as an advantage, rather than a drawback.

In fact, to differentiate arguments from adjuncts requires an appeal to extra machinery. In responding to Jackendoff's (1990) criticism, Larson (1990, p621) claimed that, to the extent that arguments do need to be distinguished from adjuncts syntactically, this can be accomplished by appeal to *selection*; arguments are semantically selected, while adjuncts are not. That issue is addressed in chapter 2 (see the section on compatibility); the evidence for a selectional distinction between arguments and adjuncts is weak. But even if there *were* a semantic A/AD to draw on,

Larson's appeal to the semantic A/AD would only predict syntactic contrasts if it has some syntactic realization, which would amount to a stipulation of the syntactic A/AD.

Thus, the VP-shell analysis does not depend upon the A/AD, but is equally coherent without it. It posits uniform rightward-descending structure for all post-verbal dependents.

2.3. Uniform rightward-ascending structures

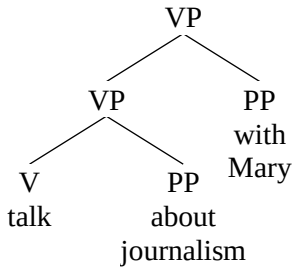
A second, opposite approach holds that all PPs are right-adjoined to the VP, including PPs canonically considered adjuncts and those canonically considered arguments. An example of such an approach comes from Janke & Neeleman (2012). According to them, a VP-shell structure is only projected for reasons of Case Adjacency (Stowell 1981); NP objects must be adjacent to their case-assigning verbs. Thus, if a verb's second complement is an NP, a VP-shell structure is required to satisfy Case Adjacency.

(9) a. *[$_{VP}$ [$_{VP}$ V XP] NP]

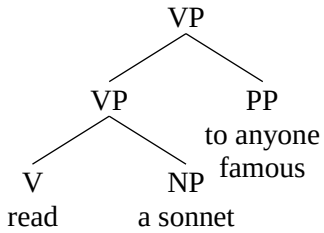
b. [$_{VP}$ V [$_{VP}$ NP [$_{V'}$ V XP]]]

Outside this context, any PP will attach to VP in a uniformly rightward-ascending fashion. This can be seen in Janke & Neeleman's analysis of verbs taken to have PP complements. The verbs in (10) illustrate this; Janke & Neeleman assume the verb *talk* takes an *about*-phrase complement and a *with*-phrase complement, and that the verb *read* takes a *to*-phrase complement. In each case, the PPs attach in a rightward-ascending fashion.

(10) a.



b.



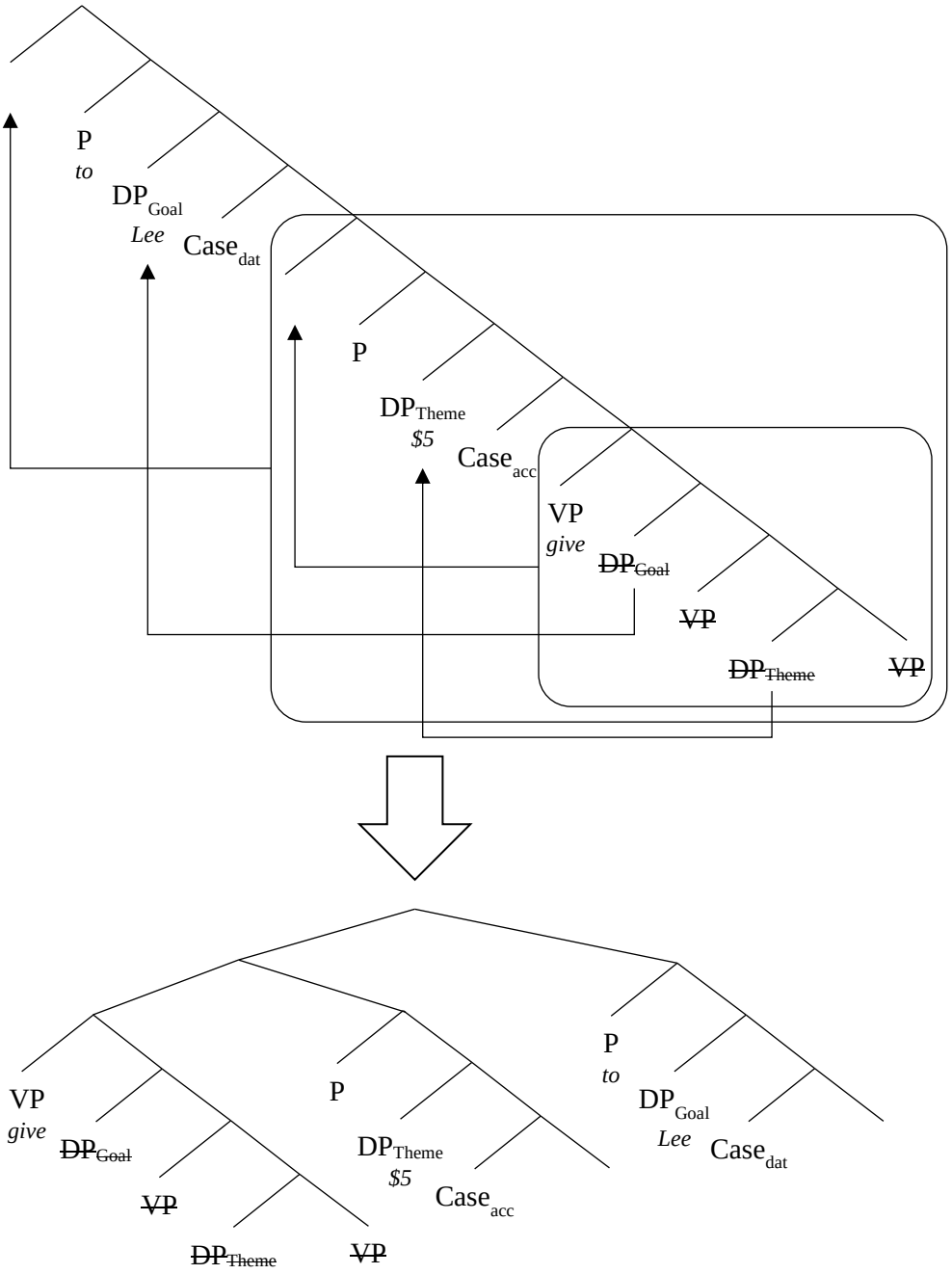
This approach does not require a configurational distinction between arguments and adjuncts. Both attach in the same way, as right-adjuncts.

2.4. Roll-up structures

Cartographic approaches such as Cinque's (1999, 2006) or Schweikert's (2005) also effectively neutralize the distinction between arguments and adjuncts. According to Cinque (1999), canonical adjuncts are merged into a hierarchically organized sequence of functional projections. This sequence includes adverbs and participant PPs, as well as canonical arguments. Cinque (2006) argues that complement PPs are derived by Merge of P above VP, followed by roll-up movement of lower PP projections. The derivation of a VP like *give $5 to Lee*, with two canonical argument PPs, a Theme and a Goal, would proceed as in (11).[5] (Importantly, a sentence with canonical adjunct PPs would be derived in the same way, as I discuss shortly.)

[5] An assumption for this structure is that the THEME of *give* is introduced by a null preposition. As discussed in chapter 2, I assume for the purposes of this dissertation that such elements are introduced by *v*, not by a null preposition.

(11) *Cartographic Argument PPs (Adapted from Cinque 2006, p158)*:



Following Kayne (2002, 2004), Cinque takes oblique DPs to be generated in extended projections of VP, raising to higher prepositional projections to receive case. In this system, the leftmost complement PP is the most deeply embedded, with roll-up movement to the edge of each PP. Here, the VP first moves to Spec-PP_{Theme}, yielding the linear order V < PP_{Theme}. Then, the entire PP_{Theme}, including the VP in Spec-PP_{Theme}, raises to the higher Spec-PP_{Goal}. The end result is that the verb precedes both PPs, with PP_{Theme} preceding PP_{Goal}, as desired.

What's critical for the present discussion is that, according to Cinque, the derivation of canonical adjunct PPs proceeds in exactly the same way. For a sentence with two adjuncts rather than two arguments, say a Locative and a Temporal, Cinque proposes the same derivation with Locative substituted for Theme and Temporal substituted for Goal (see Cinque 2006, p158). A VP containing both arguments and adjuncts would simply have the adjuncts stacked on top of the arguments. Thus, the cartographic approach takes arguments and adjuncts to have the same external syntax. To *distinguish* arguments from adjuncts on this approach would take an arbitrary stipulation placing a concrete boundary somewhere in the functional spine, the projections below which would be considered arguments, and those above, adjuncts. In the absence of evidence for the A/AD, no such stipulation need be made.

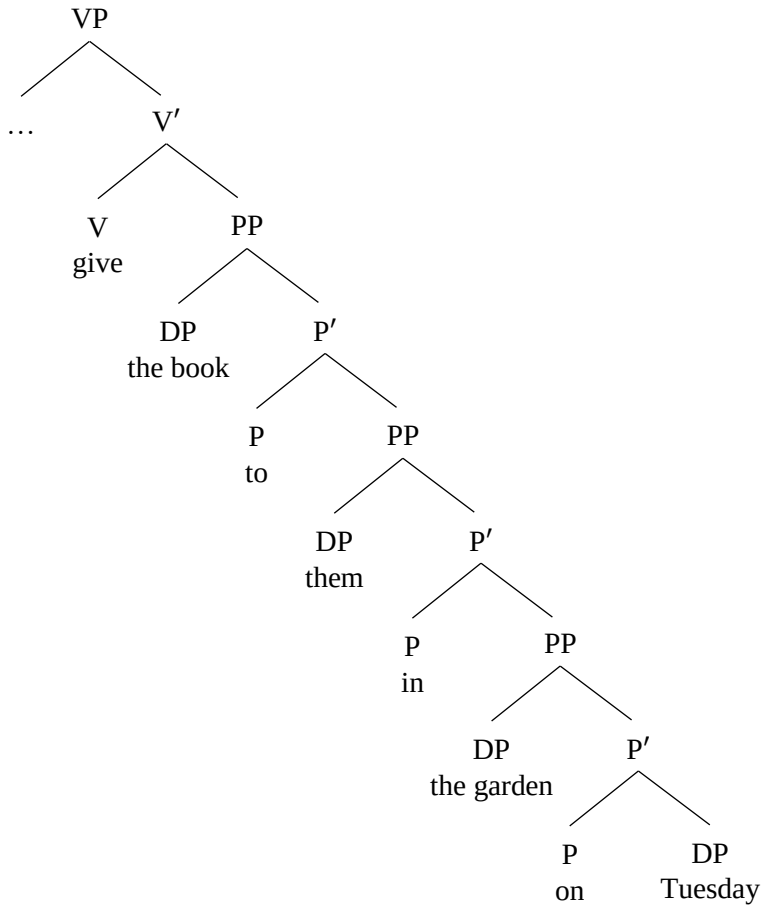
Though the roll-up approach can capture an impressive range of properties (such as those discussed in section 5 below), it struggles to account for the fact that many PPs are freely permutable. Ernst (2002, p236ff) discusses these difficulties in great detail. Additionally, the roll-up approach can be viewed as problematic on the more general grounds that it involves a large number of unmotivated movements (Culicover & Jackendoff 2005), and that it presupposes the Linear Correspondence Axiom (which may be seen as incongruous with the dissociation of syntax and linear order, in addition to being empirically tenuous). I will therefore not consider the roll-up approach further below. For the purposes of this chapter, it simply serves to illustrate that a configurational A/AD in the VP is unnecessary.

2.5. Dual structures

A further analysis, in a similar vein to VP-shells, is the *dual structure approach* of Pesetsky (1995) and Phillips (2003). In this analysis, uniformly rightward-descending "cascade" structures co-exist with rightward-ascending or flat structures. Cascade structures share with VP-shells the "rightward

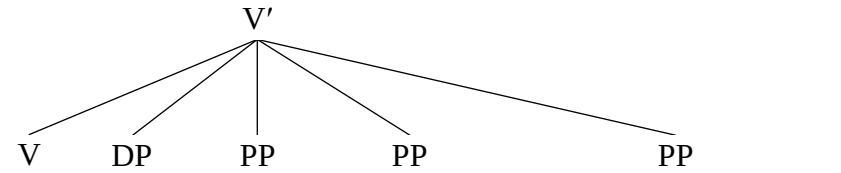
is downward" property, such that arguments and adjuncts successively further to the right in a clause are successively more deeply embedded. Where Larson (1988) accomplishes this with VP-recursion, cascade structures do so with PP-recursion. The tree in (12) illustrates the proposed structure (Pesetsky 1995, p229). Canonical adjuncts, like locatives and temporals, participate in the structure in the same way as canonical arguments, like themes and recipients.

(12) *Cascade structure*:



The cascade structures are supposed to exist in parallel with an alternative "layered" structure, which may be partially rightward-ascending or totally flat. This is illustrated in (13), based on Pesetsky 1995, p233. See also his p230-232.

(13) *Layered structure*:



While the dual structure approach can capture any or all of the properties discussed, I reject it on methodological grounds; it violates core principles of scientific parsimony. Such an approach can only be adopted after descriptive adequacy requires rejection of all simpler alternatives. I will assume that theories postulating a single structural representation for a given sentence[6] are categorically more parsimonious than a theory postulating more than one simultaneously. Thus, we cannot accept dual-structures until it can be shown that single-structure approaches are descriptively inadequate.

I therefore do not consider the dual-structure approach in any more detail in this chapter. Instead, it simply serves to add credibility to the idea that structural differences between argument vs. adjunct positions are not needed in the structure of the VP.[7]

2.6. Flat structure

A final approach holds that the VP lacks any internal hierarchical structure at all. Instead of being comprised of binary layers, the VP has a single layer into which all kinds of arguments and adjuncts attach. This might be considered the traditional approach to the structure of VP (see e.g. Huddleston & Pullum 2002), though flat structure has been disfavored in the mainstream in recent years.

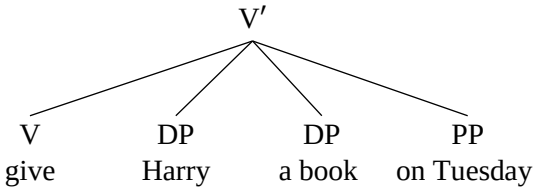
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[6] Under a particular interpretation.

[7] It is worth noting that Pesetsky (1995, p183-185) does explicitly distinguish between arguments and adjuncts using cascade structures, but in doing so, he is forced to make an arbitrary stipulation: the specifiers of the first and second PPs in a cascade can be arguments, while the specifiers (and complements) of all more deeply embedded PPs are adjuncts. In (12), *the book*, being the specifier of the first PP in the cascade, and *them*, being the specifier of the second PP in the cascade, would be arguments of *give*, while *the garden* and *Tuesday* would be adjuncts. If there is no syntactic A/AD, this stipulation becomes unnecessary, and the system is concomitantly simplified.

One example of this approach comes from Culicover & Jackendoff (2005, Ch4). They argue for a flat-structure analysis of VP, about which they write that "there is no syntactic difference between arguments and adjuncts in VP: they are all simply attached to a flat VP in the appropriate linear order," (p289).[8] I give an example in (14) of this analysis applied to the VP *give Harry a book on Tuesday* from Culicover & Jackendoff (2005, p109).

(14) *Flat structure*:



They justify this structure with arguments *against* the various pieces of evidence purportedly supporting hierarchical structure. According to Culicover & Jackendoff, all the standard arguments in favor of multiple VP projections fail.

Given a flat-structure analysis like this, there is no difference in the way canonical argument PPs participate in the structure as compared to canonical adjunct PPs. Both are sisters to V, with no special argument/adjunct properties needing to be stipulated.

It is worth noting that the flat-structure approach of (14) is a somewhat more radical deviation from mainstream generative thinking than any of the other approaches I considered. Specifically, the other approaches are all compatible with the contemporary consensus that syntactic structure is binary, licensed by the allegedly simplest possible operation of structure building, binary Merge. Clearly, (14) could not be generated by such an operation. Perhaps, then,

[8] While Culicover & Jackendoff argue against the *configurational* distinction between arguments and adjuncts, they implement the A/AD in other ways. For example, they assume that the A/AD is realized syntactically in terms of linear order, such that arguments must precede adjuncts (p130). In addition, some of their syntactic constructions reference the A/AD; Culicover & Jackendoff's *do so* construction (p289-290), for instance, allows "adjuncts" but not "arguments" to co-occur with *do so*.

the burden of proof should be greater for flat-structure theories which maintain *n*-ary-branching structure.

That said, this line of reasoning (against (14) and in favor of binary structure) must be balanced against various critical counterweights. For example, taking up the conceptual "simplicity" scalpel, consider that flat structures can be straightforwardly *labeled* in the system of Chomsky (2013, 2015), where none of the other structures reviewed above can. I discuss this in more detail in section 3.1. In brief, Chomsky's system takes the label of an object to be determined by Minimal Search applied to that object. The label is the unique output of Search (if there is a unique output; otherwise labeling fails). In the case of head-complement configurations, Search finds the head H; H then serves as the label. Flat structures like (14) with multiple complements are labelable in just the same way; Search returns the head V, which provides the label for the object. Binary structures like (5)-(12) cannot be labeled straightforwardly in this way, as pointed out by Milway (2019, p91-92).

Another potential advantage of flat structure concerns the distinction between "adjuncts" and specifiers. As Boeckx (2003, p98-99) points out, specifiers and canonical adjuncts have distinct properties. Focusing on English, specifiers always appear on the left, while adjuncts sometimes appear on the right, for example (sometimes exclusively on the right, cf. Ernst 2002, p289ff). In this respect and several others, canonical adjuncts behave more like prototypical complements than like prototypical specifiers. In no respects do they behave more like specifiers than like complements.[9] If the differences between complements and specifiers translate into the present framework,[10] it would be an advantage of (14) that it unifies canonical adjuncts with *complements*, rather than unifying them with *specifiers* as in rightward-descending structures.

Finally, as I discuss in more detail in section 3.3.2, there are strong empirical reasons to reject strict adherence to binarity. Flat structure is needed to capture the existence of unbounded,

[9] This is in spite of the fact that adjuncts and specifiers have frequently been treated as a natural class, e.g. Huang (1982), Lasnik & Saito (1994), Kayne (1994).
[10] In the framework adopted in this dissertation, "complement" and "specifier" are not syntactic primitives.

unstructured coordination (Chomsky 2019b, 2021). The idea that structure building is strictly binary is therefore descriptively inadequate, nullifying the simplicity argument for strict binarity.

3. Prepositional phrases and Labeling Theory

This section considers the flat-structure analysis of the VP in further detail. Two relevant aspects of this analysis were mentioned briefly in section 2.6. First, among the proposals discussed in section 2, the flat-structure analysis is unique in its potential compatibility with Labeling Theory. However, it also has the potential drawback of requiring *n*-ary branching, which cannot be generated under the traditional understanding of Merge.

Here, I give a more formal characterization of both these issues (i.e. the problem of labeling and the problem of *n*-ary branching). Section 3.1 first reviews the basic principles of Labeling Theory, as developed by Chomsky (2013, 2015, 2020). Section 3.2 then shows how PP-specifiers or adjuncts would pose a problem in this system. Finally, section 3.3 discusses how recent proposals regarding *n*-ary structure building could circumvent the labeling problem by facilitating a flat-structure analysis.

I will then turn in section 4 to potential limitations of the flat-structure analysis, and will discuss potential consequences of extending it.

3.1. Labeling Theory

Since Chomsky (1995), it has been customary to describe syntax in bottom-up, derivational terms. A fundamental component of the Minimalist framework associated with this type of thinking is the structure-building operation *Merge*, defined along the lines of (15). The element *z* is the "label" of the output object $\{z, \{x, y\}\}$. Traditionally, *z* is assumed to be equal to either *x* or *y*.

(15) $\text{Merge}(x, y) \rightarrow \{z, \{x, y\}\}$

This definition from Chomsky (1995) has a variety of properties making it suitable for structure building in syntax. Most importantly, it enables generation of an unbounded array of hierarchically structured objects. It also has two subtypes, either *x* is a term of *y* or *x* is not a term of *y*.[11] If the

[11] The converse statement, "either *y* is a term of *x* or *y* is not a term of *x*," yields the same two subtypes.

former, then *Internal Merge* results. If the latter, *External Merge* results. This has the desirable consequence of enabling syntactic movement at zero cost (Kitahara 1994, Chomsky 2005).

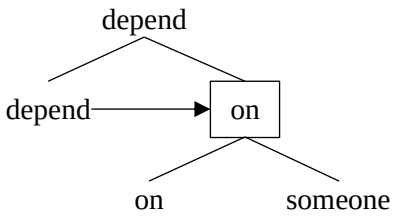
Since its proposal, critical aspects of Merge's original definition have come under scrutiny. I will discuss three potential criticisms in this section, along with the changes to Merge's definition which the criticisms have led to. The first of these, taken up in this subsection, involves labeling. The other two issues (involving the syntactic workspace and the concept of binarity) are taken up in section 3.3.

Concerns about the *labels* created by Merge have been present since at least Collins 2002 (see also Seely 2006). According the definition (15), Merge applied to objects *x* and *y* does two things, (i) it joins *x* and *y* into a single object, and (ii) it generates a label *z* for this new object. Collins argued that the labeling component was unnecessary; Merge can be defined without incorporating a label. Instead, labeling can be treated as a form of Search. This alternative version of Merge (called "Simplest Merge" by Chomsky 2013, 2015; Epstein et al. 2015) can be defined as in (16).

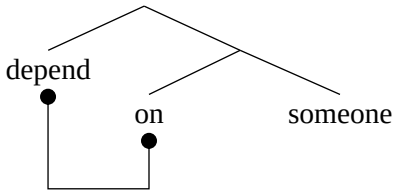
(16) Merge(x, y) → {x, y}

Collins, for example, highlighted the fact that certain syntactic phenomena which might be taken to reference the *label* of an object can be captured by referring to the object's head. Subcategorization (or *c-selection*) requirements, for instance, might naturally be viewed as following from a relationship between a head H and the label of its complement, as illustrated in (17a). However, Collins pointed out that, since the label of an object corresponds to one of its members (according to Chomsky 1995), the same relation could be established simply by applying Search to H's complement. As shown in (17b), this search operation would result in a relation being established between H and the head of its complement. This accomplishes the same thing that label-based subcategorization does, without the need to assume labels as part of syntactic structure.

(17) a.



b.



The idea that a constituent's label could be determined by Search was adopted and further developed in the 2010's, for example by Ott (2012), Chomsky (2013, 2015, 2020), Saito (2016), Epstein et al. (2016, 2017b), Al-Khalaf (2019), Ke (2019), and Carstens (2020), among others. Chomsky's work in particular adopted the view that labeling is a prerequisite for interpretation at the interfaces. In other words, derivations converge at the interfaces if and only if every constituent can be labeled. Thus, although labels need not be present in Narrow Syntactic representations generated by Merge, they must be *uniquely deducible* from these representations at the interfaces.[12]

(18) A derivation converges at the interfaces iff every term of X is labeled.

The nature of the *labeling algorithm* was also more carefully investigated in this work. Ott (2012) and Chomsky (2013) argued (building on distantly related suggestions from Moro 2000) that an object X's label is the *unique output of Search* applied to X.[13]

(19) The label of X is the unique output of Search applied to X.

If there is no such unique output, then X is not labeled. Given the requirement that every object must be labeled, then, some Merge-generable structures are uninterpretable at the interfaces (since they cannot be labeled). The most troublesome such structures are XP-YP configurations, i.e.

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[12] I assume this requirement must be met by the end of the derivation, when interpretation must ultimately be resolved (McInnerney 2022).

[13] For detailed illuminating discussion of the nature of Search, including in the context of labeling, see Ke (2019, 2021). For the purposes of this dissertation, I assume Search is an on operation Σ defined for a search domain D and a search target T along the lines of (i). Compare with Ke 2019, p44. See also Epstein et al. (2020).

(i) a. If $\{ d \in D \mid d \text{ matches T} \} \neq \emptyset$, then return $\{ d \in D \mid d \text{ matches T} \}$.

b. Otherwise,

1. If $\{ d \in D \mid d \notin \text{lexicon} \} = \emptyset$, then return $\emptyset$.

2. Otherwise, return $\Sigma(\bigcup_{d \in D} \{ d \mid d \notin \text{LEXICON} \}, T)$.

For labeling, the search target is any feature, which returns the highest feature(s) within the search domain.

structures in which two non-heads are Merged. Minimal Search returns both the head X of XP and the head Y of YP. In the general case, this result does not qualify as a unique label, meaning that XP-YP structures are in general not labelable, and fail to converge at the interfaces.

Two resolutions to this problem have been proposed. First, an XP-YP configuration is labelable if the heads X and Y share prominent features, as in the case of agreement.[14] According to Chomsky (2013), the constituent created by Merge of a subject phrase and a T′ projection, though it qualifies as an XP-YP structure, can be labeled, because the heads of the two projections agree. Assuming that the head of a nominal is D or N, then T and D/N agree, and the resulting co-varying features can serve as the label of TP.

XP-YP structures can also be labelable if either XP or YP undergoes Internal Merge. The idea is that only the head of a chain is accessible to Search; the tail of a chain (along with any intermediate links) is inaccessible. Since labeling involves Search, once an object is targeted by Internal Merge, it ceases to be visible for labeling. Thus, if XP undergoes IM, then only YP is accessible to Search, and a unique label can be returned (i.e. Y).

There are thus three conditions under which a constituent is labelable:

(20) For a constituent α,

a. If α = {H XP}, where H is a head and XP is not, then α is labeled H.

b. If α = {XP, ~~YP~~}, where XP and YP are headed by X and Y respectively, where YP is inaccessible, then α is labeled X.

c. If α = {XP_F, YP_F}, where XP and YP are headed by X and Y respectively, where X and Y share feature(s) F, then α is labeled F.

d. Otherwise, α is not labeled.

To illustrate more concretely, consider the derivation of a sentence like (21).

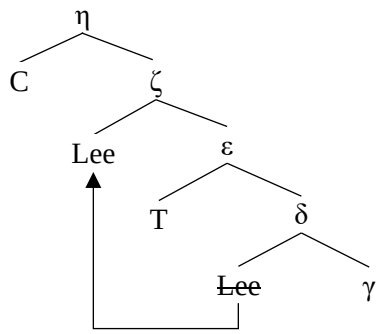
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[14] This follows as a reflex of Minimal Search. Assuming labeling of a constituent X involves search for features in X, labeling of an XP-YP configuration returns the features of X and Y. Labeling succeeds only if search returns a *unique* result; hence X and Y must share features.

(21) Lee sees Terry.

Take the derivation of the CP phase in this sentence. We assume that the VoiceP phase (Chomsky's *v**P) has already been completed, with γ corresponding to what would be called Voice′ in X-bar terminology (eventually spelled out as *sees Terry*).

(22)



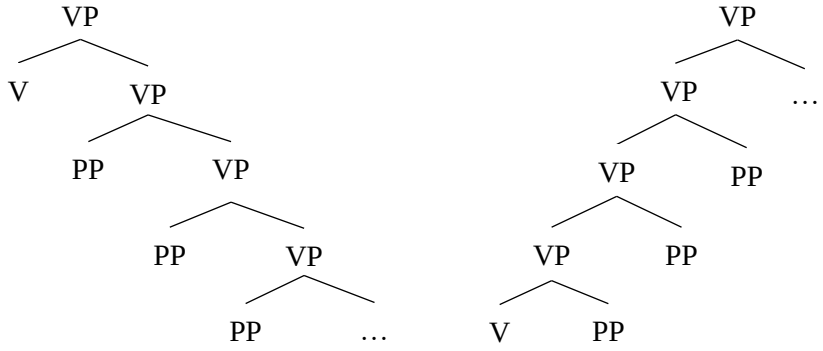
In this structure, labeling case (20a) applies for ε, labeled T, and η, labeled C. That is because Minimal Search applied to ε returns T, and Minimal Search applied to η returns C. Case (20b) applies for the object δ. So δ receives the label of γ (i.e. *v*), because ~~Lee~~ is invisible (being the tail of a chain). Finally, case (20c) describes labeling of ζ. Since the subject Lee agrees with T, ζ can be labeled with shared features.

3.2. The labeling problem of PPs

Let's now return to VP-PP structures. Section 2 outlined several different approaches to the configuration of PPs within the VP. Of these, the two most fundamental ones are the uniform rightward-descending approach, and the uniform rightward-ascending approach.[15]

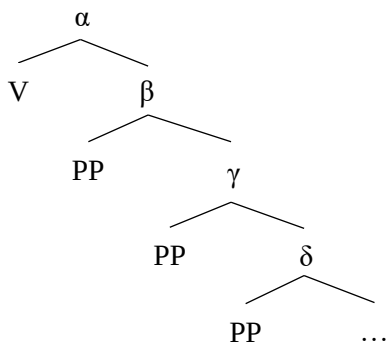
[15] Note that the rightward-descending structure is typically implemented with a version of VP-shells.

(23) a. *Rightward-descending VP*: b. *Rightward-ascending VP*:



In both approaches, there is an extended verbal projection, with PPs adjoined to this projection either on the left (usually as specifiers) or on the right. Yet in the context of Labeling Theory, labels must be determined via the search-based labeling algorithm. As Milway (2019, p91-92) points out, this poses a problem. Consider how this would apply for the rightward-descending analysis. The tree diagram in (24) shows relevant aspects of the structure.

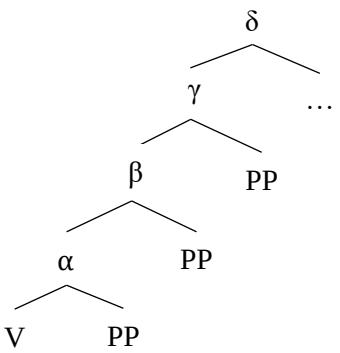
(24)



The constituent α could be labeled straightforwardly. As a head-complement configuration, Minimal Search applied to α yields a unique output, namely V. However, the other projections β-δ are XP-YP configurations, which are only labelable under the specific conditions where either (i) X and Y agree or (ii) XP or YP is extracted. Neither situation holds for β-δ. Labeling is therefore predicted to fail for this structure.

The rightward-ascending analysis has essentially the same problem. The tree diagram in (25) shows relevant aspects of the rightward-descending structure.

(25)



The object α is a head-complement configuration, and as such it can be labeled straightforwardly via Minimal Search. However, β-δ are XP-YP configurations, and the necessary conditions for labeling do not hold here. I.e., I assume the PPs do not move, and I assume they do not agree with V. As such, β-δ are predicted to be unlabelable.

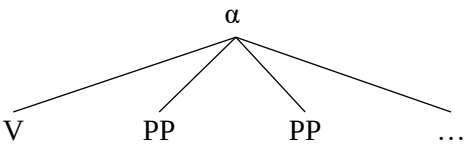
The rightward-ascending and rightward-descending analyses for VP-PP structures are therefore problematic from the perspective of labeling. This means that the other mixed approaches (A/AD-based structures, roll-up structures, and dual structures) discussed in section 2 are problematic as well. These all involve the basic configurations (24) or (25) in some way, and so the same labeling problems are present in these approaches as well.

Thus, almost all the proposals discussed in section 3 make liberal use of unlabelable XP-YP configurations. Of course, any of these approaches could get around the labeling issue by assuming adjuncts are introduced by special operations, like Pair Merge: if Pair Merge results in an asymmetric pair, labeling will arguably be determinate. However, given the arguments of this dissertation, we cannot accept this operation, meaning that structures like (24) and (25) are indeed problematic from the perspective of Labeling Theory.

3.3. Labeling via multiple complementation

As noted in section 2.6, if we take Labeling Theory into account, the flat-structure analysis becomes attractive. If postverbal PPs are arranged in a flat structure, all complements to V, then the search-based labeling algorithm would identify the head V as the unique label of the full VP.

(26)



It would therefore be desirable to be able to adopt representations like (26) for VP-PP structures. However, although similar structures were entertained in the context of early generative syntax and continue to be defended by some (e.g. Culicover & Jackendoff 2005), the mainstream position is to reject them. Thus, the commitment to binary branching is codified in the definition of Merge as a binary operation.

With Merge as the only structure-building operation, *n*-ary structures simply cannot be generated. To entertain (26) for VP-PP configurations therefore requires an operation other than the standard, binary Merge. This in turn requires strong justification. This subsection provides arguments in this direction. First, I review necessary background on the syntactic workspace, following recent work by Chomsky (2019a, 2019b, 2021a, 2021b). I then discuss the *n*-ary formulation of Merge, and provide empirical reasons to adopt such a formulation over a strictly binary one.

3.3.1. The syntactic workspace

As mentioned in section 3.1, Merge has traditionally been understood as an operation mapping from syntactic objects to syntactic objects.

(27) Merge(x, y) → {z, {x, y}}

The early definition (27) has been criticized for a number of reasons, three of which concern us here. The first, involving the label z, was the focus of section 3.1. As discussed, there are reasons to prefer a version of Merge without labels. This has been called Simplest Merge, as mentioned.

(28) Merge(x, y) → {x, y}

We can now turn to a second critique of this operation, focusing on the concept of *accessibility*. Merge is restricted in its application to objects which are *accessible* to it, including elements in the lexicon and elements which were accessible at the previous application of Merge. In general, once

an object is generated by Merge, it becomes accessible to later iterations of Merge.[16] To accommodate this, Merge must refer to and update a memory space.

We can illustrate this property by considering the illegitimate derivation in (29). Let *x*, *y*, *w*, and *z* stand for lexical items. Also, the stages shown in (29) are intended as a complete derivation; no prior derivational steps should be inferred.

(29) a. Merge(x, y) → $\{x, y\}$

b. Merge($\{x, y\}$, $\{w, z\}$) → $\{\{x, y\}, \{w, z\}\}$

This derivation is illegitimate, because it requires Merge to apply to an object $\{w, z\}$ which it did not generate. For any given application of Merge, the inputs must be outputs of a previous application of Merge (unless the inputs are lexical items).

Compare with the legitimate version (30).

(30) a. Merge(x, y) → $\{x, y\}$

b. Merge(w, z) → $\{w, z\}$

c. Merge($\{x, y\}$, $\{w, z\}$) → $\{\{x, y\}, \{w, z\}\}$

Here, Merge only applies to lexical items or elements which it constructed previously. In steps (30a) and (30b), Merge applies to lexical items, and in step (30c), it applies to the outputs of steps (30a) and (30b). Thus, every targeted object is generated at a previous stage.[17]

To capture this property, we can understand Merge to update a set of already-generated objects, and to be restricted in its application to the terms of this set. Following Collins & Stabler (2016), among others, we can call the set of already-generated objects accessed by Merge the *Workspace* (WS), and we can understand Merge as an operation on the WS (i.e. the WS is one of the arguments of the Merge operation).

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[16] There are exceptions. Constituents cease to be accessible when they are transferred (the Phase Impenetrability Condition), and when they undergo Internal Merge (Inaccessibility of Lower Copies).

[17] As Chomsky (2019a, p277) points out, a similar requirement holds in formal proof theory. At a given line in a proof, we can only make deductions on the basis of statements that have been justified on an earlier line. Theorems cannot be introduced out of the blue.

Now, there are at least two distinct ways in which Merge could interact with the WS, in order to make newly generated objects accessible at later stages (McInnerney 2017). First, Merge could update the WS strictly by *adding* to it. This version of Merge would be defined as in (31).[18]

(31) Merge(x, y, WS) → WS′ = WS ◁ {x, y}

Alternatively, Merge could update the WS by *replacing* its targets with a newly created set, as would follow from the definition in (32).[19]

(32) Merge(x, y, WS) → WS′ = [WS \ {x, y}] ◁ {x, y}

This adapts the Collins & Stabler's (2016) definition of Merge (see their definition 14-iii).

However, Chomsky (2019a *et seq*.) asks why we should adopt (32) instead of (31) or any other possible formulation of Merge. Note, for example, that (32) could be described in terms of two suboperations, one of removal and one of addition. Is this necessary?

Chomsky claims that there is an empirical basis for rejecting (31). If Merge strictly *adds* to the WS, preserving every previously-generated object at all later stages, then it is difficult to identify the source of locality conditions on Merge. A constituent could be contained within an island, yet it would still be accessible to Merge, because it would remain in the WS. Thus, Chomsky argues that (31) is empirically untenable.

There is also arguably a conceptual motivation for rejecting (31): Chomsky's (2019b) *Minimal Yield* (MY). Chomsky claims (citing personal correspondence with Sandiway Fong), that there is reason to believe that syntactic derivations are subject to the condition in (33).[20]

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[18] The symbol '◁' here is intended as set-append, such that A ◁ B = C iff C is the smallest set containing B and every member of A. I.e. A ◁ B = A ∪ {B}.

[19] The symbol '\' here denotes the *difference* relation between sets, such that A \ B = C iff C is the smallest set containing every member of A which is not a member of B.

[20] The notion *accessible* features heavily in Chomsky's recent proposals concerning the WS. For present purposes, I understand *accessible* to be defined as follows:

(i) A constituent x is *accessible* in workspace WS iff there is some feature F such that Search for F in WS (i) has a unique output y, where y is a term of x, and (ii) entails Search for F in $z \ni x$.

(33) *Minimal Yield*:

Given a mapping from input WS to output WS′, the number of accessible terms in WS′ is no more than one greater than the number of accessible terms in WS.

Together with a condition ensuring that objects accessible at a given stage remain accessible at the next stage (called *Preservation* in (34c)), the definition of Merge (32) can be derived. Explicit suboperations of removal and addition need not be stipulated.[21]

(34) Merge(x, y, WS) → WS′ = [$\{x, y\}$ …], where the following conditions hold:

a. $\{x, y\} \subseteq$ acc(WS)

b. Minimal Yield: | acc(WS′) | ≤ | acc(WS) | + 1

c. Preservation: For each $z \in$ WS, there is a unique, structurally identical $z' \in$ acc(WS′)

It is possible to show that, even though the core mapping of (34) is radically underspecified, the constraints (34b) and (34c) function to fix a determinate output.[22]

The conception of Merge as an underspecified operation on the syntactic WS is relevant for present purposes, because it enables an account of *n*-ary structure building, as I discuss presently.

3.3.2. *N*-ary structure building

The third criticism of Merge relevant here concerns the concept of *binarity*. The idea that all structure building is binary has a long and illustrious pedigree (and an equally long backlog of intense critique). The binarity requirement on structure became attractive with the advent of X-bar Theory (Chomsky 1970, Jackendoff 1977), and formal proposals for strict binary branching soon appeared (Kayne 1984, Larson 1988). The binary branching hypothesis received conceptual

[21] The symbol '| · |' denotes cardinality. The function 'acc(X)' denotes the set of all accessible terms of X.

[22] E.g., if WS = [x, y, z_1 … z_n], then the output Merge(x, y, WS) → WS′ = [$\{x, y\}$, w_1 … w_j , u_1 … u_k] meets the conditions iff (i) w_1 … w_n = z_1 … z_j and (ii) u_1 … u_k is null (k = 0). If any z lacks a corresponding w, then (34c) is violated. If there is any u in WS′, (34b) is violated. This shows that External Merge always has exactly one determinate output by the definition in (34).

support from Chomsky (1995) and Collins (1997),[23] from which time it became a core tenet of Minimalist syntax.

However, the idea that structure building is *never* n-ary ($n > 2$) is untenable.[24] Chomsky (2019a, 2019b, 2021) highlights the significance of coordinate structures in this respect. In the general case, coordinate structures show no evidence of internal hierarchy. Consider, for instance, the bracketed coordinate structures in (35). I refer to these as *Unbounded, Unstructured Coordinate-structures* (UUCs).

(35) a. Lee is [happy, tired, … and eager to go to college].
b. [Lee, Terry, … and Casey] are having lunch.
c. We should [go shopping, come home, … and go to bed].

We need to analyze UUCs as *internally unstructured* in order to differentiate them from coordinate structures which *do* exhibit internal structure. Consider the data in (36).

(36) a. Lee and [Terry or Casey] will be at the party.
b. Lee and [Terry and Casey] will go home and go shopping (respectively).

In (36a), the interpretation is that Lee will be at the party, along with either Terry or Casey. The structure of the coordinate phrase should reflect this, as in (37).

(37) [Lee and [Terry or Casey]]

In (36b), the interpretation is the Lee will go home, and Terry and Casey will go shopping. Again, this must be reflected in the structure of the coordinate phrase, as in (38).

(38) [Lee and [Terry and Casey]]

These are special cases, forced by mixing coordinators (as in (36a)) and by using a distributive or "respective" reading (as in (36b)). Normally, however, all conjuncts are treated equally, as in (39).

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[23] The idea was that a binary structure-building operation is the "simplest such operation," (Chomsky 1995:207-208).
[24] Culicover & Jackendoff (2005) offer relevant discussion. However, though they provide many arguments *against* strict binarity, they do not provide arguments *in favor* of *n*-ary branching structure, as compared to any other potential alternative. The evidence I discuss here is positive evidence in this direction.

(39) a. Lee and Terry and Casey will be at the party.

b. Lee and Terry and Casey will go home and go shopping.

In these sentences, there is no reason to posit internal structure in the coordinate phrases. In fact, if there were internal structure, we would not be able to distinguish between the different readings coordinate structures can be associated with. The coordinate structures in (36) should have a different hierarchical configuration than the ones in (39). Yet they are forced to have the same structure if we assume binary branching.

Ke et al. (2022) offer further arguments against hierarchical structure in UUCs.

Thus, some coordinate structures are not binary, but permit *n*-ary branching. Chomsky argues that the usual case, e.g. for examples like (39), is as in (40).

(40) [& [$_{\alpha}$ Lee, Terry, Casey]]

I will adopt a simplified version of this structure. I know of no reason to believe the sequence of conjuncts forms a constituent to the exclusion of the coordinator. Notice also that if we do assume the structure in (40), the object α is unlabelable. Thus, I assume the coordinator and the conjuncts all comprise one complex unstructured constituent. This solves the labeling problem; the whole thing can be labeled '&.'[25]

(41) [&, Lee, Terry, Casey]

To derive *n*-ary branching structures, Chomsky proposes to re-define Merge as applying to a set of constituents, instead of to two designated ones. Let Σ stand for a set of constituents $\{x_1 \ldots x_n\}$.[26]

(42) Merge(Σ, WS) → WS′ = [Σ …], where the following conditions hold:

a. Σ ⊆ acc(WS)

a. Minimal Yield: | acc(WS′) | ≤ | acc(WS) | + 1

c. Preservation: For each $z \in$ WS, there is a unique, structurally identical $z' \in$ acc(WS′)

[25] This analysis contradicts Chomsky's (2013, p46) account of structured coordination, where '&' cannot serve as a label.

[26] Alternatively, one could use (i), as Chomsky (2021, p20) does.

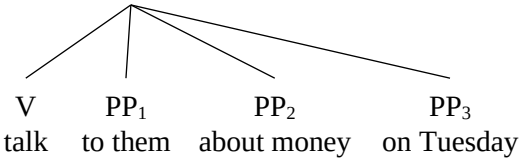
(i) Merge(X_1, …, X_n, WS) → WS′ = [X_1, …, X_n …]

Thus, Merge is not binary,[27] but is *n*-ary. This opens the door to an analysis of VP structure making use of partially flat structure, as I discuss in the next section.[28]

4. Layered *n*-ary structure

The previous section argued for an approach to structure building which can accommodate *n*-ary branching. As such, the flat-structure analysis of the VP can be implemented via Merge. An object such as (43), based on (14) above, results from Merge(Σ, WS) with Σ = {V, PP_1, PP_2, PP_3}.[29]

(43)



Importantly, (as mentioned above), this structure avoids the labeling problem faced by all the other analyses of VP structure I considered in section 2.[30] Minimal Search applied to (43) returns the head, *talk*, since that is the structurally highest feature-bearing element. Therefore, the structure in (43) is labelable and could provide a valid basis for a sentence like (44).

(44) We talked to them about money on Tuesday.

I take the labeling considerations discussed to this point as a strong motivation for accepting flat configurations like (43) for VP-PP constructions. However, the mere fact that a structure *can* be generated is not a sufficient argument for its application in a given context. There is an abundance of argumentation in the literature towards hierarchy among the PPs in sentences like (44). For

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[27] It is not binary in the sense that it is not restricted to producing binary-branching objects. It is binary in the sense that it takes two arguments, a set Σ and a set WS.

[28] Many questions arise as to the extent of flat structures, given that they are generable by Merge. I will argue the verbal domain is partially flat, but will not say anything about other domains (NP, AP, etc.).

[29] I assume V, PP_1, PP_2, and PP_3 would be members of the input WS:

Input WS = [V PP_1 PP_2 PP_3]

Output WS′ = [{V, PP_1, PP_2, PP_3}] (=(43))

Note that Minimal Yield (42b) and Preservation (42c) are satisfied.

[30] Questions arise here, in particular, how such structures can capture the empirical facts resulting from asymmetric c-command among VP constituents that served as important foundations for Larson's and other binary-branching approaches (e.g. binding theory facts, NPI licensing, variable binding). See section 5 for discussion.

example, the rightward-ascending analysis has been supported by arguments to the effect that PPs on the right c-command those on the left. This would suggest that PPs are not arranged in the flat fashion depicted in (43); some would have to be higher in the structure than others.

In the remainder of this chapter, I review potential arguments of this sort. First, some evidence does seem to indicate that the structure in (43) is overly simplistic. In section 4.1, I discuss how ordering preferences among PPs can be taken to suggest that PPs are arranged in an at least partially ascending fashion, and I show in section 4.2 how the necessary hierarchical relations can be implemented given layering of *n*-ary structures. Section 5 turns to other kinds of arguments used to support strictly ascending/descending representations, which I argue to be inconclusive (following prior literature).

4.1. Evidence for hierarchy

This subsection reviews evidence suggesting that the VP is not strictly flat (nor uniformly rightward-descending). The primary observations discussed involve permutability of different PPs. Basically, PPs seem to be partitioned into permutation classes; for any given kind of prepositional phrase *p* (e.g. locative, temporal, manner, etc.), there are some kinds PPs with which *p* can be readily permuted, and there are other kinds of PPs that resist permutation with *p*. The idea is that these ordering restrictions reflect hierarchy in the VP; those PPs which can be readily permuted attach at the same level, and PPs that resist permutation attach at different levels.

To make this case, the subsection is split into two sub-subsections. Sub-subsection 4.1.1 first reviews some general considerations relevant to rightward displacement (assumed to underlie the relevant kind of permutation; cf. Ernst 2002). Then, sub-subsection 4.1.2 highlights a few key observations regarding PPs specifically. My analysis of these observations is developed in section 4.2.

4.1.1. Extragrammatical constraints on permutability

English permits permutation of post-verbal constituents: dependents of different types can often occur in a variety of different orders. This is well-known to be true for canonical adjuncts; in many cases, the order of "adjunct" PPs is totally free. Consider the permutations of bracketed constituents in (45) from Ernst (2002, p132) or in (46) from Culicover & Jackendoff (2005, p130).

(45) a. Carol built a treehouse [for her brother] [in the backyard] [with her new tools].
b. Carol built a treehouse [in the backyard] [for her brother] [with her new tools].
c. Carol built a treehouse [with her new tools] [for her brother] [in the backyard].
d. Carol built a treehouse [in the backyard] [with her new tools] [for her brother].

(46) a. Robin slept [for ten hours] [with her cat] [on the couch] [on Thursday].
b. Robin slept [with her cat] [on Thursday] [for ten hours] [on the couch].
c. Robin slept [on the couch] [for ten hours] [on Thursday] [with her cat].

It is also often the case that canonical argument PPs are freely re-orderable, as in examples like (47)-(49).

(47) a. Bill talked [with Mary] [about chess].
b. Bill talked [about chess] [with Mary].
(Culicover & Jackendoff 2005, p172)

(48) a. Pat talked [to many people] [about the movie].
b. Pat talked [about the movie] [to many people].
(Wasow 2002, p9)

(49) a. Lee bet $5 [with Terry] [on the race].
b. Lee bet $5 [on the race] [with Terry].

Additionally, there are cases where so-called arguments and adjuncts can be permuted (across categories) with little difficulty, as discussed in chapter 3. Examples (50)-(53) illustrate this clearly.

(50) a. Terry argued [$_{Adj.}$ for hours] [$_{Arg.}$ with Lee].
b. Terry argued [$_{Arg.}$ with Lee] [$_{Adj.}$ for hours].

(51) a. Terry talked [$_{Adj.}$ like an expert] [$_{Arg.}$ about the race].
b. Terry talked [$_{Arg.}$ about the race] [$_{Adj.}$ like an expert].

(52) a. Terry blew $100 [$_{Adj.}$ at the casino] [$_{Arg.}$ on blackjack].
b. Terry blew $100 [$_{Arg.}$ on blackjack] [$_{Adj.}$ at the casino].

(53) a. Terry went [$_{Adj.}$ with Lee] [$_{Arg.}$ to the store].

b. Terry went [$_{Arg.}$ to the store] [$_{Adj.}$ with Lee].

It is even possible for NP complements to be postposed around a number of PPs.

(54) Lee wrote [on notecards] [at home] [last week] [a detailed, point-by-point set of instructions for the house sitter].

There are nevertheless often preferences about ordering. Hawkins (2000) and Wasow (2002), in corpus data and judgment surveys respectively, identified a strong influence of *prosodic weight* on post-verbal constituent order.[31] The effect is readily demonstrated with Heavy NP Shift, as in the contrasts below.[32] A prosodically heavy NP can be shifted, but a relatively light NP resists shifting.

(55) a. Mark showed to John [some letters from Paris].

b. ?Mark showed to John [some letters].

(Inkelas & Zec 1995, p546)

Prosodic weight also plays a role in ordering preferences among PPs. Relatively heavy PPs preferentially occur to the right of relatively light PPs. For example, sentence (56a), with the very heavy *to every person to walk into the room that evening* on the right, is more natural than sentence (56b). (I use '>' to indicate relative preference in judgments.)

(56) a. Lee spoke [about the war] [to every person to walk into the room that evening].

b. > Lee spoke [to every person to walk into the room that evening] [about the war].

The effect of weight can be summed up as in (57), from Wasow (2002, p3).

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[31] Hawkins (among others, including Ernst 2002 and Wasow 2002) refer to "grammatical" weight. Weight is a prosodic property, not a syntactic one. There is no adequate way to define weight in syntactic terms. Number of (branching) nodes is sometimes suggested, but this doesn't work, since the bracketed constituents in (i) and (ii) arguably have an equal or close to equal number of (branching) nodes, yet (i), the one which is heavy by *prosodic* standards (consisting of more than one prosodic word), is clearly more natural than (ii).

(i) Lee cooked for us [a Louisianian jambalaya].

(ii) ?? Lee cooked for us [one of them].

Wasow (2002, p21) claims unstressed NPs can be shifted, but I disagree with his judgments. I therefore recast Hawkins's discussion of "syntactic weight" in (what I consider to be) more appropriate, prosodic terms.

[32] Inkelas & Zec's original judgment on (55b) shows a '*', indicating ungrammaticality. My judgment is that (55b) is marked, but possible. I therefore append '?' instead.

(57) Phrases are presented in order of increasing weight.

This is not a hard and fast principle; clearly, sometimes phrases *aren't* presented in exact order of increasing weight. Nevertheless, it is a tendency that it would be good to capture.

However, if the order of two constituents reflects a hierarchical relation between them, then the tendency (57) is highly unexpected. Imagine we adopt a binary-branching VP, with PPs attached in a rightward-ascending fashion. Critically, the position of *about Y* higher in the structure than *to X* ensures that *to X* precedes *about Y*.

(58) [VP [VP V [PP to X]] [PP about Y]]

Then how do we capture the fact that *to X* preferentially precedes *about Y* if X is relatively heavy compared to Y, and vice versa if Y is relatively heavy compared to X? To do so, we would have to either allow (i) rightward movement of *to X*, or (ii) free arrangement of the two PPs in the two positions. Taking option (i) we would allow for a derivation like (59) if X is relatively heavy compared to Y.

(59) [VP [VP V __] [PP about Y]] [PP to X]
|_____↑

However, notice that the operation would have to be limited in its application on the basis of *prosodic weight*. That is, a *syntactic* operation would have to refer to *prosodic* representations. I assume such operations are undesirable.[33] Therefore, the sensitivity of ordering to weight is poorly captured by attributing re-ordering to rightward movement.

Option (ii) suffers a similar problem; we would have to allow the base position of a given PP to be determined in part by reference to its relative weight (compared to other PPs in the same VP).

[33] There are no narrowly syntactic operations limited in their application to other prosodically defined targets. For instance, no syntactic operation applies only to constituents beginning with a voiceless obstruent, or only to constituents ending in closed syllables.

The same problems occur if we adopt a rightward-descending structure like (60). We either (i) require rightward movement of heavy PPs, or (ii) require the base position of PPs to be determined by relative heaviness.

(60) [$_{VP}$ V [$_{VP}$ [$_{PP}$ to X] [$_{V'}$ V [$_{PP}$ about Y]]]]

Weight preferences thus suggest that the order of otherwise freely permutable constituents is not syntactically determined, but follows from some other principles. This is compatible with a flat structure, in which the order of constituents is determined post-syntactically. Imagine for example that the PPs *to X* and *about Y* are arranged in a flat VP, which lacks linear order in Narrow Syntax.

(61) { talk, [$_{PP}$ to X], [$_{PP}$ about Y] }

Then purely *post-syntactic* principles can apply to determine the order in which the elements of (61) are pronounced. If one of these principles involves relative prosodic weight, then ordering preferences like (57) follow naturally.

Studies of corpora (Hawkins 2000, Wiechmann & Lohmann 2013) and judgment data (Wasow 2002) have shown prosodic weight to be one of the strongest factors influencing the order of post-verbal constituents. Still, some relatively strong preferences on ordering emerge when weight is controlled for. To some extent, these preferences can be accounted for by processing principles. Hawkins (2000) argues, for example, that the degree to which there is a "lexical dependency" dependency between the verb and one of its dependents plays a major role in ordering preferences. We can see this preference at work in such examples as (62)-(63).

(62) a. Lee put the book [on it] [for us].
b. > Lee put the book [for us] [on it].

(63) a. He might have died [of hunger] [with her].
b. > He might have died [with her] [of hunger].

According to Hawkins, "lexical dependency" is revealed by the following tests.

(64) *Verb entailment test*:
If [X V PP …] does not entail [X V PP], then V is dependent upon PP.

(65) *Pro-verb entailment test*:

Where pro-V = {*do something, be, happen, be the case*}

If [X V PP …] does not entail [X pro-V PP] or [*something* pro-V PP], then PP is dependent upon V.

Applying (64) to (62), *put the book on it* does not entail *put the book*. Thus, *put* is dependent upon *on it*. Applying (65) to (63), *die of hunger* does not entail *something happened of hunger* or anything of the like. Thus, *of hunger* is dependent upon *die*. These results, according to Hawkins, explain the ordering preferences among the PPs in (62)-(63). The lexically dependent constituents should be placed closer together, because (according to Hawkins) it is easier to process that way.

I follow Hawkins's general proposal that ordering preferences in certain cases arise for reasons of processing, rather than for properly grammatical reasons. However, I would reformulate Hawkins's criteria for "dependency." I assume what's relevant is lexically encoded semantic/syntactic obligatoriness and idiomaticity. Certain PPs are obligatory with a given verb, as discussed in chapters 2 and 3, meaning either that they must be syntactically expressed, or must be licensed by a discourse antecedent. Such PPs preferentially occur closer to the verb, controlling for weight. Similarly, some verb-preposition combinations are idiomatic, as discussed in chapter 3 (*look into, depend on, believe in*). In these cases, it is preferred that the PP occur closer to the verb.

(66) Given postverbal PPs X and Y, X preferentially precedes Y if either:

a. X is obligatory and Y is optional, or

b. X participates in an idiom with the verb and Y does not.

The first principle explains the preference in (62), since *on it* is non-omissible with *put*, and the second principle explains the preference in (63), since *die of* is idiomatic. Further data explained by these principles are given in (67)-(70).[34]

[34] In (67), the *with*-phrase is non-omissible, and so it preferentially precedes the optional durational. In (68), the *into*-phrase is obligatory (in that it must be interpreted anaphorically when omitted), and so it preferentially precedes the optional comitative. In (69), *run for* is idiomatic, and so the *for*-phrase preferentially precedes the *with*-phrase. In (70), *focus on* is idiomatic, and so *on it* preferentially precedes *with us*.

(67) a. Lee lived [next door] [for years].
b. > Lee lived [for years] [next door].

(68) a. Lee went [into it] [with us].
b. > Lee went [with us] [into it].

(69) a. Lee ran [for governor] [with Terry].
b. > Lee ran [with Terry] [for governor].

(70) a. Lee focused [on it] [with us].
b. > Lee focused [with us] [on it].

4.1.2. Syntactic restrictions on permutability

Nevertheless, even controlling for these factors (i.e. prosodic weight and lexical dependency), there are certain grammatically-based ordering preferences among postverbal PPs. In corpus data, Wiechmann & Lohmann (2013) found a statistically significant (albeit slight) effect of the traditional *manner* ≪ *place* ≪ *time* ordering preference familiar from traditional grammar (see Quirk et al. 1985). Despite being relatively weak, the preference for manner phrases before time phrases seems to be robust; sentences containing both a manner phrase M and a temporal phrase T consistently show a preference (controlling for the independent factors of weight and lexical dependency) for M to precede T, as Neeleman & Payne (2020) found experimentally (with judgment data). Example (71) shows a characteristic contrast.

(71) a. Lee walked to school slowly yesterday.
b. > Lee walked to school yesterday slowly.

This alone does not necessarily imply hierarchical structure in the VP. However, Neeleman & Payne also found that manner adverbials permute more readily with certain kinds of PPs than temporals do. Example (72) shows a typical contrast, with the manner vs. temporal phrase before a goal PP. (Both are equally acceptable with the goal first.)

(72) a. Lee walked slowly to school.
b. > Lee walked yesterday to school.

This interaction indicates *permutation classes* among verbal dependents; controlling for other factors, some pairs of dependents are more readily permutable than others. In this case, manner and temporal expressions appear not to be in the same permutation class. I claim that the most natural account of this phenomenon posits hierarchy in the VP (as do Neeleman & Payne 2020, among many others); there is a distinction in the positions accessible to manner vs. time adverbs, with time adverbs preferentially attaching higher in the structure. Assuming the VP has a broadly rightward-ascending structure, this predicts a preference for manner before time.

(73) $[_{VP}$ … $[_{VP}$ … manner] … time …]

While the manner ≪ time ordering preference is quite weak, there are other much stronger preferences. Consider, for example, that certain PPs can be either subject-oriented or object-oriented. As discussed in chapter 3, this can be illustrated by locatives and comitatives. In (74a), either Lee or Terry could be at home. In (74b), either Lee or Terry could be with Casey. See chapter 3 for more detailed discussion.

(74) a. Lee talked to Terry [at home].
b. Lee talked to Terry [with Casey].

There are clear ordering preferences for subject- vs. object-oriented PPs. First, if both types of PPs co-occur in the same sentence, the object-oriented one must come first. This is illustrated in (75). It is not possible here to interpret the first PP as subject-oriented and the second as object-oriented. Sentence (75a) can be interpreted so that *Lee* is at home, and *Terry* is at school, but not vice-versa.[35] Similarly, in (75b), *Lee* can be with *Avery*, and *Terry* with *Casey*, but the opposite pairing is not possible.[36]

(75) a. Lee talked to Terry [at school] [at home].
b. Lee talked to Terry [with Casey] [with Avery].

[35] A context is required in which Lee is calling Terry over the phone. Then (75a) can describe a situation where Lee makes the call from home, while Terry is at school.
[36] An over-the-phone context is also required here. (75b) can describe a situation where Lee and Avery are together in one place, and Terry and Casey are together in another place.

Second, certain manner phrases, like *over the phone* in (76), preferentially come *after* object-oriented PPs, but can go before *or* after subject-oriented PPs. The preferred reading of (76a) is one where Lee is at home, not Terry, and the preferred reading of (76b) is one where Lee, not Terry, is with Casey.

(76) a. Lee talked to Terry [over the phone] [at home].
b. Lee talked to Terry [over the phone] [with Casey].

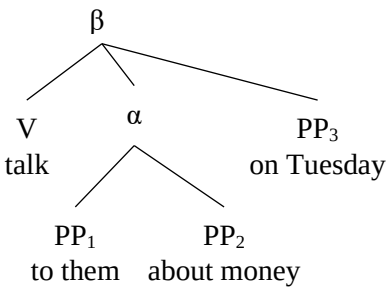
Thus, subject-oriented PPs and object-oriented PPs participate in distinct permutation classes. This is naturally captured if object-oriented PPs occupy a lower position in the VP than subject-oriented PPs do. Compare with Maienborn's (2001) distinction between (structurally lower) *internal* modifiers and (structurally higher) *external* modifiers.

I conclude that the VP is hierarchically structured to some extent. Nevertheless, evidence does not necessarily require that the structure is binary. In fact, to capture permutation classes, the most natural analysis places members of the same class on the same level. The next section explores a way of implementing such an analysis in a recent Minimalist framework.

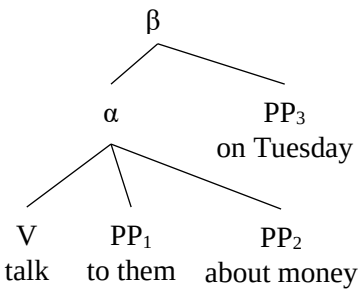
4.2. Analysis

Section 4.1 discussed evidence suggesting that there is some amount of hierarchy among dependents in the VP. Yet any additional hierarchical structure added directly in (43) would induce the familiar labeling problem (of section 3.2). Both (77) and (78) are unlabelable, for instance. In (77), β can be labeled *talk*, but α is an XP-YP configuration with no shared features. In (78), α is labelable as *talk*, but β cannot be labeled.

(77)



(78)

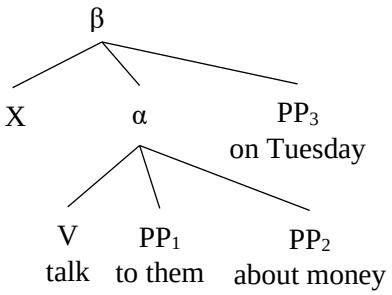


This subsection extends the analysis of section 3 to account for PP permutation classes. Section 4.2.1 first introduces the core proposal, and the remaining subsections technical issues concerning different aspects of the analysis, including determination of linear order (section 4.2.2), PP vs. NP positions (section 4.2.3), and interpretation of *n*-ary constituents (section 4.2.4).

4.2.1. Layering PPs

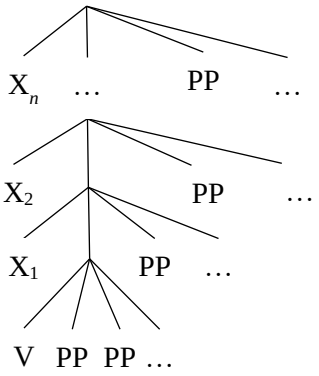
As just discussed, direct PP-grouping induces a labeling problem. Given the assumptions of Labeling Theory, what's needed to accommodate layering in the VP is the presence of additional heads, one for each layer, to serve as its label. If there were an additional head X dominated by, say, β in (79), then the structure would be labelable; β would be labeled 'X.'

(79)



Any number of layers could be adopted, in fact, permitted a corresponding number of additional heads is justified.

(80)

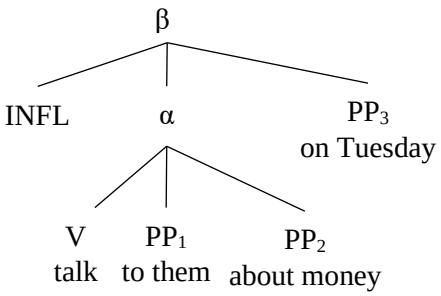


If we assume (following most work in Mainstream Generative Grammar) that clauses consist of multiple functional projections, then structures like (80) are not unrealistic. Consider the fact that virtually every sentence in English containing a VP also contains an inflection phrase INFLP.

(81) $[_{IP}$ INFL $[_{VP}$ V …

Then a structure just like (80) could be generated as (82). The structure would be fully labelable, with *talk* serving as the label of α, and INFL serving as the label of β. In fact, for temporal expressions to be generated relatively high in the clause (as part of what Ernst 2002 calls the "Aux range") accords with work on the semantics of such expressions (Maienborn 2001, Ernst 2002).

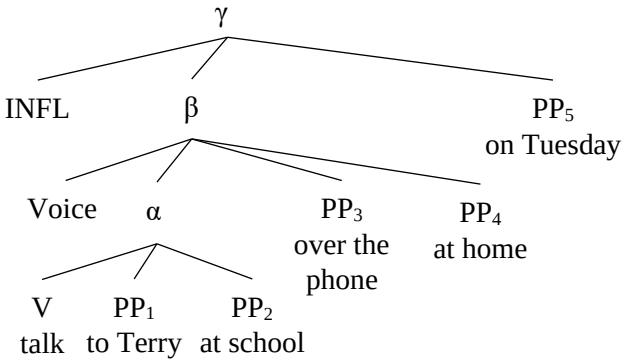
(82)



Additionally, as discussed in detail in chapter 2, much recent work holds that the category 'V' itself can be broken into two or more distinct projections. Most widely accepted is the idea that 'V' consists of two layers, (i) V itself and (ii) a functional head associated with agentivity, e.g.

Voice (or 'little *v*' in some work).[37] With a system like this, there would be room for at the very least three permutation classes. To capture the limited data set discussed in section 4.2, PPs can be partitioned among these three classes.

(83)



Recall that evidence suggests temporal expressions are part of a different permutation class than manner phrases (with manner phrases preferentially preceding temporal phrases). Given a rightward-ascending structure such as (83), this requires temporal expressions to attach to a higher projection than manner adverbs. Evidence also suggests that manner expressions are part of a different permutation class than object-oriented locatives/comitatives. Given a rightward-ascending structure, this means object-oriented locatives/comitatives must be lower than manner phrases.

I highlight the fact that these differential attachment heights accord with prior claims about the relative height of such elements. Maienborn (2001) claims that "internal locatives" (corresponding to object-oriented locatives here) attach as low as possible in the VP (i.e. to the verb itself), in line with what's shown in (83). In contrast, according to Maienborn, "external locatives" (corresponding to subject-oriented locatives here) attach slightly higher, adjoining to the VP itself. The structure here eliminates the extra branching associated with adjunction to VP,

[37] Chatper 2 discussed additional structure, such as a head Appl introducing applicatives (Pylkkänen 2002, 2008) and a head *v* introducing themes (Borer 2003, Lohndal 2014, Smith & Yu 2021, Ahn 2022). Also, on some analyses (Harley 2013) holds that verbs are abstract roots, which are categorized by another dedicated head. This would give a further projection to accommodate PP layers.

and instead places subject-oriented locatives as sisters to the VP in a locally quaternary configuration.

Ernst (2002) also provides arguments that PPs cluster around the functional heads in the verbal domain. For him, Participant PPs (including benefactives, instrumentals, and locatives) and certain manner adverbials are associated with a projection PredP (roughly corresponding to what I label VoiceP here). Other kinds of PPs are associated with different projections. What Ernst calls argument PPs (including L-selected PPs, directional PPs, internal locatives, and several other types)[38] are associated with V. Still other kinds of PPs attach in what Ernst terms the "Aux-range" (such as temporals, as mentioned).[39] The analysis proposed here, for layered *n*-ary structure, could be interpreted as collapsing these layers. While Ernst takes these different PP layers to be rightward-ascending, so that permutability within a layer follows from free right-adjunction, the present analysis predicts permutability from free ordering of PPs within a single layer (see section 4.2.2 below).

In summary, this account of VP structure simply compresses what might otherwise have been considered multiple layers of adjuncts of the same projection into a single structural layer. So-called adjuncts that might previously have been analyzed as adjoining to a particular projection (e.g. internal modifiers adjoining to V) in a rightward-ascending fashion are reanalyzed as complements in that projection. This has the advantage of permitting free permutability within projections (assuming free ordering among complements) while simultaneously capturing the cost associated with permutation across classes (assuming extraposition incurs an acceptability penalty). These structures also avoid the labeling problem faced by previous accounts of VP structure.

There is a major question about this sort of structure. Namely, in order to capture the permutation-class phenomenon, we need to ensure that the complements of a higher projection

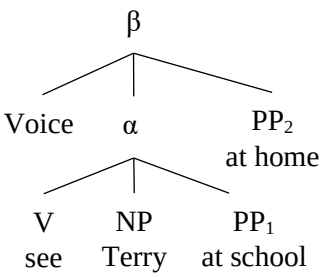
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[38] Though Ernst classifies these as "arguments" and the other kinds of PPs as "adjuncts," this does not play a critical role in his argumentation. Ernst's arguments concerning the attachment sites of different kinds of PPs would be just as relevant if there were no argument/adjunct distinction.

[39] Ernst's discussion of Participant PP and manner adverbs at the PredP/VoiceP layer is on his p289ff. His discussion of PPs at the VP layer is on his p211ff; see also his p290-291. His discussion of temporals attached at the Aux-range level is on his p328ff.

follow the complements of a lower projection. But if we assume that the complements of a head are totally unordered, then this is not guaranteed. Take the simplified representation in (84). I assume the verb is pronounced in Voice as the result of what is traditionally called "head movement."

(84)



Object-oriented locatives must precede subject-oriented locatives. The structure (84) captures this fact only if α must precede PP_2. But if the order among complements is free (as it must be to capture the fact that elements within a layer can freely permute), then α is not required to precede PP_2. PP_2 could just as easily precede α. Indeed, if prosodic weight has an effect on linearization, then the relative heaviness of α ought to favor its being pronounced after PP_2, rather than before it. But this would yield the order in (85).

(85) Voice ≪ PP_2 ≪ PP_1
= see at home at school

This incorrectly places the subject-oriented PP before the object-oriented one. A solution is required. I turn to this issue in the next subsection. Although I will not be able to provide an exhaustive analysis of linearization in this dissertation, I describe a set of principles that could function to ensure the observed ordering facts in this narrow domain (i.e. for PPs attached within the verbal domain).

4.2.2. Ordering principles

The question how order is imposed upon constituents in syntax is highly contentious. Simplifying for exposition, there are essentially two poles of thought. One position, exemplified by Berwick & Chomsky (2016), holds that order is imposed upon syntactic objects at the Sensorimotor interface, but not in syntax, nor at the CI interface. Call this the Berwick-Chomsky Conjecture (BCC). One

primary argument for the BCC comes from the non-existence of transformational rules referencing linear order as opposed to hierarchy. Chomsky's favored illustration is (86), showing that an adverb, ambiguous when positioned between two verbs, is unambiguous when positioned sentence-initially (see e.g. Chomsky 2017, p201, inter alia).[40]

(86) a. Eagles that fly instinctively swim.

b. Instinctively, eagles that fly swim.

Two things are striking about this fact, (i) its cross-linguistic robustness and (ii) its emergence in acquisition. Apparently, no language uses rules which obligatorily refer to linear proximity (e.g. such that the adverb in (86b) would associate with *fly*, the linearly closer of the two verbs). Additionally, studies on acquisition have shown the structure-dependence of rules is present remarkably early in acquisition (see e.g. Crain & Nakayama 1987, Crain & Thornton 1998, Rombough & Thornton 2019, Shi et al. 2020). The BCC predicts this; assuming adverb association is a syntactic rule, then the BCC predicts structure-dependent rules are the only ones possible – languages will not implement structure-independent variants, nor will children entertain such variants in acquisition. The cross-linguistic and acquisition facts are surprising, though, if linear order can constrain syntactic rules.

On the other hand, numerous authors claim that linear order must be encoded in syntactic representations. Ernst (1994), Culicover & Jackendoff (2005), Zwart (2011), Bruening (2014, 2018), Al-Khalaf (2015), Belk & Neeleman (2017), and many others have argued that the BCC is too strict; there appear to be phenomena requiring reference to linear order. Various authors argue, for instance, that linear order is central to principles of binding and coreference (though see Büring 2005, p12-13 for arguments against linear order in this domain).[41]

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[40] That is, in (86a), the adverb *instinctively* can be associated either with *fly* or with *swim*, but in (86b), it can only be associated with *swim*.

[41] Some authors continue to hold that linear order is the sole factor required to explain restrictions on coreference, as in Condition C effects, for instance (see, e.g., Chater & Christiansen 2010, p1144-1146, citing work by O'Grady 2005). But Reinhart (1976) showed that linear order alone is insufficient for this purpose. Thus, structure-free approaches like Chater & Christiansen's are not tenable. I should stress, however, that this does not imply that linear order plays *no* role at all (cf. comments by Chomsky 2013, p36).

Most recently, Chomsky (2019b, 2021) has advocated adoption of an operation in syntax which imposes order upon already-generated objects. This operation, *Form Sequence* (FSQ), applies to a set S, and replaces it with an ordered sequence comprised of the members of S. This order can then be accessed at both the SM and CI interfaces.

The particular argument for FSQ on which Chomsky has focused (from *respective*-predication) does not in fact provide compelling evidence that this operation is needed.[42] However, there are still good reasons to adopt it. See Ke et al. (2022) for a different kind of argument based on coordinate structures (not relying on *respective*-predication). Another argument comes from sequences of thematically uniform PPs, as in (87).

(87) a. I ran [between the pillars] [around the corner] [into the alley].

b. I ran [around the corner] [between the pillars] [into the alley].

The PPs in these sentences comprise complex paths. It is clear that the order of these elements affects the interpretation. The first PP is interpreted to precede the others in the trajectory of motion. Thus, in (87a), the runner first passes between the pillars, then under the bridge, then around the corner, before finally reaching the alley. In (87b), the order is reversed. The runner first passes around the corner, then under the bridge, then between the pillars.

As discussed in chapter 5, sequences of thematically uniform PPs are analyzed as multiple-complementation structures to the same preposition.[43]

(88) $[_{P_1P}$ $\emptyset_{path}$ $[_{P_2P}$ between the pillars] $[_{P_2P}$ around the corner]].

In order to capture the effect of order on interpretation, this structure, unordered in Narrow Syntax, must have order imposed upon it before it is handed over to the interfaces. That is, the order of

[42] Chomsky's chief argument concerns *respective*-predication, with the idea being that the paired-list readings which arise with the adverb *respectively* in English require reference to syntactically-imposed order. See also Kubota & Levine's (2020) account in terms of Type-Logical grammar, adopting similar assumptions (though cf. their p125). This syntactic-order approach is not tenable, however: data demonstrate that *respectively* is not sensitive to syntactic order. Instead, *respectively* is sensitive to *order of mention*, even across discourse, as revealed by Dalrymple & Kehler (1995); syntactic order is just a special case of this.

[43] Compare with sequences of GOAL PPs in constructions such as (i).

(i) They rolled the ball from behind the shed [to [in front of the house] [on the sidewalk]].

pronunciation is identical to the order of (temporal) interpretation; in order to ensure the two orders match, the interfaces must both be referencing the same already-determined order.[44]

I will assume the required order is imposed by FSQ.[45] This operation applies at Transfer, i.e. at the phase level, *after* all operations of Narrow Syntax have been executed, but *before* interpretation by the interfaces. This ensures that the same order is available at both interfaces, while at the same time ensuring that the order is not present in the Narrow Syntax. This means that principles of *interpretation* can refer to order, but operations in Narrow Syntax cannot. Thus, we maintain the desirable prediction of the BCC that syntactic operations do not refer to linear order, while allowing CI and SM to do so. That is, if order is imposed *after* the operations of Narrow Syntax, then we do not expect order to be available for operations like auxiliary inversion. However, given that order is imposed *before* interpretation at the interfaces, then this information will be accessible for things like binding (assuming binding conditions are filters at CI).

The solution to the problem of (84) thus rests in the principles used by FSQ to convert an unordered set into an order sequence. Specifically, we are interested in the principles which order head-complement configurations (since that is the problematic configuration of (84)); other configurations (e.g. specifier configurations) may require a different analysis.

Let us immediately adopt (for English) the principle (89) based on Fox & Pesetsky (2005a, p40).[46]

(89) *Ordering principle 1 – Head-Complement Rule* (English setting):
Given a constituent $\Sigma = \{X, Y, \ldots\}$, if X is a head and Y is not, then $X \lessdot Y$ in FSQ(Σ).

[44] See data in Roeper & Oseki (2018) for evidence that order has a similar effect in sequences of other kinds of locatives (particularly goals). Also, Goto & Ishii (2021) draw on similar arguments in their proposal that that multiple-nominative constructions in Japanese involve FSQ.
[45] I should highlight the fact that my assumption is that FSQ is required independently of any specific aspect of the problem at hand. It is simply a fact that some semantic phenomena involve reference to the same linear order as is expressed at SM. Therefore, some operation at least as complex as FSQ must apply at a point before interface interpretation.
[46] Fox & Pesetsky's version is as in (i).
(i) Where X is the mother of α and β and β is a complement of α, α precedes β.

Thus, when FSQ applies to an unordered constituent, the resulting sequence places heads before their complements (i.e., their non-head sisters).

Now, how to ensure that complements of *lower* projections precede complements of *higher* projections? I suggest that the notion of *linking* or *amalgamation* proposed to handle "head movement" may be relevant (see e.g. Harizanov and Gribanova 2018 adapting earlier ideas from Matushansky 2006 among others. Chomsky 2019b, 2021 adapts similar ideas). According to Chomsky (2021), for example, two heads can enter into a LINK relation when one c-commands the other. The LINK relation can be used to establish "amalgams," intended to capture what is traditionally called "head movement." For example, in a typical clause like (90) containing INFL, *v*, and V, Chomsky (2021, p36) stipulates that a LINK relation holds between INFL and *v*, and between *v* and V. As a result, the amalgam <INFL, <*v*, V>> is formed, normally pronounced in English at *v*, and in other positions in other languages.[47]

(90) [C [John [INFL [John [*v* [V_{meet} Bill]]]]]

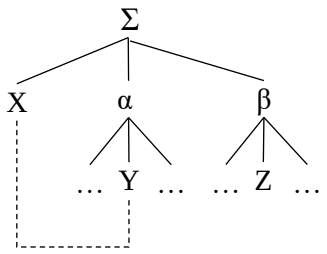
If LINK relations are established among functional elements along the clausal spine, then we can solve the precedence problem of (84) by allowing FSQ to exploit the LINK relations.

(91) *Ordering principle 2 – Linked-Complement Rule* (English setting):
Given a constituent Σ = {X, {… Y …}, …, {… Z …}},
if LINK(X, Y) but not LINK(X, Z), then {… Y …} ≪ {… Z …} in FSQ(Σ).

(92) illustrates how (91) applies for an abstract structure. Assuming a LINK relation between X and Y (indicated with a dashed line), but not between X and Z, then (91) would require α to precede β.

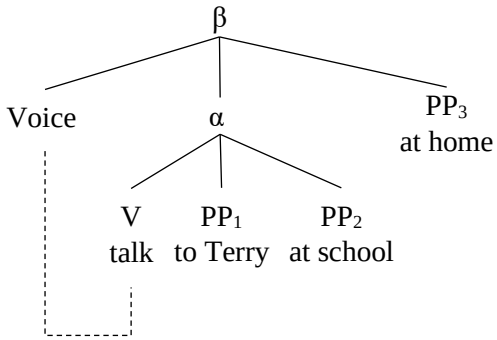
[47] Perhaps pronounced at V in English passives, cf. Caponigro & Schütze (2003).

(92)



With this principle, then, assuming a LINK relation between Voice and V in (84), repeated here, we require that α precedes PP_3, in accordance with observed fact.[48]

(93)



In this way, we require that, given two projections, the complements of the higher projection follow the complements of the lower projection, provided the heads of the two projections are in a LINK relation.

4.2.3. The position of NP complements

There is a remaining question about the position of NP complements in these structures. Unless Heavy-NP Shift applies, PPs cannot precede NPs.[49]

(94) a. i. Lee put [NP books] [PP there].

ii. * Lee put [PP there] [NP books].

---

[48] A language like Mandarin, where participant PPs precede the verb, could perhaps have the opposite setting:

(i) *Ordering principle 2 – Linked-Complement Rule*:
Given a constituent Σ = {X, {… Y …}, …, {… Z …}},
if LINK(X, Y) but not LINK(X, Z), then {… Z …} ≪ {… Y …} in FSQ(Σ).

[49] Variations on both (94a-ii) and (94b-ii) are fine if the NP is prosodically heavy, as in (iii) and (iv) respectively.

(iii) Lee put [PP there] [NP all the books they could find].

(iv) Lee saw [PP then] [NP all the friends they had met along the way].

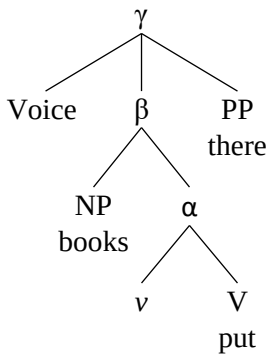
b. i. Lee saw [$_{NP}$ friends] [$_{PP}$ then].

ii. * Lee saw [$_{PP}$ then] [$_{NP}$ friends].

If these NPs are generated as complements to V, then we could capture this by stipulating an ordering principle which refers to syntactic category; in a multiple-complement configuration, NPs precede PPs. Otherwise, free permutability with PPs in the same layer would be predicted.

Alternatively, we could appeal to the idea of argument-introducers. As discussed in chapter 2, θ-role assignment is arguably mediated by functional elements. In the case of direct objects, we would assume a projection *v*P above the VP responsible for assignment of the theme role.[50]

(95)



Assuming that specifiers precede heads, this would ensure that direct objects precede PPs within the VP. The same reasoning applies to indirect objects introduced by Appl (see chapter 2).

4.2.4. A note on interpretation

Büring (2005, p39-40) notes that *n*-ary structures (with $n > 2$) cannot be interpreted via standard mechanisms, e.g. Heim & Kratzer's (1998) Function Application (FA). To illustrate, example

[50] Yet another possibility is to invoke the raising-to-object hypothesis. That is, it is often assumed that NP objects *move* to specifier positions from Comp-V, as in (i).

(i) [γ Voice [β books [α put ~~books~~]] [$_{PP}$ there]]
↑_____|

From the present perspective, this procedure would have to be obligatory. This is in line with Chomsky (2015, 2020), according to whom raising of a NP object into the specifier of V is required for reasons of labeling. In (95), for instance, the verb *put* is "weak," and cannot label without an agreeing NP in its specifier. Once NP raises, α can be labeled *put*, and β can be labeled with shared features (after agreement between α and NP).

(96) gives a possible rendition of FA based on Büring p39 (assignment function omitted for simplicity).

(96) *Function Application*:
⟦ A B ⟧ = ⟦A⟧(⟦B⟧) or ⟦B⟧(⟦A⟧), whichever is defined

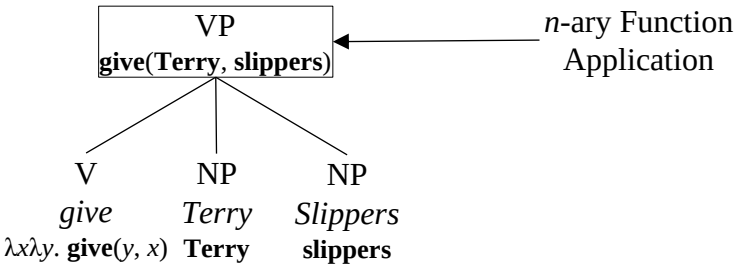
FA is defined for binary structures. As such, it is not applicable for *n*-ary structures. However, Büring points out that flat structure can be accommodated via a simple generalization of FA, such as (97).[51]

(97) N-*ary Function Application*:
⟦ H XP_1 … XP_n ⟧ = ⟦H⟧(⟦XP_1⟧)…(⟦XP_n⟧)

Application of *n*-ary FA to binary structures is then the special case where $n = 1$. Büring shows how *n*-ary FA, defined along lines similar to (97), applies in a theory where verbs project argument structure directly. If we assume, for example, a denotation for the verb *give* along the lines of (98), then *n*-ary FA applies as shown in (99).

(98) λ*x*λ*y*. **give**(*y*, *x*)

(99)



Since I assume argument introducers in this dissertation (see chapter 2, section 2.2), a generalization of Event Identification (Kratzer 1996) is also needed. Something along the lines of (100) would do the trick.

[51] The rule as shown in (97) simplifies the version which Büring provides, glossing over the issue of ordering. Büring's definition of the rule handles ordering with a notion "argument list" which I do not adopt.

(100) N-*ary Event Identification*:

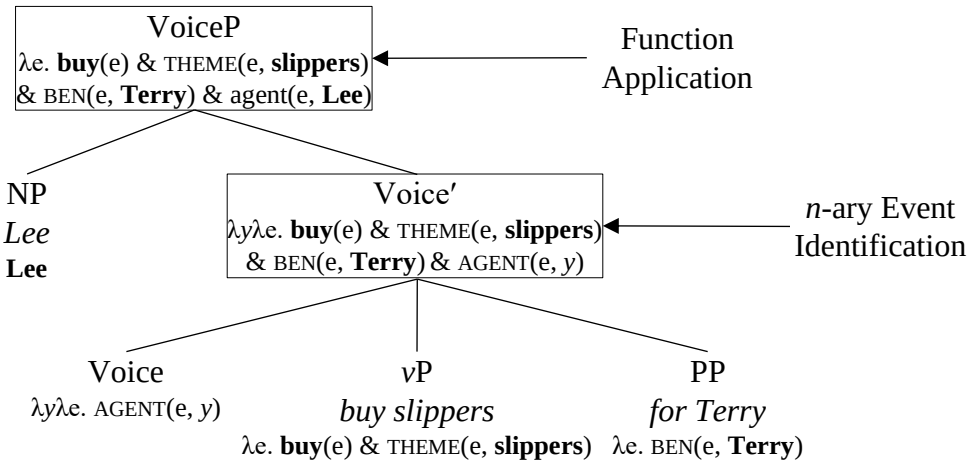
f g_1 … g_n → h

⟨e, ⟨s, t⟩⟩ ⟨s, t⟩ ⟨s, t⟩ ⟨e, ⟨s, t⟩⟩

$\lambda x \lambda e.\ f(e, x)\ \&\ g_1(e)\ \ldots\ \&\ g_n(e)$

The tree diagram in (101) shows how this applies to a sentence like "*Lee bought slippers for Terry*" to yield the interpretation of Voice′ with a benefactive *for*-phrase.[52]

(101)



5. Traditional evidence

In the previous sections of this chapter, I developed an analysis of VP-PP constructions making use of multiple *n*-ary-branching layers. However, it is important to recognize that much previous work has developed arguments in favor of binary-branching structure within VP. If an *n*-ary-braching analysis is to be given serious consideration, then it would have to be possible to re-interpret prior arguments such that the relevant phenomena are compatible with *n*-ary-branching structure. To provide detailed analyses of the full range of relevant phenomena falls outside the

[52] This assumes argument introducers and prepositions both have denotations like (i) for thematic relations θ.

(i) $\lambda x \lambda e.\ \theta(e, x)$

Since a preposition will combine with an NP before event identification applies, PPs are type st, subject to *n*-ary event identification as defined here.

scope of this dissertation. However, I will discuss a number of relevant arguments, suggesting that relevant phenomena are plausibly compatible with *n*-ary-branching structure.[53]

It is useful to characterize the relevant arguments from prior literature by dividing them into two categories. Some evidence suggests the VP is rightward-*ascending*, while other evidence suggests the VP is rightward-*descending*. The conflict between these two data sets has been discussed in detail by previous authors (e.g. Pesetsky 1995, Phillips 2003, Lechner 2003, Cinque 2006, among others). Here, I will recapitulate the arguments in both directions, focusing on the rightward-ascending properties in section 5.1, and on the rightward-descending properties in section 5.2.

I would like to highlight that the discussion in this section presents the data primarily as they have been traditionally understood, i.e. so as to support one or the other structure. I return to the question of whether or not these data really do support one or the other structure in section 5.3; in fact, I argue that in many cases the data do not show what they have often been said to show.[54]

5.1. Evidence for a rightward ascending VP

I will begin with the properties motivating a rightward-ascending VP. The relevant properties are summarized in (102) below.

(102) a. Substitution tests
b. VP Ellipsis
c. VP-fronting
d. Adverbial scope
e. Presupposition with *again*

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[53] A secondary goal of this section is to show that the traditional evidence, on the whole, is difficult to reconcile with an A/AD-based approach holding that arguments and adjuncts participate differently in the structure of the VP. Though many of the phenomena discussed in this section do not clearly identify rightward-descending vs. -ascending structure (as I discuss in section 5.3), if they tell us anything about the structure of VP, it's to suggest that arguments and adjuncts participate in the same way.

[54] Classic constituency tests like *do so*-substitution, *do what*-pseudoclefting, and VP-fronting are a case in point. These phenomena are traditionally used to motivate a rightward-ascending structure. However, I showed in chapter 3 that these phenomena do not in fact diagnose syntactic constituency, and therefore cannot be used to motivate the rightward-descending structure.

f. Floating quantifiers

g. Focus-associating particles

h. Coordination

I will now illustrate each of these properties.

A. Substitution tests

Pro-form substitution is one of the best-known tests for constituency. At least two substitution tests can be used to argue for a rightward-ascending VP. One is *do so*-substitution. On the assumption that *do so* is a pro-form whose antecedent must be a complete VP, examples like those in (103) can be taken to suggest that constituents progressively closer to the right edge of the VP are structurally more peripheral to the VP.

(103) Lee [$_{VP}$ saw a turtle on the beach at 10am], …

a. and Terry [$_{VP}$ did so] too.

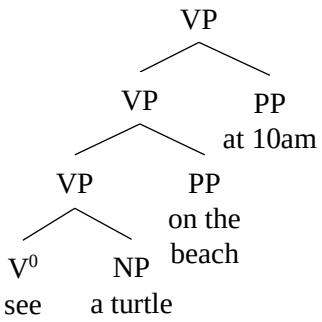
b. and Terry [$_{VP}$ did so at noon].

c. and Terry [$_{VP}$ did so in the park at noon].

If *do so* must substitute for a complete VP constituent, then (103a) illustrates (naturally) that the whole VP is a constituent. Example (103b) illustrates that *saw a turtle on the beach*, to the exclusion of the temporal PP *at 10am*, is a constituent. The fact that *saw a turtle on the beach* forms a constituent to the exclusion *at 10am* has traditionally been taken as evidence that *at 10am* is attached to the right edge of an inner VP. Finally, (103c) shows that *saw a turtle* forms a constituent to the exclusion of both *on the beach* and *at 10am*.

If *see a turtle* forms a constituent to the exclusion of *on the beach at 10am*, and *see a turtle on the beach* forms a constituent to the exclusion of *at 10am*, this suggests a left-branching VP as in (104) below.

(104)



Pseudocleft formation also suggests a left-branching VP. If the free relative clause in a pseudocleft (e.g. *what Lee did* in (105a)) is formed via substitution of a complete VP constituent by the *wh*-proform *what*, then the sentences in (105) require the VP has a rightward-ascending structure as in (104).

(105) a. What$_1$ Lee [$_{VP}$ did __$_1$] was [see a turtle on the beach at 10am]$_1$.
b. What$_1$ Lee [$_{VP}$ did __$_1$ at 10am] was [see a turtle on the beach]$_1$.
c. What$_1$ Lee [$_{VP}$ did __$_1$ on the beach at 10am] was [see a turtle]$_1$.

However, I argued at length in chapter 3 that substitution tests like this do not in fact reflect syntactic constituency. Instead, these phenomena reveal subcategorization requirements of the lexical verb *do*. The sentences in (105) are acceptable because the PPs *on the beach* and *at noon* are independently compatible with *do*. Thus, sentences like (106) are also possible, though such sentences do not clearly provide evidence for constituency in the VP.

(106) a. Lee [$_{VP}$ saw a turtle on the beach at 10am], and Terry did so in the park.
b. Lee [$_{VP}$ saw a turtle at 10am on the beach], and Terry did so at noon.

Substitution tests like *do so*-anaphora and *do what*-pseudoclefting therefore do not provide evidence for rightward-ascending structure in the VP (nor any other kind of structure).

B. VP-fronting

The possibility of stranding PPs under VP-fronting has also been argued to support a rightward-ascending analysis. If VP-fronting targets a complete VP constituent, then *see a turtle on the beach at 10am* must be a constituent in order to be fronted in (107a). In order for *see a turtle on the beach* to be fronted as in (107b), that string must form a complete constituent to the exclusion of *at 10am*

exactly. And in (107c), *see a turtle* must be a complete constituent in order to be fronted, stranding both *on Platte Point Beach* and *at 10am exactly*.

(107) Lee said they would see a turtle on the beach at 10am, …

a. and [see a turtle on the beach at 10am]$_1$ they did [$_{VP}$ __$_1$].

b. and [see a turtle on the beach]$_1$ they did [$_{VP}$ __$_1$ at 10am exactly].

c. and [see a turtle]$_1$ they did [$_{VP}$ __$_1$ on Platte Point Beach at 10am exactly].

This is again exactly what is predicted by the structure in (104).

Nevertheless, I argued in chapter 3 that VP-fronting is not a reliable test for constituency in the VP, because "stranding" can be analyzed as extraposition from VP. Thus, we cannot tell simply from the fact that *see a turtle on the beach* is fronted in (107b) that this unit forms a constituent to the exclusion of *at 10am*. It is equally possible that *see a turtle at 10am* is a constituent to the exclusion of *on the beach*, but that *at 10am* is extraposed. VP-fronting then does not support claims about constituency in the VP.

C. VP-ellipsis

Verb Phrase Ellipsis (VPE) has also traditionally been taken as evidence for a rightward-ascending VP structure. Consider the sentences in (108).

(108) Lee [$_{VP}$ saw a turtle on the beach at 10am], …

a. and Terry did [$_{VP}$ __] too.

b. and Terry did [$_{VP}$ __ at noon].

c. and Terry [$_{VP}$ did __ in the park at noon].

Under the assumption that VPE targets complete VP constituents, the fact that the whole VP can be elided in (108a) indicates that the full VP is a constituent. The sentence in (108b) further illustrates that the string *saw a turtle on the beach* forms a constituent to the exclusion of the PP *at noon*. Finally, (108c) shows that *saw a turtle* is a constituent to the exclusion of both *in the park* and *at noon*. Again, this suggests a rightward-ascending structure resembling (104).

However, VP-ellipsis is known not to directly reflect constituency. Kubota & Levine (2017), building on much previous work in a similar vein, including Jayaseelan (1990) and Lasnik

(1999), find that VP-ellipsis can target surface strings which do not correspond to constituents in a useful sense. That is, in cases like (109), ellipsis does not target a complete VP, but leaves a remnant inside the VP.

(109) a. Lee served Terry dinner much more carefully than they would an ordinary client.
b. I hope the explosion gave you less of a fright than it did me.

In (109a), we have ellipsis of *serve dinner*, stranding *an ordinary client*. In (109b), we have ellipsis of *give a fright*, stranding *me*. In neither case do we conclude that the elided material is a constituent. Instead, various authors have suggested that stranding in VP-ellipsis involves an application of movement *out of* VP, before ellipsis targets the remnant. With this sort of analysis, stranding does not reflect constituency in the VP, but instead reflects evacuation from the VP. Thus, VP-ellipsis does not provide evidence for rightward-ascending structure in the VP.

D. Adverbial scope

Somewhat more subtle evidence for the rightward-ascending structure comes from scope interactions, particularly among adverbials. Ernst (1994), among others, points out that adverbials of certain types take scope over the VP, and that the scope taken by a given adverbial interacts with its position relative to other adverbials in the clause. For example, in (110a) below, the adverb *willingly* takes *many times* in its scope. That is, the sentence entails Lee was willing to repeatedly kiss Terry. The sentence in (110b), conversely, has *willingly* within the scope of *many times*. In (110b), it is entailed that Lee was repeatedly willing to kiss Terry.

(110) a. Lee kissed Terry many times willingly.
b. Lee kissed Terry willingly many times.

These scope effects have a natural account given a rightward-ascending VP, according to which elements successively further to the right are successively higher in the structure. In such an account, the sentences in (110) have the corresponding structures in (111).

(111) a. Lee [$_{VP}$ [$_{VP}$ kissed Terry many times] willingly]
b. Lee [$_{VP}$ [$_{VP}$ kissed Terry willingly] many times]

If we assume that the scope of a predicative adverb or PP corresponds to its c-command domain (following Huang 1982; Andrews 1983; Ernst 1991, 1994, 2002, p317), then the difference between (110a) and (110b) is predicted. In (110a), *willingly* scopes of *many times* because it c-commands *many times*. Assuming a simplified event representation as in (112), the difference in scope between (110a) and (110b) would be captured as follows.[55]

(112) a. willingly(many-times(kiss(L, T)))
b. many-times(willingly(kiss(L, T)))

The layered *n*-ary representation introduced in section 4 could be compatible with these data, if relevant adverbs may attach in different layers in a (not strictly binary) rightward-ascending fashion.

E. Presupposition with *again*

According to Smith & Yu (2021, p4), "*again* is a function of type <<*v*,*t*>,<*v*,*t*>>, being an identity function in the assertion and introducing a presupposition that an identical event had happened temporally prior to the asserted event [references omitted]." They give the definition in (113), adapted from Bale (2007), for the relevant presupposition.

(113) $[\![\textit{again}]\!](P(e))$ is defined iff $\exists e^1 \exists e^2 [e^1 \prec e^2 \prec e \ \& \ P(e^1) \ \& \ \neg P(e^2)]$

We can use the presupposition of *again* to identify its scope in the event with which it occurs. Take (114a). It is ill-formed, because it negates the presupposition required by *again*. That is, *again* in (114a) presupposes a prior event in which Lee ate pizza. (114a) is unacceptable because it explicitly denies the existence of this prior event.

(114) a. #Lee ate pizza again. Lee had never eaten pizza before.
b. Lee ate pizza again. Terry had never eaten pizza before.
c. Lee ate pizza again. Lee had never eaten salad before.
d. Lee ate pizza again. Lee had never eaten pizza on a Friday before.

[55] See Ernst (2002, p54ff) for more detailed semantic representations of the relevant types of adverbs.

On the other hand, all the examples in (114b)-(114d) are acceptable, because all are compatible with the required presupposition. Though (114b) denies the existence of a prior event in which *Terry* ate pizza, this does not preclude the existence of a prior event of *Lee* eating pizza.

Now consider the following examples.

(115) a. #Lee ate pizza at midnight again. Lee had never eaten at midnight before.
b. Lee ate pizza again at midnight. Lee had never eaten at midnight before.

These two examples are identical except for the position in which *again* occurs. In (115a), *again* appears to the right of *at midnight*. In (115b), it appears to the left of *at midnight*. Critically, this changes the presupposition required by *again*, as reflected by the fact that (115b) is acceptable but (115a) is not. These facts are explained if (115a) presupposes a prior event of Lee eating pizza at midnight, and if (115b) presupposes an event of Lee eating pizza at no specific time. Then (115a) directly negates the required presupposition, but (115b)'s presupposition is still possible.

Note that what's relevant is simply that (115b) *need not* presuppose that Lee ate pizza at midnight before. This presupposition is still possible, as can be seen with negation, as in (116). The fact that the discourse is acceptable shows that *on a Friday* can be included in the *again*-presupposition.

(116) Lee never ate pizza again on a Friday. Still, Lee ate pizza on Thursdays.

If we assume, as Smith & Yu (2021) do, following Bale (2007), that *again* gets its presupposition from the constituent with which it combines syntactically, then this provides an argument for rightward-ascending structure in the VP. With a rightward-ascending structure, the VP in (115) has the structure in (117a). This provides a constituent VP_2 *eat pizza*, and constituent VP_1 *eat pizza at midnight*. If *again* attaches to VP_2, we get a presupposition of a prior "eating pizza" event. If *again* attaches to VP_1, we get a presupposition of a prior "eating pizza at midnight" event.

(117) a. $[_{VP1}\ [_{VP2}$ eat pizza$]\ [_{PP1}$ at midnight$]]$
b. $[_{VP1}\ [[_{VP2}$ eat pizza$]$ again$]\ [_{PP1}$ at midnight$]]$
c. $[[_{VP1}\ [_{VP2}$ eat pizza$]\ [_{PP1}$ at midnight$]]$ again$]$

These data are again compatible with layered *n*-ary structure as proposed in section 4, as long as the PPs included/excluded from the scope of *again* can attach in different layers.[56]

Under the above analysis, the presuppositions occurring with *again* support a rightward-ascending analysis of the VP. If we accept this argument, then we must conclude that canonical argument PPs and canonical adjunct PPs show the same behavior. Take the following examples showing that *again* can separate canonical arguments as well as canonical adjuncts from the VP.[57]

(118) a. I played the lead in the most recent play, and I'll play the lead again [in the next one].

b. The fancy voting machines were available for the last election. I hope they'll be available again [for the next one].

(119) a. I donated money to the most recent charity event, and I'll donate again [to the next one].

b. I had a chance to talk to the band about their most recent album, and I'll talk to them again [about their next one].

In (118b), *again* presupposes a prior event of the voting machines being available, excluding the "adjunct" PP *for the next one*. In (119b), *again* presupposes a prior event of the speaker donating, excluding the "argument" PP *to the next one*. Thus, whatever the appropriate analysis of *again*'s presuppositions is, it cannot treat argument and adjunct PPs differently, and hence it cannot be used as evidence for a dichotomous analysis (like (5)-(7) from section 2).

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[56] With a rightward-descending structure, this analysis of *again* would not derive the appropriate presuppositions. Say we have a rightward-descending structure as in (i). Then *again* could attach to VP_1 or VP_2 to yield the "eating pizza at midnight" presupposition, but there is no constituent for the "eating pizza" presupposition.

(i) $[_{V_1P}\ V_1\ [_{V_2P}$ pizza $[_{V_2'}\ V_2$ [at midnight]]]]

[57] I should point out that examples similar to those in (118)-(119) can be retrieved easily on Google. Some relevant ones are below.

(i) a. … reprocess a good or service they buy before selling it again to the next buyer (URL)
b. Follow the beam to that tower and Bash its left-hand button to bounce the laser further down the beach. Follow the beam yet again to the next tower (URL)
c. Kill them, then move through the grass again to the next enemy near the ledge (URL)
d. I think I've said this before about other Melissa Brayden's books, and will probably say it again about the next one, but this is my new favorite. (URL)

F. Floating quantifiers

Additional evidence comes from floating quantifiers (from Janke & Neeleman 2012). Relevant data are given in (120).

(120) a. *Lee read the books both.
b. Lee read the children both a book.
c. *Lee read the children a book both at 10am.

These data suggest a basically rightward-ascending structure, if we make two assumptions. First, we need to assume that floating quantifiers (like *both*) can appear on the left edge of a VP with an unassigned theta role.[58] Second, we need to assume that double-object constructions (like *read the children a book*) do in fact involve a rightward-*descending* VP-shell-like structure (though it will follow that *PPs* are attached in a rightward-ascending fashion).

With these two assumptions, the unacceptability of (120a) is predicted. In order to get *both* in sentence-final position, as required in (120a), *both* would have to attach to the *right* of the VP. According to Janke & Neeleman (2012), floating quantifiers must attach to the *left* of their VP.[59]

(121) Lee [[$_{VP}$ read the books] both]

The presence of a rightward-descending VP for the double-object structure (120b) provides a VP on whose left edge the quantifier can attach. Thus, we predict a floating quantifier between the two objects (at the left edge of the lower V′).

(122) Lee [$_{VP1}$ read [$_{VP2}$ the children [both [$_{V'}$ ~~read~~ a book]]]]
↑_____|

If the rightward-descending structure continued in (120c), with the PP *at 10am* hosted by yet another VP-shell, then we would expect the floating quantifier to be licensed in the position in (120c).

[58] This actually also requires that the subject receives its theta role in Spec-TP, not Spec-*v*P, an issue I ignore here.
[59] Actually, Janke & Neeleman's examples have a floating quantifier attached to V′; the difference is not relevant for present purposes.

(123) Lee [$_{V_1P}$ V_1 [$_{V_2P}$ the children [$_{V_2'}$ V_2 [$_{V_3P}$ a book [both [$_{V_3'}$ V_3 [$_{PP}$ at 10am]]]]]]]

That this is not possible (as (120c) shows) indicates that the rightward-descending structure (123) is not accurate for (120c). Instead, the PP *at 10am* must be attached in a rightward-ascending fashion.

(124) Lee [$_{VP}$ [$_{VP}$ read the children a book] [$_{PP}$ at 10am]]

Unfortunately, this argument goes through only under Janke & Neeleman's assumption that floating quantifiers attach to the left of a projection with an unsaturated theta role. There are alternative accounts, making the force of this argument unclear.

What is important to emphasize, then, is that however one analyzes floating quantifiers, facts like (120) apply for canonical arguments and canonical adjuncts alike, as Janke & Neeleman acknowledge. Just like apparent "argument" PPs can follow a floating quantifier in contexts like (120c), so can apparent "adjunct" PPs. Examples (125a) and (125b) report Janke & Neeleman's judgments with adverbs. I find that similar examples with other kinds of canonical adjuncts are similar, as (125c)-(125e) demonstrate.

(125) a. If he read them at all, he read the sonnets both to Salman Rushdie.
b. If he read them at all, he read the poems both extremely carelessly.
c. If he read them anywhere at all, he read the books both at home.
d. If he read them last week, he read the memos both on Tuesday.
e. If he starts reading now, he'll have to read the books both in a couple of hours.

Therefore, while it is unclear exactly how (or whether) the distribution of floating quantifiers bears on constituency in the VP, to the extent it is relevant at all, it shows that postverbal PPs (so-called arguments and adjuncts alike) participate in the same way.

G. Focus-associating particles

A further argument for rightward-ascending structure comes from the scope of focus-associating particles like *only*. *Only* must have within its scope (defined by c-command) a focused constituent with which it associates (Rooth 1992). This is illustrated with the examples in (126), where small

capitals indicate the placement of prosodic focus (the nuclear pitch accent associated with focus), and underlining indicates the focused constituent.

(126) a. Lee only said that Terry saw SEAGULLS.
b. Lee only said that Terry saw SEAGULLS.
c. Lee only said that Terry saw SEAGULLS.
d. Lee only said that Terry saw SEAGULLS.

For example, in (126a), *only* associates with just the NP *seagulls*. As a result, the interpretation of the sentence is that *seagulls* were the only things that Lee said Terry saw. The same string of words can be interpreted differently, however, depending on the size of the focus. *Only* could also associate with the embedded VP *saw seagulls*, in which case the interpretation is that "seeing seagulls" is the only thing Lee said Terry did. Similarly, association with the full complement clause as in (126c) and with the full matrix VP as in (126d) yield additional interpretation, i.e., respectively, that the only thing Lee said was that Terry saw seagulls and that the only thing Lee did was say Terry saw seagulls.

Importantly, *only* must c-command the focused domain in order for association to succeed. In a sentence like (127), the focus can't be the full matrix VP because *only* does not c-command that constituent here.

(127) Lee [said only [that Terry saw SEAGULLS]].
→ the only thing Lee said was that Terry saw seagulls.
↛ the only thing Lee did was say that Terry saw seagulls.

This provides a diagnostic for the left edges of constituents. If *only* must c-command its associated focus, then if *only* fails to associate with a given constituent X in a given sentence, then *only* must not c-command X.

This diagnostic suggests a rightward-ascending structure for the VP due to data such as (128). Here, the question presupposes that Lee could see seagulls on the beach at some time. The particle *only* must associate with this narrow focus in the answers A_1-A_3.

(128) Q: When could Lee see seagulls on the beach?

A_1: Lee could only see seagulls on the beach <u>in the MORNING</u>, (not at NIGHT).

A_2: * Lee could see seagulls only on the beach <u>in the MORNING</u>, (not at NIGHT).

A_3: Lee could see seagulls on the beach only <u>in the MORNING</u>, (not at NIGHT).

The acceptability of A_1 is predicted under the assumption that *only* c-commands the VP in a structure like (129a). The acceptability of A_3 is predicted under the assumption that *only* c-commands the PP *in the morning* in a structure like (129b). The *un*acceptability of A_2 is predicted with a rightward-ascending structure like (129).[60]

(129) a. Lee could [only [$_{VP}$ see seagulls on the beach in the morning]]

b. Lee could see seagulls on the beach [only [$_{PP}$ in the morning]]

c. Lee could [$_{VP}$ [$_{VP}$ [$_{VP}$ see seagulls] only [$_{PP}$ on the beach]] [$_{PP}$ in the morning]]

However, we cannot necessarily conclude that the distribution of *only* supports a rightward-ascending structure. First, the evidence is equally compatible with a flat-structure analysis incorporating linear order at the interfaces. Second, the argument for rightward-ascending structure depends on the assumption that *only* is free to attach to any projection of the VP, which is not uncontentious. For instance, Ernst (2002) argues that adverbs (including *only*) cannot attach to the left of (any projection of) VP. If that were the case, then the data remain compatible with a rightward-descending analysis.

H. Coordination

Coordination has sometimes been given as evidence for a rightward-ascending VP as well. Assuming only constituents can be coordinated, the data in (130) are correctly predicted by the rightward-ascending analysis.

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[60] The unacceptability of A_2 is *not* predicted with a rightward-*descending* structure like (i).

(i) [$_{V_1P}$ V_1 [$_{V_2P}$ seagulls only [$_{V_2'}$ V_2 [$_{V_3P}$ [on the beach] [$_{V_3'}$ V_3 in the morning]]]]]

(130) a. Lee [saw a turtle on the beach at 10am] and [saw a seagull in the water at noon].
b. Lee [saw a turtle on the beach] and [saw a seagull in the water] at 10am.
c. Lee [saw a turtle] and [saw a seagull] on the beach at 10am.

As is well known, however coordination is not a reliable test for constituency, and therefore it cannot be used as evidence for a rightward-ascending structure. Consider the examples in (131).

(131) a. Lee [[saw a turtle] on the beach] and a bird in the air.
b. Lee [[talked to Terry] about France] and to Casey about Germany.
c. [Lee [donated to the charity]], and Casey to the church.

If we treat coordination as evidence for constituency, such that the examples in (130) motivate a rightward-*ascending* structure, then the examples in (131a) and (131b) would motivate a rightward-*descending* structure. Neither conclusion is valid, however, in light of data like (131c), where the right conjunct *Casey to the church* clearly does not correspond to any constituent (at least, not to any *contiguous* constituent) in the left conjunct *Lee donated to the charity*. Instead, it is conventional to accept that constituency is coordination is obscured by factors like ellipsis, in which case some deletion analysis will virtually always be available to make coordination data compatible with a particular hypothesis about constituency. For example, in (130), we might have deletion as shown in (132), and for (131), we might have deletion as shown in (133).[61]

(132) a. Lee [saw a turtle on the beach at 10am] and [saw a seagull in the water at noon].
b. Lee [saw a turtle on the beach ~~at 10am~~] and [saw a seagull in the water at 10am].
c. Lee [saw a turtle ~~on the beach at 10am~~] and [saw a seagull on the beach at 10am].

(133) a. Lee [saw a turtle on the beach] and [~~saw~~ a bird in the air].
b. Lee [talked to Terry about France] and [~~talked~~ to Casey about Germany].
c. [Lee donated to the charity], and [Casey ~~donated~~ to the church].

Coordination can only offer evidence for constituency in the presence of focus particles like *either*. As many have shown, *either* behaves like *only* in that it must c-command the (linearly leftmost or

[61] Alternately, we might assume some variant of Bare Argument Ellipsis which does not involve deletion (Culicover & Jackendoff 2005), in which case the problems are the same; coordination fails to reflect constituency.

"first") focus in the left conjunct (Hendriks 2003, Den Dikken 2006b, Wu 2021). With *either* at the beginning of the clause, any constituent can be associated with (up to the next CP boundary, see Den Dikken 2006b, p705-706). This is illustrated in (134). Notice that the size of the focused constituent correlates here with deletion in the right conjunct.

(134) a. Either Lee pretended to be looking for TERRY,
or ~~Lee pretended to be looking for~~ CASEY.

b. Either Lee pretended to be looking for TERRY,
or ~~Lee pretended~~ to be totally CONFUSED.

c. Either Lee pretended to be looking for TERRY,
or ~~Lee~~ lured away the police with a DIVERSION.

d. Either Lee pretended to be looking for TERRY,
or Casey told everyone the TRUTH.

Like *only*, *either* cannot occur *within* the focused constituent, giving contrasts like (135). In (135a), *either* can occur in any of the marked positions, since all of them c-command the focused constituent in this sentence, which is the NP *Terry*, the object of *look for*. In (135b), the focus is the TP *to be looking for Terry*, so *either* can occur in any of the positions 1-3 which c-command this constituent, but not in position 4, which falls *within* the focus (hence not c-commanding it). Examples (135c) and (135d) receive the same sort of account.

(135) a. ⟨Either⟩$_1$ Lee ⟨either⟩$_2$ pretended to ⟨either⟩$_3$ be looking for ⟨either⟩$_4$ TERRY,
or ~~Lee pretended to be looking for~~ CASEY.

b. ⟨Either⟩$_1$ Lee ⟨either⟩$_2$ pretended ⟨either⟩$_3$ to be looking for ⟨*either⟩$_4$ TERRY,
or ~~Lee pretended~~ to be totally CONFUSED.

c. ⟨Either⟩$_1$ Lee ⟨either⟩$_2$ pretended ⟨*either⟩$_3$ to be looking for ⟨*either⟩$_4$ TERRY,
or ~~Lee~~ lured away the police with a DIVERSION.

d. ⟨Either⟩$_1$ Lee ⟨*either⟩$_2$ pretended ⟨*either⟩$_3$ to be looking for ⟨*either⟩$_4$ TERRY,
or Casey told everyone the TRUTH.

Thus, essentially the same argument can be used with *either* as with *only* to motivate a rightward-ascending configuration in VP. Consider (136).

(136) ⟨Either⟩$_1$ Lee ⟨either⟩$_2$ saw ⟨*either⟩$_3$ seagulls ⟨*either⟩$_4$ on the beach ⟨either⟩$_5$ in the MORNING, or ~~Lee could see seagulls on the beach~~ at NIGHT.

In this example, the focused constituent in the left conjunct is *in the morning*. The appropriate interpretation is that Lee's seeing seagulls *in the morning* contrasts with their seeing seagulls *at night*. This focus structure is also forced by deletion in the right conjunct. With *in the morning* as the focus, *either* is acceptable in positions 1, 2, and 5, but not in positions 3 or 4. Assuming that *either* must c-command the focus, these facts are compatible with a rightward-*ascending* analysis of the VP as in (137a), but not with a rightward-*descending* analysis as in (137b).

(137) a. [$_S$ Lee [$_{V_1P}$ [$_{V_2P}$ [$_{V_3P}$ saw [$_{NP}$ seagulls]] [$_{P_1P}$ on the beach]] [$_{P_2P}$ in the morning]]]

b. [$_S$ Lee [$_{V_1P}$ V_1 [$_{V_2P}$ seagulls [$_{V_2'}$ V_2 [$_{V_3P}$ [on the beach] [$_{V_3'}$ V_3 in the morning]]]]]]

In (137a), the acceptable positions 1, 2, and 5 correspond to attachment of *either* on the left of S, V_1P, and P_2P respectively; from all these positions, *either* c-commands the focus P_2P. The unacceptable positions 3 and 4 correspond to attachment of *either* on the left of NP and P_1P respectively, where *either* would not c-command P_2P.

In (137b), we might predict acceptability of *either* in positions 1, 2, and 5, since these could correspond to attachment of *either* on the left of S, V_1P, V_3P respectively, but we would fail to predict unacceptability of *either* in positions 3 and 4. These could correspond to attachment of *either* on the left of V_2P and V_3P respectively. In those positions, the rightward-descending structure predicts *either* to c-command focus, incorrectly predicting acceptability. In this way, *either* can be used to argue for a rightward-ascending configuration. Of course, just like *only*, this depends on the assumption that the left edge of VP is a valid attachment site for *either*.

5.2. Evidence for a rightward descending VP

The properties just discussed are all consistent with (though not necessarily implicative of) a rightward-ascending VP. I will turn now to the properties commonly taken to motivate a rightward-descending VP. The relevant properties are listed in (138).

(138) a. Binding effects (Barss & Lasnik 1986, Larson 1988)
b. NPI licensing (Barss & Lasnik 1986, Larson 1988)
c. Superiority effects (Barss & Lasnik 1986, Larson 1988)
d. Weak Crossover effects (Barss & Lasnik 1986, Larson 1988, p338)
e. Sloppy identity readings (Larson 1990, p622-623)
f. Coordination (Pesetsky 1995, p175-176)

Each of these properties is illustrated below.

A. Binding effects

Many of the following properties were noticed by Barss & Lasnik (1986). Larson (1988, 1990) then argued that these and several other properties suggest the VP has a rightward-descending configuration. All the properties are based on an implication of c-command, perhaps the most obvious of which involve binding. For example, as (139) illustrates, a pronoun in a VP-internal PP can be bound by a quantifier in a PP to its left.

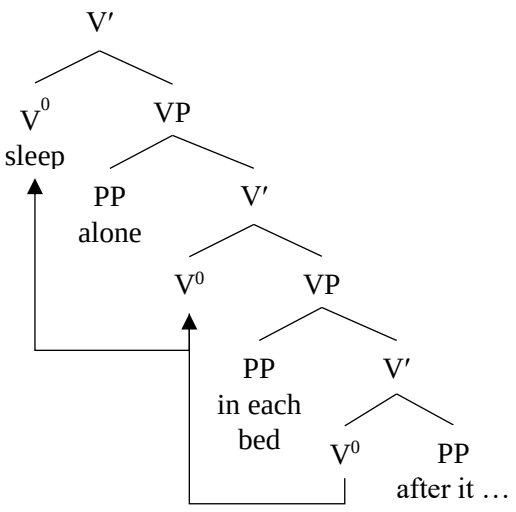
(139) a. Lee talked [$_{PP}$ to [every boy scout]$_1$] [$_{PP}$ about his$_1$ scout master].
b. Lee refused to sleep alone [$_{PP}$ in [each bed]$_1$] [$_{PP}$ after it$_1$ had been cleaned].

Importantly, the converse does not hold; a quantifier in a PP on the right cannot bind a pronoun in a PP to its left.

(140) a. *Lee talked [$_{PP}$ to his$_1$ scout master] [$_{PP}$ about [every boy scout]$_1$].
b. *Lee refused to sleep [$_{PP}$ in it$_1$] [$_{PP}$ after [each bed]$_1$ had been cleaned].

Larson (1990) took these facts to indicate that PPs on the left c-command those on the right, in a right-branching configuration. For present purposes, it is relevant to note that this holds with canonical argument PPs as in (139a), as well as with canonical adjunct PPs as in (139b). The structure of (139b) would therefore be something like (141).

(141)



Ignoring the recalcitrant issue of c-command out of PP,[62] the configuration of (141) is one in which the pronoun in the *after*-phrase can be bound by the QP *each bed*. This would not be possible on a left-branching structure, in which the *after*-phrase would be structurally higher than the QP, and thus unable to be bound by it.

The same structure is needed to account for certain Condition C effects. In (142), a pronoun in the leftward PP cannot co-refer with an R-expression in the rightward PP. If we take this to be a Condition C effect, it implies the pronoun c-commands the R-expression, which again requires a right-branching structure like (141) (again we ignore the issue of c-command out of PP).

(142) a. *Lee talked [$_{PP}$ to her$_1$] [$_{PP}$ about Mary$_1$].

b. *They were seen [$_{PP}$ inside it$_1$] [$_{PP}$ on [the house's]$_1$ second floor].

Condition A/B effects give a similar result. In many cases, a reflexive in a rightward PP can find its antecedent in a leftward PP. This appears to be a locality requirement related to Condition A/B

[62] That is, in order for c-command to fall out as intended, it must be stipulated that the PP layer enclosing the quantifier *each bed* "doesn't count" for the purposes of c-command. If we define c-command as in (i), for instance, the PP can't qualify as a branching node; otherwise the quantifier will not c-command the pronoun.

(i) X c-commands Y iff (i) X does not dominate Y and (ii) the first branching node dominating X also dominates Y.

in cases like (143a), because replacing the reflexive with a pronoun is unacceptable, as (143b) shows.

(143) a. Lee talked [$_{PP}$ to Mary$_1$] [$_{PP}$ about herself$_1$].
b. *Lee talked [$_{PP}$ to Mary$_1$] [$_{PP}$ about her$_1$].

If we assume that all these binding effects depend upon c-command, then this suggests the VP has a rightward-descending structure. However, while c-command may be a *sufficient* condition for each of these effects, it is not a *necessary* one. I discuss this in greater detail in section 5.3. Still, even if we did accept that binding effects like (139)-(143) had some consequences for the structure of the VP, we would not be able to mobilize these arguments in favor of an A/AD-based analysis of VP, because canonical arguments and canonical adjuncts behave alike with respect to these properties.

B. NPI licensing

Another property Barss & Lasnik noticed involved NPI licensing. An NPI in a given PP can be licensed by a negative expression in a PP to its left.

(144) a. They talked [$_{PP}$ to none of the students] [$_{PP}$ about anything].
b. They were seen [$_{PP}$ with no money] [$_{PP}$ at any time].

NPIs are not licensed in the inverse situation. An NPI in a PP on the left cannot be licensed by a negative expression in a PP on its right.

(145) a. *They talked [$_{PP}$ to any of the students] [$_{PP}$ about nothing].
b. *They were seen [$_{PP}$ with any money] [$_{PP}$ at no time].

If we assume NPIs are licensed under c-command by a negative expression, then these facts suggest a right-branching structure along the lines of (141).

However, it is known that c-command is not necessary for NPI licensing. This is illustrated in (146).

(146) [[No one's] homework] has been graded yet.

Ernst (1994) suggests NPI licensing can be governed by m-command plus precedence, instead of by c-command. Semantic literature traditionally takes NPI-licensing to be determined by semantic environments (e.g. downward entailing environments license NPIs). If either of these analyses are adopted, then NPI licensing does not provide evidence for a rightward-descending structure in the VP, but would also be compatible with rightward-ascending or flat structure.

Of course, whatever account of NPI licensing is adopted, canonical arguments and canonical adjuncts are treated equally (as in (144)). As such, NPI licensing suggests a uniform structure for postverbal PPs.

C. Superiority effects

Barss & Lasnik (1986) and Larson (1988) also pointed to superiority effects as evidence for rightward-descending structure. Extraction of one *wh*-element over another can be taken to be constrained by c-command; a *wh*-phrase can't be extracted over another *wh*-phrase which c-commands it. This receives an account in terms of Relativized Minimality (Rizzi 1990) which can be implemented naturally in Chomsky's (2000, 2001) Probe-Goal architecture (e.g. Preminger 2010, see also Tanaka 1999). Assuming such an account of superiority effects, the contrasts in (147) and (148) suggest that the *wh*-complement of the leftward PP c-commands the *wh*-complement of the rightward PP.

(147) a. Who$_1$ did you talk [$_{PP}$ to __$_1$] [$_{PP}$ about what]?
b. *What$_1$ did you talk [$_{PP}$ to who] [$_{PP}$ about __$_1$]?

(148) a. Which painting$_1$ did you look [$_{PP}$ at __$_1$] [$_{PP}$ in which exhibit]?
b. *Which exhibit$_1$ did you look at [$_{PP}$ at which painting] [$_{PP}$ in __$_1$]?

Thus, given a Relativized Minimality analysis, superiority effects can be taken to suggest a rightward-descending structure in the VP.

However, the status of superiority effects is entirely unclear in current theorizing. Works like Haider (2000) and Sag et al. (2009) make it clear the phenomenon is not as straightforward as the account just sketched might predict. Some (e.g. Sag et al.) argue superiority is not a grammatical phenomenon at all, but results from processing factors. I doubt such an approach will be fully adequate, but the existence of this kind of approach serves to underscore the uncertain

status of these effects; the relevance of the data in (147)-(148) for c-command is far from obvious. I therefore will not take superiority effects as solid evidence suggesting right-branching structure.

I hasten to point out, as well, that the effect seems to apply equally to canonical arguments and canonical adjuncts alike. The contrasts in (147) and (148) serve as an illustration of this.

D. Weak Crossover

Weak Crossover (WCO) effects are thought to arise when a fronted *wh*-phrase binds both a trace and an NP containing a pronoun where NP c-commands the trace. The presence of WCO effects with postverbal PPs indicates a right-branching configuration.

(149) a. Who$_1$ did you talk [$_{PP}$ to __$_1$] [$_{PP}$ about [$_{NP}$ her$_1$ mother]]?

b. *Who$_1$ did you talk [$_{PP}$ to [$_{NP}$ her$_1$ mother]] [$_{PP}$ about __$_1$]?

Extraction of *who* is acceptable in (149a), indicating that the NP *her mother* in the *about*-phrase does not c-command the *wh*-trace (because a WCO effect doesn't arise). However, extraction of *who* is unacceptable in (149b). If we take this to be a WCO effect, and if we assume WCO effects occur when an operator binds both a trace and a pronoun, it indicates the NP *her mother* in the *to*-phrase c-commands the *wh*-trace in the *about*-phrase. This pattern then suggests the leftward PP c-commands the rightward PP, which is the prediction of a rightward-descending analysis, but not a rightward-ascending analysis.

Unfortunately the argument from WCO data faces now-familiar problems. There is simply not an accepted analysis of WCO effects which would clearly implicate c-command. The classic definition mentioned above (WCO ← a trace bound by an operator and an NP containing a bound pronoun) comes from GB theory (e.g. Lasnik & Stowell 1991), but the status of such effects in current theorizing is unclear (see Safir 2017 for a review of various proposals). We therefore cannot take WCO effects as solid evidence for rightward-descending structure.

Still, it is possible to conclude that, to the extent WCO effect do tell us something about the structure of the VP, they have the same thing to say about canonical arguments as about canonical adjuncts. To illustrate, compare (149) with (150).

(150) a. Who$_1$ did you talk [$_{PP}$ to __$_1$] [$_{PP}$ with [$_{NP}$ her$_1$ mother]]?

b. *Who$_1$ did you talk [$_{PP}$ to [$_{NP}$ her$_1$ mother]] [$_{PP}$ with __$_1$]?

E. Sloppy identity readings

Larson (1990) argued that the availability of sloppy identity readings also suggests a rightward-descending configuration in the VP. Consider the availability of sloppy identity in (151).

(151) a. Zelda bought Siegfried$_1$ a picture of his$_1$ wedding day, and Felix$_2$ too.

b. Felix persuaded [a friend of Rosa$_1$] to visit her$_1$, but not a friend of Zelda$_2$.

The second clause in (151a), which is intended as Bare Argument Ellipsis (BAE) on the object *Felix* (underlyingly *Zelda bought Felix a picture of his wedding day too*), is ambiguous. On one reading, the BAE clause says Zelda also bought Felix a picture of Siegfried's wedding day. This is the strict reading, because the overt pronoun *his* refers to *Siegfried*, and the elided pronoun has the same referent.

On the other reading, the second clause says Zelda bought Felix a picture of his *own* wedding day. This is the sloppy reading, because here the elided pronoun *his* has a different antecedent in the elided clause as compared to the overt clause. Importantly, the pronoun is bound by the indirect object *Siegfried* in the antecedent clause, and is bound by the distinct indirect object *Felix* in the clause with ellipsis.

According to Reinhart (1983a), sloppy readings are available under ellipsis only when the elided pronoun is c-commanded by its antecedent. Thus, (151b) is unambiguous as an instance of BAE on the object *a friend of Zelda*, because the elided pronoun is not c-commanded by its antecedent.

Larson (1990, p622-623) pointed out that the same effect occurs with canonical adjunct PPs, as in (152).

(152) a. I always visit Max$_1$ without calling him$_1$ first, and you Felix$_2$.

b. I always visit [Max's$_1$ friends] without calling him$_1$ first, and you Felix's$_2$ friends.

In (152a), both strict and sloppy readings are available for the elided material. That is, the second clause can be interpreted as *You always visit Felix$_2$ without calling him$_1$ (=Max) first*, or it can be

interpreted as *You always visit Felix$_2$ without calling him$_2$ (=Felix) first*. On the other hand, (152b) only allows a strict reading. The second clause must be interpreted as *You always visit Felix's$_2$ friends without calling him$_1$ (=Max) first*, not *You always visit Felix's$_2$ friends without calling him$_2$ (=Felix) first*. If we adopt Reinhart's account of sloppy identity, data like (152) indicate the pronoun in the "adjunct" PP is c-commanded by the direct object, which is possible with a rightward-descending configuration, but not a rightward-ascending one.

Unfortunately, the c-command account of sloppy identity is not uncontroversial (see e.g. Keshet 2013). I therefore will not take sloppy identity data like (152) as clear evidence in favor of rightward-descending structure.

F. Coordination

Finally, Pesetsky (1995, p161) and others have argued coordination supports a right-branching analysis because of data like (153).

(153) a. Lee will talk to Terry [about politics on Wednesday] and [about sports on Sunday].
b. Lee's going camping [with Terry this week] and [with Casey next week].

If only constituents can be coordinated, then sequences of postverbal PPs must be constituents. That configuration occurs in a right-branching analysis, but not in a left-branching analysis.

Of course, as mentioned in section 2.1, coordination does not clearly reflect constituency, and is radically confounded by deletion. The sentences in (153) could easily be analyzed as involving ellipsis in the second conjunct, as in (154).

(154) a. L will [talk to T about politics on W], and [~~talk to T~~ about sports on S].
b. L is [going camping with T this week] and [~~going camping~~ with C next week].

Thus data such as (153) do not clearly indicate a rightward-descending structure.

5.3. Equivocalness of the traditional evidence

This section has reviewed various properties traditionally used to motivate different kinds of hierarchical structure in the VP. Unfortunately, the evidence is not always decisive. In some cases, it is clear that phenomena traditionally taken to reflect the structure of VP do not in fact do so. This is well-known for coordination, for example. We cannot conclude from the fact that two

strings can be coordinated that those strings are constituents.[63] I have also argued in detail (in chapter 3) that substitution tests and VP-fronting are irrelevant in determining the structure of the VP.

Most of the remaining evidence (beyond coordination, substitution, etc.), unfortunately, is simply unclear. Take the remaining properties supposedly suggesting a rightward-descending analysis from section 5.2, repeated here.

(155) a. Binding effects
b. NPI licensing
c. Superiority effects
d. Weak Crossover
e. Sloppy identity readings

The rationale for each property is that it involves a c-command relation. However, while c-command may be a *sufficient* condition for many of these effects, for none of them is it a *necessary* one. Take Q-binding. It is well-known that surface c-command is not necessary to license Q-binding, as the following examples show (compare with examples in Barker 2012).

(156) a. [[No student's]$_1$ parents] talked to their$_1$ teacher.
b. [A report on [each student]$_1$] was kept in her$_1$ teacher's desk.
c. At his$_1$ parties, [[no student]$_1$ should drink irresponsibly].

For such cases, a common analysis assumes an operation of covert quantifier raising, such that the quantifier c-commands the bound pronoun at some level of logical form (May 1977). Under such an analysis, Q-binding data like (139) do not require a rightward-descending structure in the VP. The PPs on the right could c-command those on the left, as long as there is covert quantifier raising. Alternatively, we could adopt an approach referencing linear order (see e.g. Ernst 1994, Barker 2012, Bruening 2014).

[63] Arguably, if we find that two strings *cannot* be coordinated, we can conclude that those two strings are *not* constituents. This direction of implication is not relevant for present purposes. Coordination remains irrelevant here.

Conditions A and B also do not necessarily require a rightward-descending structure, because Conditions A and B are widely analyzed without referring to c-command. While the classic formulation of Condition B does involve c-command (Chomsky 1981), Reinhart & Reuland's (1993) more descriptively adequate account of Condition B does not. See chapter 5 for details. On Condition A, Reinhart & Reuland also have a semantically-formulated account that does not require c-command between an anaphor and its antecedent. So does Ke (2019). In Ke's account, Condition A derives from Minimal Search at the phase-level. According to Ke, reflexive pronouns bear an unvalued *index* feature [IND:], which must be valued by agreement with an NP. Assuming agreement is mediated by Minimal Search applied to the full phase, then Condition A can be stated as the requirement that a reflexive's [IND:] feature must be valued by the time it is transferred. Thus, (157a) succeeds, since Search at the *v*P phase finds *the students*. But (157b) fails because Search at the CP phase fails to find a valuer for the [IND:] feature.

(157) a. The students T [$_{vP}$ ⟨the students⟩ *v* [$_{VP}$ impressed themselves].

b. *The students were told [$_{CP}$ that themselves were expelled].

Critically, this approach does not require c-command between the reflexive and the valuer. Ke's approach thus accurately predicts the acceptability of such sentences as (158).

(158) a. [Only [Lee and Terry]$_1$] like themselves$_1$.

b. [Not even [the students]$_1$] like themselves$_1$.

Though the valuers do not c-command the reflexives in (158), these examples are handled in the same way as (157a) in Ke's system. Thus, with a system like this, we don't need to appeal to c-command between PPs to account for data like (143a), and hence we don't necessarily need a rightward-descending structure for these data.

Since c-command is not a *necessary* component of these effects, the relevance of these data would therefore require evaluation of *when exactly* c-command is implicated by each phenomena. Does Q-binding from PP to PP in the VP indicate c-command, or not? For the purposes of the dissertation, I will follow Ernst (1994), Culicover & Jackendoff (2005), Janke & Neeleman (2012), and others in assuming that c-command is not involved. The phenomena in (155) are thus taken to be compatible with non-rightward-descending structure, though it remains to be shown exactly how.

Several of the remaining properties discussed in section 5.1, traditionally argued to motivate a uniformly rightward-ascending structure, are similarly unclear.

(159) a. Adverbial scope
b. Presupposition with *again*
c. Floating quantifiers
d. Focus-associating particles

The distribution of floating quantifiers (FQs), for example, bears on the structure of VP under Janke & Neeleman's assumption that FQs can attach to the left of a projection with an unsaturated theta role. But this is by no means uncontentious; many authors analyze FQs quite differently, e.g. by identifying the positions of FQs with intermediate landing sites along a movement path. Under such alternative analyses, the relevance of floating quantifiers' distribution for constituency in the VP is not clear.

Additionally, while adverbial scope interactions have traditionally been used as evidence in favor of rightward-ascending structure (Ernst 1994, 2002), the data are also compatible with an analysis involving rightward-descending structure, as Larson (2014) shows. To determine how the facts about adverbial scope bear on the structure of VP thus depends on careful evaluation of how adverbial scope-taking works. Additionally, Ernst (2002) has provided arguments against left-adjunction to the VP, in which case the data from focus-associating particles would be inconclusive.

Given the diverse range of properties potentially at issue, I will not attempt a definitive, detailed conclusion about each one on purely empirical grounds. Instead, this section serves as an argument that the analysis outlined in section 4 is plausible; evidence from binding/*do so*-substitution/etc. does not necessarily preclude a partially flat structure for the VP.

6. Conclusion

To recap the ground covered here, I (i) reviewed previous accounts of the structure of VP, (ii) described the labeling problem faced by many previous analyses and showed how *n*-ary structure overcomes this problem, (iii) analyzed evidence suggesting hierarchy within the VP, and (iv)

reviewed various potential counterarguments. In all, I conclude that it is plausible PPs could be arranged in *n*-ary-branching layers associated with different functional heads in the VP.

The purpose of these considerations was to explore consequences of eliminating the A/AD in an area where the distinction has historically played an important role. Traditionally, the A/AD has informed hypotheses about the structure of the VP, in that adjuncts are canonically relegated to more peripheral positions than arguments are. This chapter, in conjunction with the results of chapter 3, argued that the VP need not be carved up in this way. The question then naturally arises: how then are post-verbal dependents – particularly PP dependents – structured relative to the verb?

While many approaches to the structure of VP posit a uniform structure for PP dependents (e.g., all rightward-ascending, all rightward-descending, etc.), the hypothesis I explored is that post-verbal PPs are uniformly *complements* (i.e. sisters to a head). This comports with theories allowing flat structure in the VP. In addition, the flat-structure analysis has the further advantage of solving the fatal labeling problem faced by all other competing analyses. At the same time, by assuming the VP consists of multiple projections (with multiple heads), PPs can be arranged in several layers, potentially capturing the permutation possibilities of different types of PPs.

More generally, the results of this chapter suggest that, while elimination of the A/AD introduces complications for traditional analyses (e.g., by rejecting Pair Merge, traditional adjunction structures become difficult to reconcile with Labeling Theory), pursuit of A/AD-less solutions may ultimately lead to desirable simplification without loss in empirical coverage. I believe this adds plausibility to the null hypothesis, that there is no A/AD. The following chapters aim to add further support to this conclusion.

CHAPTER 5

Binding into Prepositional Phrases

1. Introduction

The previous chapter considered certain consequences of the hypothesis that there is no A/AD, specifically concerning the configuration of postverbal PPs within the VP. It was argued that, by eliminating the A/AD and hence forcing an analysis which treats postverbal dependents equally, problems emerge whose solution results in descriptive advances. For example, by treating postverbal PPs as structurally equipotent, a labeling problem occurs. The proposed solution to this problem, i.e. layered *n*-ary structure, also provides a potentially parsimonious account of postverbal constituent order, arguably improving on previous proposals.

This chapter explores additional consequences of the null hypothesis (that there is no A/AD) in the domain of pronominal binding (i.e. 'Condition B' effects). I find that approaches which adopt the A/AD face certain problems which can be more readily handled if we reject the A/AD. I outline an approach which solves a variety of problems facing traditional approaches to Condition B without assuming an A/AD.

For the purposes of this chapter, I restrict my primary focus to prepositional phrase dependents in the VP. The questions at issue, therefore, are those in (1).

(1) a. Among PP dependents of V, exactly when can an oblique pronoun (i.e. a pronoun complement of a preposition) have an co-clausal binder?

b. Is the A/AD involved in a parsimonious account of the above?

That is, I will seek a descriptive generalization describing the situations in which a (non-reflexive) pronoun can be bound, given that the pronoun is the complement of a preposition. Then, I will consider how this description might follow from linguistically-relevant principles.

To begin, I outline the phenomenon under consideration in this chapter, and explain how the A/AD might at first seem to be useful in describing the data. I then describe how these data pose problems for prior approaches to Condition B, including Chomsky (1981), Reinhart & Reuland (1993), Büring (2005), Lee-Schoenfeld (2005, 2008), Hicks (2009), and Bruening (2014). Next, I show that the data require a solution which has both a semantic (predicate-based) component and a syntactic (locality-based) component. I then motivate certain relevant aspects of the internal structure of PP, before turning to the new analysis. The chapter concludes with some speculation about the status of PP as a locality domain (i.e., as a phase).

2. The Argument/Adjunct Distinction and Condition B

The empirical focus of this chapter is licensing of pronouns within English PPs. In some instances, it is possible for a preposition to have a pronominal complement, but other times, this is not possible. A sample of some of the (im)possibilities is given in (2).

(2) a. The man$_1$ told the children$_2$ [$_{PP}$ about her$_3$].
b. The spies$_1$ realized the police$_2$ didn't know [$_{PP}$ about them$_1$] yet.
c. *The linguistics student$_1$ talked [$_{PP}$ to him$_1$].
d. *Mary$_1$ is saving money [$_{PP}$ for her$_1$].
e. The magician$_1$ cast the cloak [$_{PP}$ in front of her$_1$].
f. The customs officer$_1$ told the travelers$_2$ to give the jewels$_3$ [$_{PP}$ to him$_1$].

The sample in (2) includes several constructions which are not of direct interest to this chapter. I will narrow the empirical scope of this chapter by drawing generalizations about some of the less relevant cases. First, it is well-known that a pronoun is (virtually always) acceptable when its antecedent occurs in an entirely separate sentence.

(3) A: [$_{UTTERANCE}$ Frodo$_1$ carried the ring].
B: [$_{UTTERANCE}$ Samwise$_2$ went with him$_1$].

Further (glossing over some details involving null elements), even when a pronoun and its antecedent occur in the same sentence, a pronoun is acceptable whenever the minimal CP containing the pronoun excludes the antecedent.

(4) [$_{CP_1}$ Samwise$_2$ told Frodo$_1$ [$_{CP_2}$ he$_2$ couldn't carry the ring for him$_1$]].

In general, then, a pronoun is freely licensed when its antecedent is not contained in its same minimal CP. This chapter is interested in the somewhat more complex cases in which a pronoun and its antecedent occur within the same minimal CP.

Pronoun direct objects (not contained in a PP) are generally unacceptable in this context (i.e. in the same minimal CP as their antecedent). Consider (5), for example. The plain pronoun is unacceptable in each sentence. (A reflexive must be used in these contexts instead.)

(5) a. *The ghost$_1$ is fighting it$_1$.
b. *The couple$_1$ cooked them$_1$ breakfast.
c. *The stylist showed the customer$_1$ him$_1$ in the mirror.

Yet PPs show different behavior. A pronoun-object-of-PP can sometimes occur in the same minimal CP as its antecedent, and sometimes cannot. This is illustrated by the contrasts in (6)-(8).[1]

(6) a. *I'm looking at me.
b. I'm looking around me.

(7) a. *I am having a conversation with me.
b. I saw you with me in the mirror.

(8) a. I can recommend you to them for you.
b. *I saw you with you at the mall. (i.e. you were by yourself)

In all the examples in (3)-(8), a pronoun and its antecedent occupy the same minimal clause.[2] In half the examples, this is perfectly acceptable, while in the other half, a pronoun is unacceptable in this context, and a reflexive has to be used instead.

Of particular interest for this chapter is the way the A/AD is thought to be relevant for binding into PP. Consider the contrast in (9). Here, the direct object can bind a pronoun contained in a canonical adjunct PP, but cannot bind a pronoun contained in a canonical argument PP.

[1] Example (8a) can sound redundant with a plain benefactive, possibly because a recommendee is understood as a beneficiary even *without* an overt *for*-phrase. The intended reading can be brought out in a contrastive context:
(i) You can't recommend *yourself* to them, someone else has to recommend you to them *for* you.
[2] Although (7b) could be analyzed as containing a small clause, *Gollum with him*, as complement to *see*.

(9) a. They rolled the carpet$_1$ underneath it$_1$. (canonical adjunct interpretation)
b. *They rolled the carpet$_1$ onto it$_1$. (canonical argument interpretation)

The sentence (9a) is intended to mean that *they* (the subject of the sentence) rolled the carpet while they were underneath the carpet. This reflects an interpretation of the PP as a canonical adjunct. On the other hand, (9b) is intended to mean that they rolled the carpet up, such that the carpet ended up in a tight tube shape. This reflects an interpretation of the PP as a canonical argument. A pronoun can be bound by the subject in the former case, but not in the latter. The contrast in (9) could therefore be taken as an indication that argumenthood is relevant for binding into PP; adjunct PPs may contain a pronoun bound by the direct object, but argument PPs may not.

A similar pattern can be observed in (10). Again, a bound pronoun can occur in a canonical adjunct PP (10a), but not in a canonical argument PP (10b).

(10) a. Frodo$_1$ displayed the ring in front of him$_1$. (canonical adjunct interpretation)
b. *Frodo$_1$ displayed the ring to him$_1$. (canonical argument interpretation)

While in (9) the pattern holds for binding by the direct object, here it holds for binding by the grammatical subject. Reinhart & Reuland (1993, p661) take contrasts like (10) to demonstrate that the A/AD (in particular, the semantic A/AD) restricts the distribution of oblique pronouns; a pronoun is disallowed if it is coindexed with a "co-argument" of the verb. A consequence is that pronouns can freely occur in *adjunct* PPs.

Finally, the A/AD might appear to be relevant to the contrast in (11).

(11) a. *Galadriel$_1$ looked at her$_1$. (arguably argument-like)
b. Galadriel$_1$ looked around her$_1$. (arguably adjunct-like)

Though the PPs in (11a) and (11b) would both canonically be considered syntactic and semantic arguments of the verb *look*, Reinhart & Reuland treat the latter distinctly like an adjunct (see also Dalrymple 2001, p12). They don't discuss (11a) directly, but it can be inferred they would have to treat it more like an argument. Exactly how the A/AD is implicated here depends on the details of their analysis; I discuss this in more detail in section 3.2 below.

Despite the appearances conveyed by the contrasts in (9)-(11), I argue that the A/AD is entirely irrelevant for Condition B effects. This will be discussed in further detail in relation to

previous accounts in section 3. First, in the remainder of this section, I will organize the data to be analyzed later.

This chapter aims at an analysis of three different patterns of binding into PP. Two of the patterns involve directional PPs; the first of these is illustrated in (12)-(13).

(12) a. *Frodo$_1$ threw the cloak$_2$ at him$_1$.
b. Frodo$_1$ threw the cloak$_2$ over him$_1$.

(13) a. *Frodo$_1$ threw the cloak$_2$ at it$_2$.
b. *Frodo$_1$ threw the cloak$_2$ over it$_2$.

Example (13) shows that a pronoun contained within a directional PP with the verb *throw* cannot be bound by the verb's direct object. In contrast, example (12) shows that binding by the subject in the same context depends on the kind of preposition used. Strictly directional prepositions, such as *at* and *to*, do not permit binding by the subject, while spatial prepositions, like *around*, *over*, *near*, *behind*, etc. do.[3]

This pattern applies also for intransitive verbs, as illustrated in (14). We see the same pattern here as in (12). The subject can bind the pronoun if the preposition is *around* (14b), but not if the preposition is *at* (14a).

(14) a. *Galadriel$_1$ looked at her$_1$.
b. Galadriel$_1$ looked around her$_1$.

This pattern of binding occurs with many directional verbs, including transitives like *throw*, *roll*, *kick*, and *push*, intransitives like *look*, *point*, *motion*, and *reach*, among many others. A common feature of the transitive verbs displaying this pattern is that their directional vector necessarily originates with their agent. In an event of throwing, for example, the trajectory of motion necessarily has its source in the thrower. If *Frodo* is the one throwing *the cloak*, then the cloak begins with Frodo and ends up somewhere else. The same holds for all the other transitive verbs displaying this pattern of behavior.

[3] As I discuss in section 4, PP is split into (at least) two layers, with the prepositions that allow binding by the subject as in (12b) heading the lower portion of the structure, and the prepositions that *do not* allow binding as in (12a) heading the higher portion.

However, this semantic property (i.e. identification of the source location with the agent) is not a necessary property of directional verbs. Interestingly, a distinct binding pattern is displayed by transitive verbs which do not share this property. One example is the verb *draw*, illustrated in (15). Other relevant examples are *lure*, *attract*, *pull*, and *call*.

(15) a. Sauron$_1$ is drawing all evil$_2$ to him$_1$.
b. Sauron$_1$ is drawing all evil$_2$ before him$_1$.

(16) a. *Sauron$_1$ is drawing all evil$_2$ to it$_2$.
b. *Sauron$_1$ is drawing all evil$_2$ before it$_2$.

We see here that binding by the object is still not allowed (just like with *throw* in (13)). However, binding by the subject no longer depends on the type of preposition used.

Finally, different behavior is displayed by non-directional PPs, including those conventionally considered adjuncts. I will focus on benefactives. In contrast to the directionals in (12)-(16), with benefactives it is the object, not the subject, that can bind into the PP (cf. footnote 1).

(17) An eagle$_1$ brought Gandalf$_2$ down from the tower for him$_{2/*1}$.

This chapter will develop an analysis of these three patterns of binding behavior (i.e. that of directionals with *throw*-type verbs, that of directionals with *draw*-type verbs, and that of benefactives). I will show how this analysis predicts the contrasts of (9)-(11), supporting the conclusion that the A/AD does not have a role to play in explaining these data.

3. Previous approaches

This section reviews two broad approaches to Condition B effects from previous literature. Previous approaches to Binding Theory (particularly Condition A and Condition B) have sometimes been categorized into two types. The division concerns, fundamentally, the approach widely popularized by Chomsky (1981), which I will refer to as the *locality-based approach*, and the approach popularized by Reinhart & Reuland (1993), which I will refer to as the *predicate-based* approach.

In the locality-based approach, the binding conditions make reference to syntactic locality domains. For Chomsky (1981), famously, the relevant locality domain for a pronoun/anaphor is

its *governing category*. Others have made various other proposals for what the relevant locality domain should be. In recent years it has become common to identify *phases* as locality domains for binding (e.g. Lee-Schoenfeld 2005, 2008, Hicks 2009, Bruening 2014, Ke 2019, Charnavel & Bryant 2022, among others).

The predicate-based approach, in contrast, defines the binding conditions in terms of co-reference among co-arguments of a predicate. For example, Reinhart & Reuland (1993) defined Condition B simply as the requirement that "reflexive predicates must be reflexive-marked," where we can understand a predicate to be reflexive if two (or more) of its arguments are co-indexed. Thus, a reflexive pronoun must be used whenever two co-arguments co-refer.

Both sorts of approaches are equally capable of accounting for the basic facts relevant for Condition A and Condition B. Since my focus is on Condition B here, I will illustrate their equivalence with data in this area. Consider a sentence like (18). I have given the sentence a simplified structure for readability.

(18) a. *[$_S$ Smeagol$_1$ hates him$_1$].

b. [$_S$ Smeagol$_1$ thinks [$_S$ the hobbits hate him$_1$]].

Locality-based approaches usually adopt a version of Condition B with the form in (19), where the content of D remains to be further specified.[4]

(19) *Locality-based Condition B*:

A pronoun must be free within domain D.

For the simple contrast between (18a) and (18b), one possible locality-based approach would be to posit the minimal S as the relevant domain D (though this would be indefensible in light of other data, of course). For example, a pronoun must be free within the minimal S containing it. The pronoun *him* is bound within that domain in (18a), but not in (18b). A locality-based approach is possible and natural here, therefore.

[4] The content of "free" may also vary between approaches. Typically, authors adopt (i), following Chomsky (1981).

(i) A pronoun *p* is *free* in domain D iff there is no term XP of D such that XP c-commands and is co-indexed with *p*.

However, other definitions are possible. Bruening (2014) proposes the relation *phase command* to replace c-command. Others have argued in favor of *precede-and-command*. Also, Pollard & Sag (1994), though their approach is often characterized as a predicate-based theory, proposes an alternative of *o-command*. This chapter does not engage with these alternatives, because they do not factor into the analysis I ultimately propose in section 6.

Predicate-based approaches are equally capable of accounting for such data. We assume, for example, that the verb *hate* forms a semantic predicate[5] taking at least two arguments, i.e. its subject and its object, and the same for *think*. Then (18a) forms a semantic predicate along the lines of (20a), and (18b) along the lines of (20b).

(20) a. *hate*(*Smeagol*$_1$, *him*$_1$)

b. *think*(*Smeagol*$_1$, *hate*(*the-hobbits*, *him*$_1$))

And if we define a predicate P with arguments $< x_1 \ldots x_n >$ as reflexive iff there are two arguments x_i and x_j where $i = j$, then we see that (20a) meets the definition of a reflexive predicate, but (20b) does not. Hence, (18a) violates the predicate-based Condition B, but (18b) satisfies it.

Despite the equal ability of the two approaches to capture basic contrasts like (18), we will see in this section that the two approaches are not equally capable of accounting for all the patterns described in section 2. There turn out to be certain aspects of the patterns which, while they are more-or-less straightforward under a predicate-based approach, are problematic for locality-based approaches, and vice versa.

I should note explicitly that this chapter will not address in any detail the relative merits of the two types of approaches in areas other than licensing of oblique pronouns in the VP. I will not discuss, for example, the application of Condition B in nominals (e.g. with so-called *picture nouns*) or in raising-to-object structures (see Johnson 2018, p188-189 for relevant discussion). Nor will I discuss the application of Condition A (i.e. the distribution of reflexive pronouns). I take this omission to be justified under the assumption that Condition A and Condition B are distinct from one another, not defined as complementary.[6]

3.1. Locality-based approaches

This subsection considers the degree to which locality-based approaches are capable of handling the data considered in section 2. Let us begin with the pattern exhibited by directional PPs, which locality-based approaches are (partly) poised to capture. A core contrast is repeated below.

[5] This presupposes some way of generating objects called "semantic predicates." See section 5 for discussion.
[6] See Hicks (2009), Ke (2019), Varaschin (2020), Charnavel & Bryant (2022), among others, for precedent. The empirical justification for treating Conditions A and B separately is precisely the non-complementarity of the distributions of anaphors and pronouns which they are respectively meant to describe.

(21) a. *Frodo$_1$ threw the cloak at him$_1$.

b. Frodo$_1$ threw the cloak over him$_1$.

This contrast has received a great deal of attention in prior literature, beginning, seemingly, with Lees & Klima (1963), and receiving more intensive analysis following Chomsky's (1981) popularization of Binding Theory. Relevant data are in fact given a brief, skeptical appraisal by Chomsky (p290-291).

3.1.1. Θ-assigning prepositions

First, let us consider later attempts at accounting for the contrast in (21) under a locality-based approach to Condition B. Hestvik (1991), for example, simply argues that prepositional phrases can serve as binding domains for Condition B. In particular, according to him, binding domains are defined by theta-role assignment.

(22) *Hestvik's binding domain*:

D is the binding domain for a pronoun *x* iff D is the smallest constituent containing *x* such that all the θ-roles assigned by *x*'s governor are exhausted in D.

The PP *over him* in (21b) qualifies as a binding domain by this definition, if we assume that the preposition *over* assigns a θ-role to its complement, and if this is the only θ-role *over* assigns. *At him* in (21a) will not qualify as a binding domain if we assume that *at* does not assign a θ-role to its complement, but that the verb *throw* directly assigns a θ-role to the oblique complement.

This is the crux of a large quantity of prior work on the contrast in (21), both from a locality-based perspective and from a predicate-based perspective (as we will see later). That is, it is critical that the prepositions which seem to license a bound pronoun as their complement (like *over* in (21b), as well as *in front of*, *behind*, *near*, etc.) are θ-assigners, but that those which fail to license a bound pronoun (like *at* in (21a), as well as *to*) are not.

The same principle is also adopted by Büring (2005:54-55), directly following Hestvik. I give Büring's definition in contemporary terms below.

(23) *Büring's binding domain*:

D is the binding domain for a pronoun *x* iff D is the smallest constituent containing *x* such that D contains *x*'s case assigner C, *x*'s θ-assigner T, and all other XPs whose case or θ-role is assigned by C or T.

Lee-Schoenfeld (2008:292-293) adapts the (non-)θ-assigner distinction as a criterion for *phasehood* of PP, which she then implicates in Condition B. Her definition is given anachronistically in (24).

(24) *Lee-Schoenfeld's binding domain*:

D is the binding domain for a pronoun *x* iff D is the smallest phase containing *x*,
where D is a phase iff (i) D ∈ {*v*, D, P, C}, (ii) D has its maximum possible number of arguments, and (iii) D is not the complement of another phase.

This definition essentially updates Hestvik's definition in the terms of phase theory. Again, what is really critical is the difference between θ-assigning prepositions and non-θ-assigning prepositions.

However, the idea that the thematic properties of prepositions contribute to their relevance for Condition B turns out to be untenable. While it might seem natural for some of the examples Hestvik originally considered, such as those in (25),

(25) a. *The kids$_1$ rely on them$_1$

b. The kids$_1$ looked in front of them$_1$.

it is implausible for (21). That is, it is difficult to accept that *over* assigns a θ-role in this context, but that *at* does not, as the following paragraph explains.

The above authors do not make it clear what exactly constitutes evidence that a given preposition does or does not assign a θ-role. As far as I can tell, there is one plausible candidate for such evidence, namely the extent to which the preposition contributes some information which is not readily predictable from the verb alone. It might be supposed, therefore, that *on* in (25a) does not contribute a θ-role, because *rely on* is a verb-plus-preposition idiom; hence *on* makes no semantic contribution to the sentence independent of *rely*. It would be reasonable then to conclude that *on* is not responsible for θ-assignment. In (25b), in contrast, *in front of* does assign a θ-role,

because it specifies the target of the looking event. Another way to think about this is that the semantic denotation of *on them* in (25a) is identical to that of *them* (i.e. *on* is semantically vacuous in the idiom with *rely*), while in (25b) the semantic denotation of *in front of them* is different than that of *them* alone.

With this understanding of the supposed difference between prepositions, if we allow that *over* assigns a θ-role in (21b), then we must also accept that *at* assigns a θ-role in (21a). The preposition *at* in (21a) is simply *not semantically vacuous* in the same way that *on* in *rely on* is. *At* makes a clear contribution to the meaning of the sentence. *At* contrasts with *to*, for example. Compare (26a), containing *at the ground*, with (26b), containing *to the ground*. The use of *to* in (26b) entails that the glass reached a resting point on the ground, while this does not hold with *at* in (26a).

(26) a. Lee threw the glass at the ground, (but Terry caught it before it landed).
b. Lee threw the glass to the ground, (#but Terry caught it before it landed).

If the θ-assignment approach is to work, then it must distinguish the *kinds* of θ-roles assigned by *directional* prepositions like *at* and *to* as compared to those assigned by *spatial* prepositions like *in front of*, *near*, etc., such that, for some reason, the former don't count for the purposes of binding domains. I take this as an unnecessary complication to the theory of θ-roles, and therefore reject this approach.

3.1.2. Grammatical vs. spatial prepositions

A different locality-based approach to the problem of (21) comes from Hicks (2009), who simply assumes that there is a (for him, unexplained) distinction between *spatial* prepositions and *grammatical* prepositions. The former class, for him, is defined by their binding behavior, and includes prepositions like *near*, *behind*, *in front of*, etc., while the second class is the complement of the former, showing complementary binding behavior.

Hicks does not seek to explain this difference,[7] but proposes a difference in phasehood based on it. Specifically, PPs headed by a *spatial* preposition are "PF-phases," while PPs headed by *grammatical* (or non-spatial) prepositions are not. Since his understanding of Condition B relies

[7] He says the following on p178: "It appears then that arguments introduced by a grammatical preposition behave syntactically as if the preposition were not there, for reasons which we will not examine any further here."

upon the notion of a "PF-phase," this captures the fact that spatial prepositions can license bound pronouns, as in (21b), while non-spatial prepositions do not, as in (21a).

Hicks's approach captures the contrast of (21) within a locality-based approach. Furthermore, the difference posited between spatial and "grammatical" prepositions is not implausible, as it aligns precisely with independently-motivated structural differences between prepositions. As I discuss in more detail later (section 4), evidence suggests that spatial prepositions (*near*, *behind*, *in front of*, etc.) occupy a lower structural position in PP than non-spatial prepositions (*at*, *to*, *for*, *with*, etc.) do. The distinct structures would be along the lines of (27). Again, this is discussed and motivated in more detail in section 4.

(27) a. $[_{P_1P}$ at$_{P_1}$ him].

b. $[_{P_1P}$ $\emptyset_{P_1}$ $[_{P_2P}$ in-front-of$_{P_2}$ him]].

The locality-based approach to (21) therefore need not refer to a distinction in members of the same category, such that some prepositions (e.g. those that assign a θ-role) are locality domains while others (e.g. those that do not assign a θ-role) are not. If we connect the notion *locality domain* with the notion *phase* (as Hicks does), then we would simply assume that the category of spatial prepositions constitutes a phase but that the higher category of non-spatial prepositions does not (though why phasehood works this way has yet to be explained).

With these assumptions,[8] a locality-based approach to Condition B can capture the contrast in (21). However, a major problem is posed by the contrast between (21) and (28).

(28) a. *Frodo threw the cloak$_1$ at it$_1$.

b. *Frodo threw the cloak$_1$ over it$_1$.

Example (28) demonstrates that the type of preposition used does not make a difference for binding by a co-clausal object. That is, even though we might suppose on the basis of (21) that *over* creates a locality domain but that *at* does not (meaning the subject can bind into the former but not the latter), *over* fails to shield its complement from a Condition B violation when bound by the direct object.

[8] That is, that the category "*spatial preposition* phrase" is a locality domain for Condition B, and that the category "*non-spatial preposition* phrase" is not.

In an attempt to save the locality-based approach, we would need to stipulate that the direct object somehow is within the same binding domain as the oblique pronoun. There are two ways to do this: either (i) we rethink the size of the binding domain, extending it upwards to include the object, or (ii) we rethink the position of the object, fitting it into a position within the PP. Hicks takes up the latter possibility; his account of the contrast between (21) and (28) relies on the idea that these PPs contain PRO obligatorily bound by the object. Thus, even if we accept that the PP in (28b) is a locality domain, if this domain contains PRO bound by the object *the cloak*, then *it* cannot be coindexed with *the cloak.* See Ke (2019) for a similar idea.

(29) a. *Frodo threw the cloak$_1$ [$_{PP}$ PRO$_1$ at it$_1$].

b. *Frodo threw the cloak$_1$ [$_{PP}$ PRO$_1$ over it$_1$].

However, Hestvik (1991, p473) pointed out fatal flaws in this sort of approach. First, it makes incorrect predictions regarding intransitives. If there is also a PRO in the directional PPs in sentences like (30), then it would have to be bound by the subject (the only available antecedent). Yet this predicts the subject should not be able to bind into the PP, contrary to fact.

(30) Galadriel$_1$ looked [$_{PP}$ PRO$_1$ in front of her$_1$].

An additional issue, as Hestvik points out, comes in the licensing of PRO; it is not clear PRO should be licensed in this position. Thus, we cannot adopt an analysis which attributes unacceptability in (28) to local binding by PRO. See also Chomsky (1981, p290-291).

Thus, one potential locality-based analysis for the contrast between (21) and (28) (i.e. that the object might somehow occupy a position within the PP) seems implausible. However, what about the other analysis mentioned above (i.e. that the relevant binding domain might actually be bigger than just the PP, including the direct object position as well)? I argue that, if we stick to a solely locality-based approach, this is also implausible. Imagine, for example, that we extend the domain for Condition B up one additional binding domain, so that the relevant domain for Condition B is the phase immediately containing the one introducing a pronoun.[9]

[9] See section 3.3 for discussion of another possibility.

(31) Hypothetical Locality-Based Condition B (to be rejected):
For a given pronoun *p*, let Φ_1 be the phase immediately containing *p*, and let Φ_2 be the phase immediately containing Φ_1. Then *p* must be free within Φ_2.

Relevant structures are depicted in (32)-(33). Suppose that CP and VoiceP constitute binding domains in addition to spatial PP.

(32) a. *[$_{CP}$ Frodo$_1$ [$_{VoiceP}$ threw the cloak at him$_1$]].
b. [$_{CP}$ Frodo$_1$ [$_{VoiceP}$ threw the cloak [$_{PP}$ over him$_1$]]].

(33) a. *[$_{CP}$ Frodo [$_{VoiceP}$ threw the cloak$_1$ at it$_1$]].
b. *[$_{CP}$ Frodo [$_{VoiceP}$ threw the cloak$_1$ [$_{PP}$ over it$_1$]]].

Under these assumptions, the subject is separated from the pronoun by one binding domain in (32a), but by two in (32b). The object is separated from the pronoun by zero binding domains in (33a) (since they are in the same minimal binding domain, i.e. the VoiceP), and by one binding domain in (33b). If Condition B applies within one binding domain of the pronoun, then the object is just too close for a difference to be made by an additional PP binding domain enclosing the pronoun; it is always too close for a pronoun to be licensed. The subject, on the other hand, is far enough away that an intervening PP can make the difference in whether a pronoun is licensed.

This version of Condition B would be able to model the data in (21) and (28), but it introduces major problems. First, it makes the wrong predictions about examples like (34).

(34) Galadriel told Frodo$_1$ that he$_1$ should keep the ring.

This sentence has a structure along the lines of (35). What's relevant is that *Frodo*, the object of *tell*, is in the phase immediately above the embedded CP phase. By (31), the pronoun *he* should be free within VoiceP$_1$. It is not, yet the sentence is acceptable.

(35) Galadriel [$_{VoiceP_1}$ told Frodo$_1$ [$_{CP}$ that he$_1$ should [$_{VoiceP_2}$ keep the ring]]].

Additionally, (31) fails when confronted with *draw*-type verbs such as (36).

(36) a. Sauron$_1$ is drawing all evil to him$_1$.
b. The teachers$_1$ called their students to them$_1$.

Recall that to account for (21), we had to assume that non-spatial prepositions like *to* do not head binding domains. We would therefore predict (36a) to show the same behavior as (21a) in that we predict the pronoun not to be licensed. After all, it is not separated from the subject binder by an additional PP locality domain. Yet these sentences are acceptable.

We cannot simultaneously stipulate that directional prepositions like *to* are binding domains, to account for (36), and that they are *not* binding domains, to account for (21). This is a serious problem for an approach to Condition B based solely on locality.

In summary, locality-based approaches may find some success by assuming that certain PPs are locality domains, and that others are not. But there are certain facts for which locality-based approaches seem ill-equipped to provide a solution.

3.2. Predicate-based approaches

This section considers the predicate-based alternative to locality-based approaches. I will refer primarily to Reinhart & Reuland (1993), but similar ideas are developed by Pollard & Sag (1994) and others. The key innovation of predicate-based approaches is to relate Condition B to the structure of "semantic predicates," rather than syntactic binding. According to Reinhart & Reuland (p661, citing Partee & Bach 1981), pronouns are disallowed whenever they and their antecedents are "co-arguments" of the same predicate.

Reinhart & Reuland's analysis is formulated with the notion *semantically reflexive predicate*. Assuming semantic predicates are lexically specified to take a certain number of arguments, a semantic predicate is *reflexive* whenever two of those arguments are co-indexed. For Reinhart & Reuland, Condition B stipulates that reflexive predicates must be reflexive marked. If reflexive pronouns count as reflexive marking, then Reinhart & Reuland's Condition B requires that one of the arguments of a reflexive predicate must be realized as a reflexive pronoun.

(37) A reflexive predicate is reflexive marked.

For Reinhart & Reuland, this principle is relevant to Condition B and Condition A. Since I do not consider Condition A here, I will consider the formulation of their approach in (38).

(38) Predicate-based Condition B:
Co-arguments cannot be co-indexed.

For the purposes of this subsection, I will assume that co-arguments are "arguments of the same predicate," where a predicate is a semantic primitive defined in the lexicon (cf. the Incorporation Analysis discussed in chapter 2, section 1.2). I will revisit this understanding of the notion "predicate" in section 5.

3.2.1. *Throw*-type verbs

We have already seen how this approach applies to basic contrasts like (18). The goal of this subsection is to determine how successful the approach is in accounting for the core data discussed in section 2 above.

First, consider Reinhart & Reuland's account of the behavior of *throw*-type verbs, as in (39)-(40).

(39) a. *Frodo$_1$ threw the cloak at him$_1$.
b. Frodo$_1$ threw the cloak over him$_1$.

(40) a. *Frodo threw the cloak$_1$ at it$_1$.
b. *Frodo threw the cloak$_1$ over it$_1$.

According to Reinhart & Reuland's approach, verbs like *throw* are three-place predicates, taking an agent, a patient, and a goal as arguments. In (39)-(40), these arguments are realized as *Frodo*, *the cloak*, and the prepositional phrase (*at/over him*) respectively. Additionally, they assume that PPs can sometimes form predicates of their own. The PP *over him* is a predicate, for instance, with *the cloak* as its subject and the pronoun *him/it* as its object (the PP predicate means something like "the cloak is over him/it" here).

This explains the contrast between (39b) and (40b).The predicate *over*(*the-cloak*, *it*) is present in (40b), so co-reference between *the cloak* and *it* is not permitted. But co-reference between *Frodo* and *him* is possible in (39b), because the predicate formed is (41), which is not reflexive (no two arguments of any one predicate are co-indexed).

(41) *throw*(*Frodo*$_1$, *the-cloak*$_2$, *over*(*the-cloak*$_2$, *him*$_1$))

To explain (39a)/(40a), however, the predicate-based approach resorts to essentially the same strategy as Hestvik (1991), among others, discussed in the previous subsection. That is, it is

assumed that, while *over* forms its own predicate, *at* does not. Thus, according to Reinhart & Reuland, (39a)/(40a) result in the predicates in (42).

(42) a. *throw*(*Frodo*$_1$, *the-cloak*$_2$, *him*$_1$)

b. *throw*(*Frodo*$_1$, *the-cloak*$_2$, *it*$_2$)

This approach faces all the same problems discussed in the previous subsection. First, if *over* forms its own predicate, then we would have to conclude that *at* does as well. *At* is not a semantically vacuous preposition here; it makes a semantic contribution. For Frodo to throw the cloak *at* himself is different than if he threw it *to* himself. See example (26).

Further, even if we were to accept that *at* is semantically vacuous, the approach struggles to account for contrasts with intransitive verbs, as in (43).

(43) a. *Galadriel$_1$ looked at her$_1$.

b. Galadriel$_1$ looked around her$_1$.

If we assume that *at* does not form a predicate of its own, then the unacceptability of (43a) is predicted as a violation of Condition B. It might be possible for (43b) *not* to violate Condition B, then, but it would depend on *around* forming a predicate of its own, with a subject non-coreferential with *her*. That is, whatever the subject of the PP-predicate is in (43b), it can't be Galadriel.

But it is unclear what else the subject could possibly be. As Hestvik observes (noted above), Galadriel seems to be the only candidate. Reinhart & Reuland (p689) claim that in a sentence analogous to (43b), the subject of *around* is the abstract event variable. Thus, the predicate contributed by *around* is non-reflexive, meaning something like "the event of Galadriel's looking took place around Galadriel." But this analysis essentially treats the *around*-phrase like an "adjunct" would be treated, i.e. like an event locative. This is not correct; the event itself is not "around" Galadriel. *Around* simply denotes the target of the looking event. In order to make this approach work, we must assume that some other entity is available to be the subject of *around* in (43b), but that this same entity is *not* available in (43a).

A similar approach is advocated by Bruening (2014, p379-381), who claims that Condition B derives from "processing principles," which for him means it is computed left-to-right and top-

down, rather than in an all-at-once fashion (as in the other approaches considered so far). According to Bruening, locative PPs can form their own predicates, just as Reinhart & Reuland argue. The direct object is necessarily the subject of this PP predicate, and thus can never bind a pronoun within the PP. But the subject, being outside that domain, can license a pronoun. This captures the contrast between (39b) and (40b) (though it does not explain the difference between (39b) and (39a)).

However, sentences like (43) are just as problematic for Bruening as they are for Reinhart & Reuland. As Bruening (p381, fn26) acknowledges, "it appears that the subject of the verb is also the semantic subject of the preposition." Thus, Bruening does not expect the pronoun to be licensed in (43). To explain it, he suggests that certain prepositions are lexically specified to be able to "take a different deictic perspective, for instance that of the speaker." It is not obvious this is true,[10] nor is it clear how this would solve the problem. I will not consider this alternative further here.

The different binding behavior of subjects vs. objects is therefore difficult to explain on a solely predicate-based approach.

3.2.2. *Draw*-type verbs

Not addressed by most previous predicate-based approaches (see Lederer 2009 for an exception) is the behavior of *draw*-type verbs, as in (44).

(44) a. Sauron$_1$ is drawing all evil to him$_1$.

b. The teachers$_1$ called their students to them$_1$.

These examples show that some allegedly non-predicate PPs (e.g. those headed by *to*) permit binding by the subject without incurring a Condition B violation. If *to* does not itself form an independent predicate (as Reinhart & Reuland must argue, in order to explain the impossibility of *I threw it to me*), then these sentences would apparently be predicted to be impossible. The relevant predicate would be along the lines of (45).

(45) *draw*(*Sauron*$_1$, *evil*$_2$, *him*$_1$)

[10] Bruening proposes no definition or diagnostic for "taking on a different deictic perspective." Therefore, I can approach it only at the informal level at which Bruening presents it. At this level, I see no way that the informal description of "taking on a different deictic perspective" applies to (43b) any more than it applies to (43a). I therefore do not adopt Bruening's account; (43) remains a problem.

However, it is relevant to note that such examples *could* be accounted for on a predicate-based approach if we assume that *draw*-type verbs have a resultative interpretation, with the PP being part of a secondary predicate. Suppose that *draw* takes a result predicate as an argument instead of a goal. The goal would instead be part of the result.

(46) *draw*(*Sauron*$_1$, *go*(*evil*$_2$, *him*$_1$))

With such a representation, examples like (44a) would not violate predicate-based Condition B; the subject and the goal pronoun would not be co-arguments, so it would be permissible for them to be co-indexed.

I develop detailed arguments in favor of this basic idea in section 6.3. It is worth noting here that this analysis is *not* available for *throw*-type verbs. Recall that with *throw*-type verbs, co-reference between the subject and an oblique pronoun is unacceptable in contexts like (47).

(47) *Frodo$_1$ threw the cloak$_2$ at him$_1$.

But if *throw* had a resultative representation along the lines of (46), this would not be predicted. The relevant predicate involved in (47) would be (48). Here, *Frodo* and *him* are not arguments of the same predicate, so no predicate-based Condition B violation would be predicted.

(48) *throw*(*Frodo*$_1$, *go*(*the-cloak*$_2$, *him*$_1$))

It is precisely because of this difference between *throw*-type verbs and *draw*-type verbs that the different predicate representations are plausible. The resultative representations (46)/(48) predict that the subject can co-refer with an oblique pronoun. This is not the case for *throw*-type verbs, as (47) shows.

3.2.3. Benefactives

I conclude this subsection by noting a problem that benefactives pose for solely predicate-based approaches. Recall from section 2 that a benefactive pronoun can be co-indexed with the direct object of a transitive verb, but not with the subject.

(49) Gwaihir$_1$ saved Gandalf$_2$ for him$_{2/*1}$.

This is a major problem for predicate-based approaches. Suppose that we adopt a semantic A/AD, as Reinhart & Reuland do, and that benefactives would be adjuncts. Then (49) would involve two separate predicates along the lines of (50).[11]

(50) $save_e$ (*Gwaihir*$_1$, *Gandalf*$_2$) & for_e (*him*$_{1/2}$)

Clearly, *him* is not a co-argument of either *Gwaihir* or *Gandalf*. This correctly predicts that the pronoun should be able to co-refer with the direct object, but it incorrectly predicts that it should be able to co-refer with the subject as well.

We could reject the semantic A/AD, and adopt a neo-Davidsonian representation for (49) along the lines of (51).

(51) λe. *save*(e) & AGENT(e, *Gwaihir*$_1$) & THEME(e, *Gandalf*$_2$) & BEN (e, *him*$_{1/2}$)

With this sort of representation, we would need some alternative concept of "co-argument." See section 5 for detailed discussion. Suppose we follow Johnson (2018, p188-189) in treating "co-argument" to mean "arguments of the same event." Then the agent and the theme are both co-arguments of the beneficiary; it is not explained why the beneficiary can co-refer with the object but not the subject.

I take the binding behavior of benefactives as a major problem for predicate-based approaches.

3.3. Summary

This section reviewed two basic kinds of approaches to Condition B from prior literature. In *locality-based* approaches, Condition B prevents pronouns from being bound within a syntactically-defined locality domain. In *predicate-based* approaches, Condition B says pronouns and their antecedents cannot be co-arguments.

I provided arguments that each approach independently struggles to account for the core data introduced in section 2. I discussed in detail how both approaches have difficulties in dealing with the behavior of *throw*-type verbs. I also discussed how predicate-based approaches could

[11] I use the subscript *e* on predicates *save* and *for* to indicate that they are supposed to be treated as predicates of the same event in a Davidsonian system. The event variable is represented conventionally in (51).

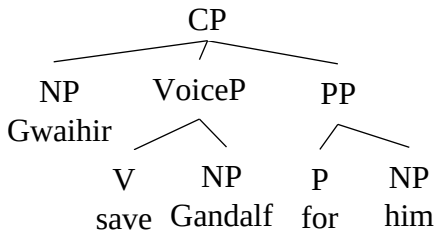
account for the behavior of *draw*-type verbs if these involve a resultative-structure, but struggle to account for the behavior of benefactives.

I note here that the deficits of each approach could be overcome by adopting aspects of the other approach. For example, predicate-based approaches cannot explain why benefactive pronouns can co-refer with direct objects but not with subjects.

(52) Gwaihir$_1$ saved Gandalf$_2$ for him$_{2/*1}$.

Yet this would be straightforward in a locality-based approach, assuming that c-command is relevant for Condition B, and assuming benefactive PPs occur higher than the direct object position, but lower than the subject position, as indicated in (53).

(53)



Conversely, locality-based approaches cannot adopt a version of Condition B as in (54) due to sentences like (55).

(54) Hypothetical Locality-Based Condition B (rejected in section 3.1.2):
For a given pronoun *p*, let Φ_1 be the phase immediately containing *p*, and let Φ_2 be the phase immediately containing Φ_1. Then *p* must be free within Φ_2.

(55) Galadriel [$_{\text{VoiceP}_1}$ told Frodo$_1$ [$_{\text{CP}}$ that he$_1$ should [$_{\text{VoiceP}_2}$ keep the ring]]].

Locality-based (54) incorrectly predicts that (55) should be unacceptable. Yet co-reference as in (55) would be straightforward for predicate-based approaches, since *he* and *Frodo* are arguments of separate predicates.

Ultimately, I will argue that aspects of both kinds of approach are needed. I develop my analysis in section 6. First, sections 4 and 5 motivate some background concepts which will be necessary for my proposal about Condition B.

4. Some aspects of the internal structure of PP

This section of the chapter motivates aspects of the internal structure of PP which will be relevant for the analysis proposed in section 6. There are three key properties. First, the PP has a bipartite structure; it (at least sometimes) consists of two distinct layers, projected by distinct syntactic heads. Second, in some cases, both layers are present even though only one is overtly pronounced. Finally, the two layers are not *always* simultaneously present; sometimes only one is projected, and the other is absent (in both syntax and interpretation). I motivate each of these properties in turn.

Let us focus on locative PPs, since these arguably have the richest structure and are most discussed in prior literature. These constituents are often assumed to be internally simplex; representations often depict a head P with a complement XP (normally an NP).

(56) [PP P NP]

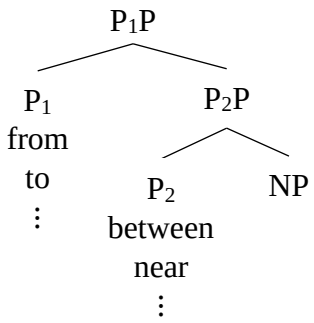
This structure may be enough to describe the simplest cases.[12] However, the syntactic and semantic properties of more complex PPs suggest this simple account is insufficient. First, consider the fact that, often, two or more distinct prepositions co-occur, as in (57).[13]

(57) a. They emerged [PP **from between** the trees].
b. ?We're headed [PP **to near** Fourth Street].
c. They rolled the ball [PP **from behind** the curtain] [PP **to under** the bed].

As various authors have pointed out (e.g. Svenonius 2010), it is natural to analyze data like these with a bipartite structure, such that the leftmost preposition (directional *from*/*to*) takes as its complement a constituent headed by the lower preposition (spatial *between*/*near*/etc.). I use the labels P_1 and P_2 for these two layers respectively (following the convention of Aboh 2010).

[12] Even some seemingly more complex examples can be accounted for by allowing the category 'P' to host seemingly phrasal prepositions like *in front of* or *next to*.
[13] Svenonius (2010) notes that *to* is often marginal when used with another preposition, as in (57b), though the reasons for this are unclear.

(58)



This hierarchical relationship between directional and spatial prepositions is recapitulated in many different languages; for reviews, see Ayano (2001), Gehrke (2008), Cinque (2010), and Lam (2013). This structure is also supported by the semantic interpretation of locative PPs.

I will proceed, therefore, with the assumption that PP is partitioned into at least two distinct layers. It will be safe to assume that the two layers are simultaneously projected in examples like (57), where each layer is expressed by an overt head. However, I also assume that the higher layer can be realized with a null head. Thus, the PPs in (59) are analyzed with the basic structure in (60).

(59) a. They went [PP between the trees].

b. Everyone put their books [PP on the shelves].

c. We remained [PP in the house].

(60) $[_{P_1P}\ \emptyset_{to}\ [_{P_2P} \left\{\begin{matrix}\text{between}\\ \text{on}\\ \vdots\end{matrix}\right\} \text{NP}\ ]]$.

The presence of a null head in such examples has syntactic and semantic motivations. First, the interpretation of P_1-less PPs like (59) is identical to that where an overt *to* is used (see e.g. Jackendoff 1983, 1990b). A desirable account of this holds that the preposition *to*, like the complementizer *that*, has two variants, one of which is phonologically null.[14]

There is also syntactic evidence in favor of the presence of a null P_1P projection. Consider the distribution of the particle *back* within the PP. It has at least two distinct uses, both of which are possible in (61). One interpretation of *back*, which I will refer to as the *iterative* interpretation, implies something like "someone had been behind the barn before." The other interpretation,

[14] This is but a special case of a much more general phenomenon in which a lexical item has various possible pronunciations. E.g., *towards* vs. *toward*, *either* /iðəɹ/ vs. /aiðəɹ/, *of* /əv/ vs. /ə/ etc.

which I will refer to as the *deictic* interpretation, says something about the relative position of the location denoted by the PP – namely that it is relatively far away.[15]

(61) a. We went [$_{PP}$ back behind the barn].

b. Everyone tossed a rock [$_{PP}$ back under the canopy].

c. The monster slunk [$_{PP}$ back inside the closet].

Yet now consider (62), when both P_1 and P_2 are realized. When *back* occurs *before* P_1, only the iterative interpretation is possible. Yet when *back* occurs *between* P_1 and P_2, only the deictic interpretation is possible. In other words, (62a) implies something like "we had been behind the barn before," but not "the barn is relatively far away," while the opposite holds for (62b).

(62) a. We went [$_{P_1P}$ ⟨back$_{iterative}$⟩ to [$_{P_2P}$ ⟨*back$_{iterative}$⟩ behind the barn]].

b. We went [$_{P_1P}$ ⟨*back$_{deictic}$⟩ to [$_{P_2P}$ ⟨back$_{deictic}$⟩ behind the barn]].

I take these facts to indicate that *back*$_{iterative}$ and *back*$_{deictic}$ are distinct lexical items, with *back*$_{iterative}$ of an appropriate semantic type to compose with a direction (denoted by P_1P) but not with a space (denoted by P_2P), and with *back*$_{deictic}$ of an appropriate semantic type to compose with a space but not a direction.

With this analysis of *back*, the fact that both interpretations are available in (61) implies that P_1P is in fact present there.[16] If there were no P_1P, then *back* would have to attach directly to P_2P, which we have seen to be impossible (in (62a)). This also comports with the semantic interpretation of P_1-less PPs, which, as mentioned, is as if a null *to* were present.

However, while the higher layer P_1P occurs whenever the lower layer P_2P occurs, it is *not* the case that the lower layer occurs any time the higher layer occurs. Sometimes, the higher layer occurs with an NP as its direct complement, no P_2P required. The evidence for this is again both

[15] Note that my choice to include *back* within the PP constituent comports with the fact that the whole bracketed strings can be fronted, with both the iterative and the deictic interpretations. Consider, e.g., (i).

(i) Back behind the barn we went.

[16] An alternative would be to assume, as Jackendoff (1983, 164) does, that spatial prepositions like *behind*, *in(side)*, etc. "lexicalize" both PATH and PLACE together, while being syntactically simplex prepositions. The downside of this alternative is that it must stipulate two lexical entries for each spatial preposition, one which lexicalizes both PATH and PLACE together, and one which lexicalizes only PLACE (in order to allow cases like *from/to behind NP*, as in (57) above). The approach adopted here is superior in that it only requires a single point of lexical redundancy in the entry for *to*.

semantic and syntactic in nature. First, Jackendoff (1983, p166) argues that, in conceptual structure, directional PPs (which he calls PATHs) can be described by the formula in (63).

(63) $[\text{PATH}] \rightarrow \left[_{\text{Path}} \text{ PATH-FUNCTION } \begin{pmatrix} [_{\text{Place}} \ x \ ] \\ [_{\text{Thing}} \ x \ ] \end{pmatrix}\right]$

This encodes the fact that a "path-function" like *to* or *from* can be defined by reference to a "place" expression *or* to a simple "thing." If we take "place" expressions to be denoted by P_2Ps and "thing" expressions to be denoted by NPs, then we expect P_1P to be able to have *either* P_2P *or* NP as its complement.

Additional, syntactic evidence comes from the availability of certain "modifiers." Svenonius (2010), among others, notes that English PPs can contain certain "degree" modifiers, as in (64a), and "deictic" modifiers, as in (64b). These are both licensed as part of the lower P_2P, not P_1P, as (65) shows.[17]

(64) a. We came/went $[_{P_1P}$ from/?to $[_{P_2P}$ $[_{\text{DegP}}$ six feet] in front of the barn]].

b. We came/went $[_{P_1P}$ from/?to $[_{P_2P}$ $[_{\text{DeixP}}$ over/here] in front of the barn]].

(65) We came/went $[_{\text{PP}} \begin{Bmatrix} \text{*six feet} \\ \text{*over/here} \end{Bmatrix}$ from/?to in front of the barn].

Now, consider examples such as (66), where no P_2 occurs overtly.

(66) We came/went from/to the barn.

Despite the fact that there is no semantic reason to expect a null P_2P projection here, one might suppose that one is required for some syntactic reason. It would not be outrageous to hypothesize a null P_2 with the semantics of an identity function, for instance. Then PP would always have a uniform structure, always consisting of a P_1P with a P_2P complement, which might be viewed as desirable.

[17] The string "We came over/here from/to in front of the barn" is acceptable, but this is a different structure than the one intended. That is, that version of *here* cannot be a PP-internal element (while the version in (64b) can). This can be seen from the impossibility of fronting in (i), indicating *here* does not form a constituent with the PP.

(i) * Over/here from/to in front of the barn, we came/went.

Similarly, "We went six feet to in front of the barn" is ok, but on a transitive reading of *go*; *six feet* would not form a constituent with the PP (as (65) intends), again revealed by the impossibility of fronting.

(ii) * Six feet to in front of the barn, we went.

Unfortunately, the distribution of degree and deictic expressions appears to contradict the null-P_2 hypothesis. Imagine there were a null, identity-function P_2 in (66), so that it had the structure (67).

(67) We came/went [$_{P_1P}$ from/?to [$_{P_2P}$ P_2 the barn]].

We would predict, then, that a degree or deictic expression should be licensed between P_1 and the null P_2, as in (68).

(68) a. We came from six feet *(in front of) the barn.
b. We came from here *(in front of) the barn.

That this prediction is disconfirmed shows that (67) is not an appropriate structure for examples like (66). Instead, when P_2 is not overtly realized, it is not syntactically present (and hence degree and deictic expressions are not licensed), which is also consistent with the semantic interpretation of such sentences. In other words, the structure of (66) is (69), with no P_2P.

(69) We came/went [$_{P_1P}$ from/?to [$_{NP}$ the barn]].

I conclude, then, that directional PPs project P_1P and optionally P_2P.[18] In the remainder of this section, I will consider how the analysis extends to other kinds of PPs. First, what about spatial locatives like those in (70)? I will assume that *near the city* and *on the train* form P_2Ps, but are these accompanied by a null P_1P in (70b) and (70c)? And in (70a), is *at* a type of P_1 or P_2?

(70) a. Lee remained [$_{PP}$ at the park].
b. Lee lives [$_{PP}$ near the city].
c. Lee appeared [$_{PP}$ on the train].

Direct evidence on either question is sparse in English, but evidence from other languages suggests that (70b) and (70c) are indeed best analyzed with a null P_1 head, and that *at* in (70a) is best analyzed as a type of P_1. Ayano (2001, p23-24) discusses evidence (also discussed by Watanabe

[18] It is important to constrain the distribution of null *to*; the null and overt variants cannot be in totally free variation, otherwise examples like (i) would be permitted, where a preposition-less NP would be interpreted as directional.
(i) * We went [$_{PP}$ $\emptyset_{to}$ the store].
I assume that null *to* c-selects P_2P to avoid this possibility.

1993, p435) from Japanese which suggests an overt P_1 head accompanies the Japanese counterparts of (70b)/ (70c). Consider (71).

(71) a. Tukue -no ue -ni
desk -GEN top-LOC
'On top of the desk'

b. Tukue-no sita -ni
desk -GEN under-LOC
'Under the desk'

c. Tukue -no mae -ni
desk -GEN front -LOC
'In front of the desk'

d. Tukue-no yoko -ni
desk -GEN beside-LOC
'In front of the desk'

Ayano analyzes the "locative nouns"[19] *ue* 'top,' *sita* 'under,' *mae* 'front,' and *yoko* 'beside' as spatial adpositions similar to their English counterparts.[20] What's relevant is the presence of the "locative" postposition *ni* in each of these PPs. Ayano argues it instantiates the category *p,* which can be analyzed as an analog of what I have referred to as P_1 here. In other words, the structure of these PPs is something like (72).

(72) $[_{P_1P}\ [_{P_2P}\ NP_{GEN} \left\{ \begin{matrix} \text{ue} \\ \text{sita} \\ \vdots \end{matrix} \right\}]\ \text{ni}\ ]$

Similar data occur in other languages. In Chinese, spatial postpositions are often accompanied by a functional preposition which can be analyzed as filling the same role as Japanese *ni*. (73) illustrates for Mandarin. Similar facts obtain for Cantonese (Lam 2013).

(73) Wǒ [$_{PP}$ zài shāfā shàng] shuì wǔjiào
1sg in/at sofa on sleep nap
'I took a nap on the sofa' (Djamouri et al. 2013:2(3))

[19] Like their English counterparts (and their counterparts in many other languages), these adpositional elements are likely derived historically from nouns. Their diachronic origin as nouns does not by any means imply that it is inappropriate to adopt a synchronic analysis of these elements as adopositions and not nouns.
[20] This glosses over certain details of Ayano's ultimate proposal, which involves a structure for PP which is more sophisticated than the simple two-layer structure adopted here.

These PPs are analyzed by Lam (2013) and Djamouri et al. (2013) as consisting of a higher prepositional layer and a lower postpositional layer, as in (74).[21]

(74) [$_{P_1P}$ zài [$_{P_2P}$ shāfā shàng]]

Thus, in these languages, there is evidence that locative PPs are introduced by a P_1 meaning something like 'at,' even in non-directional PPs analogous to those in (70b)/(70c). If we take this as evidence for what to expect about the English structure, then we might hypothesize the presence of a null *at* in (70b)/(70c). This hypothesis would be supported by the fact that spatial *at* can marginally co-occur with P_2s in English, especially when a degree expression is used, as in (75).

(75) ?We spotted it [$_{PP}$ at ten meters behind the house].
(based on Lam 2013, p24, in turn based on Svenonius 2010, p134)

The distribution of *at* in English temporal PPs also supports this conclusion. Point-temporal *at* (marking a discrete point at which an event is situated in time) can co-occur with *around* and *about*. *Around* and *about* can also occur with *from* and *until* when used to denote a temporal interval. *At* cannot co-occur with *from*/*until* in these structures.

(76) a. We got there [$_{PP}$ at about/around 2pm].
b. We were there [$_{PP}$ from (*at) about/around 2pm] [$_{PP}$ until (*at) about/around 4].

I will assume for these reasons that locative PPs like (70b)/(70c) have the structure (77b)/(77c), with a null P_1,[22] and that *at* as in (70a) is a type of P_1 (competing for the same position as directional *to* and *from*), such that (70a) has the structure (77a).

(77) a. Lee remained [$_{P_1P}$ at [$_{NP}$ the park]].
b. Lee lives [$_{P_1P}$ $\emptyset_{at}$ [$_{P_2P}$ near the city]].
c. Lee appeared [$_{P_1P}$ $\emptyset_{at}$ [$_{P_2P}$ on the train]].

[21] These authors argue against the potential alternative analysis (e.g. Huang et al. 2009) treating the postpositional elements as a special type of nouns.
[22] The distribution of the null *at* must be constrained to rule out things like (i). The means for restricting null *to* in footnote 18 can be applied here as well: null *at* c-selects P_2P.
(i) Lee lives [$_{PP}$ $\emptyset_{at}$ the city].

A consequence of this analysis is that many PPs are ambiguous. A PP such as (78a) could have the structure (78b) or the structure (78c), because P_1 could be instantiated by either $\emptyset_{to}$ or $\emptyset_{at}$.

(78) a. under the stairs

b. $[_{P_1P}\ \emptyset_{to}\ [_{P_2P}$ under the stairs]].

c. $[_{P_1P}\ \emptyset_{at}\ [_{P_2P}$ under the stairs]].

Supporting evidence for this ambiguity comes from case assignment in languages such as Russian, Polish, and Czech, as documented by Biskup (2010, 2019). One key conclusion to be drawn from Biskup's data is that P_1, not P_2, controls case on the prepositional complement. To illustrate, first consider that Czech spatial prepositions (e.g. *nad* 'above,' *pod* 'under,' and *před* 'in front of') can take complements in the instrumental case or in the accusative case, while directional *z(e)* 'from' takes a genitive complement. Examples from Biskup (2019, p169) are given in (79)-(81).

(79) a. nad bedn-ami
above box-INST.PL
'Above the box'

b. pod bedn-ami
under box-INST.PL
'Under the desk'

c. před bedn-ami
in.front.of box-INST.PL
'In front of the box'

(80) a. nad bedn-y
above box-ACC.PL
'Above the box'

b. pod bedn-y
under box-ACC.PL
'Under the desk'

c. před bedn-y
in.front.of box-ACC.PL
'In front of the box'

(81) z aut-a
from car-GEN.SG
'Out of the car'

Now, when P_1 and P_2 co-occur in the Czech counterpart to English *from behind*, we find genitive on the prepositional object (examples from Biskup 2019, p171). This indicates that P_1 controls case assignment in such examples.

(82) a. ze-za stol-u
from-behind table-GEN.SG
'From behind the table'

b. z-pod stol-u
from-under table-GEN.SG
'From under the table'

c. z-po-nad stol-u
from-on-above table-GEN.SG
'From above the table'

If P_1 consistently controls case assignment, then there must be null P_1 responsible assigning instrumental and accusative case in (79) and (80). Critically, Biskup notes that case on the prepositional object correlates with directional vs. spatial interpretation: the instrumental versions have a spatial interpretation, while the accusative versions have a directional interpretation, as reflected by the impossibility of accusative with non-directional predicates.

(83) a. ležet nad bedn-ami
lie above box-INST.PL
'It lies above the box.'

b. *ležet nad bedn-y
lie above box-ACC.PL
'It lies above the box.'

I take these facts to substantiate the hypothesis that there may be null $\emptyset_{to}$ and $\emptyset_{at}$ in P_1, with $\emptyset_{to}$ assigning accusative and $\emptyset_{at}$ assigning instrumental.

As for other, non-locative prepositions, such as benefactive *for*, dative *to*, comitative *with*, etc., I will assume that they uniformly instantiate P_1, in English at least.

This concludes my discussion of the internal structure of PP. To summarize, I assume that PPs consist of up to two distinct layers,[23] of which P_1P is always present (sometimes null) and P_2P is only sometimes present. The following section of this chapter outlines an analysis of Condition B in which the presence/absence of P_2P plays an important role.

5. On the notion "semantic predicate"

I have argued that certain aspects of the distribution of pronouns in English call for a predicate-based analysis of Condition B. As discussed above, the preeminent predicate-based analysis of Reinhart & Reuland (1993) adopts a principle along the lines of (84).

(84) Co-arguments cannot be co-indexed.

What does *co-argument* mean? Reinhart & Reuland's system assumes there are "semantic predicates" which have an internal syntax amenable to this sort of definition. According to them, a semantic predicate is an object which exists "at the stage of translating syntactic predicates into semantic ones." Modifying Reinhart & Reuland's notation, a semantic predicate has the form (85), consisting of a head P and series of arguments $x_1 \ldots x_n$.

(85) $P(x_1 \ldots x_n)$

For example, the sentence (86a) involves the semantic predicate (86b).

(86) a. The queen invited Max.
b. invite(the-queen, Max)

Given this system, *co-argument* can simply be understood to stand for the relation "argument of the same predicate."

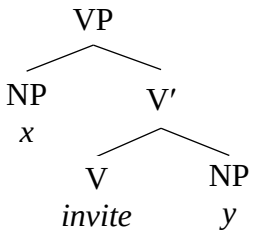
Exactly how do objects like (86b) come about? According to Reinhart & Reuland (p678), they are "formed of P […] and all its arguments at the relevant semantic level," i.e. at the LF-interface. But the term *argument* means something different in semantics than it does in syntax. In the predicate logic appropriated by formal semantics, *argument* is a notational term; it simply

[23] Others have argued that PPs may be comprised of even more layers. See e.g. Koopman (2000), Den Dikken (2010), Svenonius (2010). The arguments for this tend to be based on assumptions from Cartography, e.g. the idea that the deictic and degree expressions of (64)/(65) must be introduced by dedicated functional projections. Since I do not adopt these assumptions, I will not assume additional structure in the PP beyond the two layers I have motivated here. Ayano (2001) also argues for three layers instead of two.

refers to the element(s) to which a particular functor applies. In syntax, *argument* stands in opposition to *adjunct*, and as such is *not* a mere notational term, as I have discussed at length.

In a framework assuming (i) VP-internal subjects (along the lines of Koopman & Sportiche 1991), (ii) non-decomposable lexical predicates (like $\lambda x \lambda y$.invite(x, y) for the verb *invite*), and (iii) a syntactic A/AD, this might not be a problem. One could assume that all the semantic arguments of a predicate V are contained within the VP as syntactic arguments of V. The derivation of a semantic predicate like (86b) from a syntactic structure like (87) would seemingly be straightforward. The set of arguments of the predicate *invite* would simply correspond to the set of NPs governed by V.

(87)



Perhaps this is the sort of system Reinhart & Reuland had in mind. However, I do not assume VP-internal subjects (following Kratzer 1996), I do not assume non-decomposable lexical predicates (following Parsons 1990), and I do not assume a syntactic A/AD. Therefore, it is not clear what the source of an object like (86b) would be, and hence the *co-argument* relation is also unclear.

In this subsection, I will outline a way in which the required notion "predicate," and hence *co-argument*, can be situated within the syntactic framework I adopt in this dissertation. The proposal will be formulated based on requirements from Theta Theory, which strongly requires a unified concept of "predicate" for *univocality of θ-marking*. First, I will offer some background on univocality, and then I will propose a set of assumptions which I argue to be necessary to implement univocality. In the next section (section 6), I argue that the notion of predicate which emerges from the consideration of univocality is exactly the notion needed to implement a predicate-based Condition B.

5.1. Theta Theory

Consider the sentence in (88a), with the associated partial structural representation (88b).

(88) a. *Terry invited.

b. [Terry [Voice [~~Terry~~ [*v* invite]]]

Example (88a) is intended to be synonymous with the acceptable "Terry invited themselves." The structure (88b) is one in which a single NP (*Terry*) occupies both the internal-argument position and the external-argument position. According to Chomsky (2021), Theta Theory is needed to explain why the representation (88b) is non-generable, and hence why (88a) is unacceptable. Critically, there seems to be no *structural* reason why (88b) should be blocked. Consider the derivation (89) illustrating how (88b) could be generated via Internal Merge of *Terry*.

(89) a. EM(Voice, β) → [$_{\gamma}$ Voice [$_{\beta}$ Terry [$_{\alpha}$ *v* invite]]]

b. IM(Terry, γ) → [$_{\delta}$ Terry$_1$ [$_{\gamma}$ Voice [$_{\beta}$ Terry$_2$ [$_{\alpha}$ *v* invite]]]]

IM of the object must be permitted in general, in order to allow legitimate object extraction (e.g. object *wh*-questions or object-relative clause-formation). The application of IM in (89b) is therefore legitimate by purely structural considerations.[24]

Given this, what *does* block (89b)? According to Chomsky (2021, building on earlier ideas from Chomsky 1981 and other work), this is where Theta Theory comes in. Specifically, Theta Theory includes a condition of *univocality* (Chomsky 2021, p21).

[24] Chomsky (2021) argues that application of IM as in (89b) would be blocked by the principle Duality of Semantics (DoS), which states that IM cannot create a θ-position. Since (89b) creates a θ-position (i.e. it creates Spec-Voice), (89b) would be blocked by DoS. (Chomsky treats DoS as a condition on application of Merge, not as a filter on already generated representations.)

However, Chomsky (2021) actually permits an *alternative*, DoS-compliant derivation to generate (88b). Chomsky argues that two structurally identical elements are treated as copies in a c-command configuration *if and only if* the operation FORM-COPY (FC) applies. (By default, structurally identical elements are treated as distinct from one another, allowing repetition structures like 'Terry$_1$ invited Terry$_2$,' where Terry$_1$ and Terry$_2$ are different people.)

FC requires many ancillary assumptions and stipulations, discussion of which would complicate the exposition in this subsection unnecessarily. Ultimately, if FC is adopted following Chomsky (2021), then there is an *a priori* legitimate derivation of (88b) using FC, as in (i).

(i) a. EM(Terry$_1$, [Voice [invite Terry$_2$]]) → [Terry$_1$ [Voice [invite Terry$_2$]]]

b. FC(Terry$_1$, Terry$_2$) → [Terry$_1$ [Voice [invite ~~Terry$_2$~~]]]

Given this, univocality becomes necessary to block FC.

I do not discuss DoS in the main text here, as it does not factor into the analysis I develop later, and I believe it may ultimately be unnecessary. Instead, if we do adopt FC, then DoS may simply follow from univocality plus obligatoriness of FC. I believe that omission of these details significantly streamlines the exposition in this subsection. Thus, in the simplified version of Theta Theory presented in this subsection, univocality is needed to constrain application of IM (instead of to constrain application of FC as in the more complex system of Chomsky 2021).

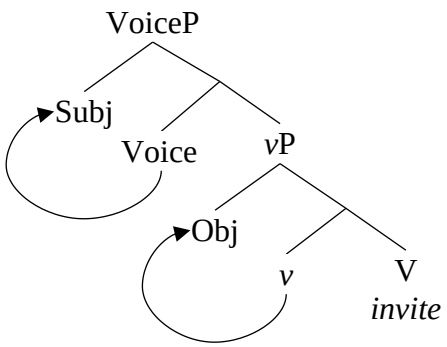
(90) *Univocality of θ-marking* (non-final):

A single theta assigner cannot assign two theta roles to the same element.

This presupposes that the occurrence of *Terry* in Spec-Voice (assigned AGENT) and the occurrence of *Terry* in Spec-*v* (assigned THEME) in some sense have "a single theta assigner." It also presupposes that the two occurrences of *Terry* count as "the same element" in some sense. If both these presuppositions hold up, then (90) successfully blocks (88b), correctly predicting ungrammaticality for (88a).

For the purposes of this dissertation, I will assume the validity of the second presupposition (i.e. that the two *Terry*'s count as the same element in the required sense).[25] On the first assumption (that there is a single θ-assigner for the AGENT and THEME θ-roles), however, let us assume, as discussed in chapter 2, that the AGENT θ-role is assigned by Voice and the theme θ-role is assigned by *v*. The tree diagram in (91) illustrates that Voice is assumed to assign AGENT to the external argument, distinct from assignment of the THEME θ-role to the internal argument.

(91)



If that's the case, then it is not obvious that there is a single θ-assigner for the two θ-roles. Instead, it looks like there are two different θ-assigners. For univocality to successfully block (89b), there must be some sense in which assignment of AGENT and THEME are connected. I propose that the notion *semantic predicate* can be defined in such a way as to provide the necessary connection. If we treat Voice and *invite* as comprising a single semantic predicate, then univocality can be defined as in (92).

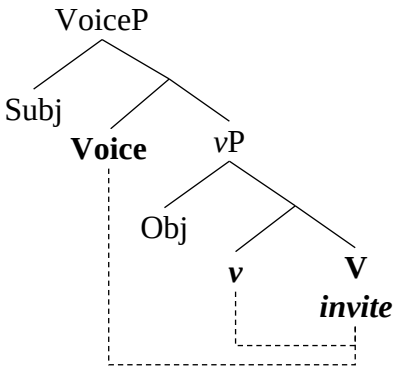
[25] Actually, according to Chomsky (2021), the two occurrences count as "the same element" if and only if the operation FORM-COPY applies to them. See footnote 24.

(92) *Univocality of θ-marking* (final):

A single semantic predicate cannot assign two theta roles to the same element.

The following subsection will develop a clear definition for *semantic predicate*. For the moment, it is relevant that Voice, *v*, and *invite* must comprise a semantic predicate together, and that the composite predicate must assign two θ-roles, AGENT to the external argument and THEME to the internal argument. We might represent this graphically by connecting Voice and *v* to *invite* with dashed lines and with boldfacing, as in (93).

(93)

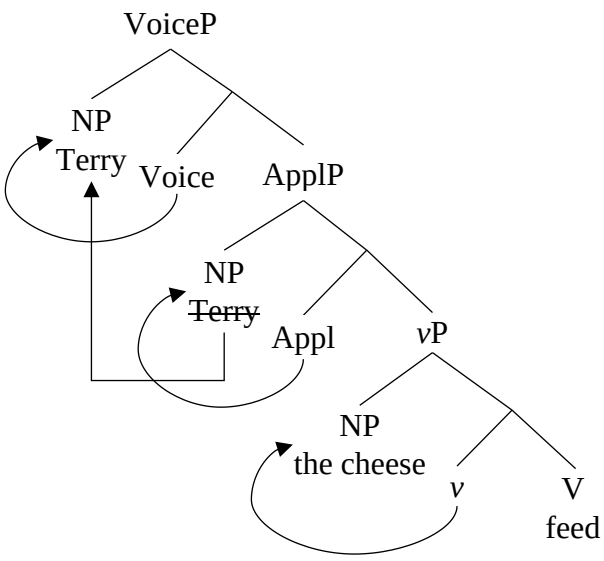


Before moving on to define *semantic predicate*, it is relevant to establish what sorts of elements must make up semantic predicates for the purposes of univocality. Example (88) requires that the verb and Voice form a semantic predicate, in order to block IM of the object into Spec-Voice (where it would receive the AGENT θ-role). By essentially the same logic, examples like (94) require that Appl also forms a semantic predicate with the verb (and with Voice).

(94) *Terry fed the cheese.

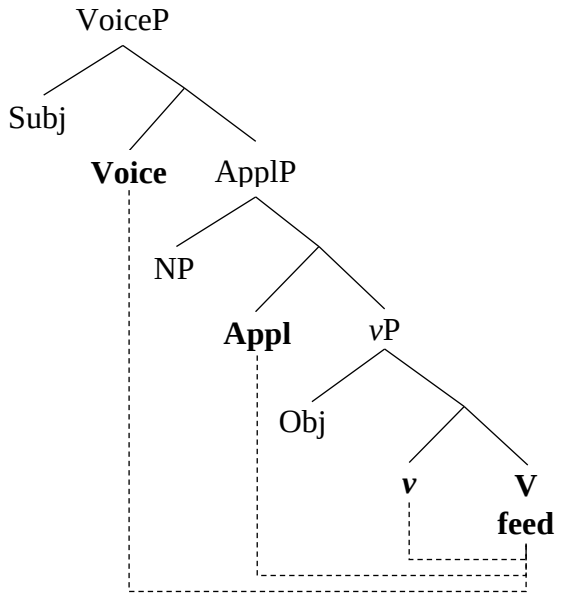
This sentence is intended as a ditransitive synonymous with *Terry fed themselves the cheese*. Assuming that ditransitives are formed with an applicative projection ApplP (following Pylkkänen 2002, 2008, Bruening 2010, Bosse 2015, and many others), then (94) could be generated via a derivation such as (95).

(95)



This diagram represents a derivation in which the NP *Terry* is generated in Spec-Appl, where it receives the RECIPIENT θ-role, and then moves into Spec-Voice, where it receives the AGENT θ-role. Univocality blocks this if Voice and Appl comprise a predicate, as represented with dashed lines and boldfacing in (96).

(96)



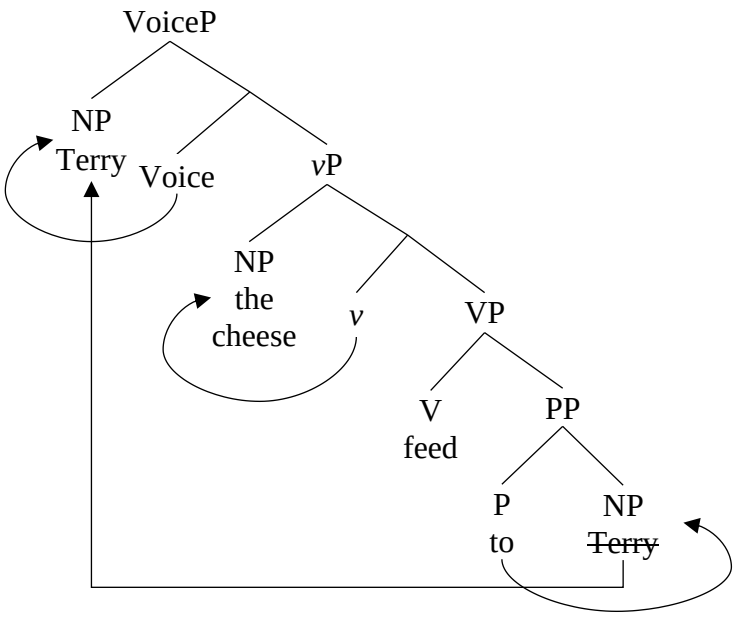
It is often assumed that prepositions are responsible for assigning θ-roles to their complements. I assume that in prepositional ditransitives like (97), the preposition *to* assigns the RECIPIENT θ-role to its complement.

(97) Terry fed the cheese to Lee.

Importantly, it is not possible to generate a sentence like (98), intended to be synonymous with *Terry fed the cheese to themselves*, along the lines depicted in (99).

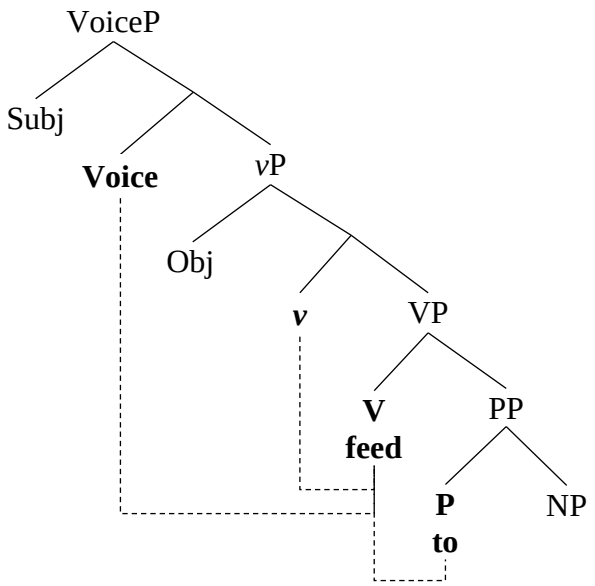
(98) *Terry fed the cheese to.

(99)



In order for univocality to block this derivation, it must be the case that the preposition and Voice are linked as part of the same semantic predicate, as depicted with dashed lines and boldfacing in (100).

(100)



This applies to all θ-assigning prepositions, including prepositions assigning conventional adjunct θ-roles. It is not possible to form the sentences in (101) via IM of *Terry* from prepositional complement position to Spec-Voice.

(101) a. *Terry is throwing a party for ~~Terry~~. (cf. … for themselves)

b. * Terry is planning the party with ~~Terry~~. (cf. … for themselves)

This implies that prepositions participate in the semantic predicates relevant for univocality.

I have argued that θ-assigners must be associated with one another in such a way as to form semantic predicates for the purposes of univocality (92). This applies to argument introducers including Voice and Appl, as well as to prepositions. The precise nature of the association needed among θ-assigners falls beyond the scope of this dissertation. For present purposes, I will assume ad hoc that association is accomplished via a mechanism of *θ-indexation*, to be made precise presently. It must be noted that I make no theoretical commitment to this particular mechanism; I adopt it only to make the following discussion unambiguous. All that matters is that θ-assigners are related to one another in some way; nothing hinges on the formal details of θ-indexation, therefore.

5.2. Defining "semantic predicate"

I propose to redefine *semantic predicate* in syntactic terms, exploiting the hypothesis that θ-roles are not assigned directly by the verb, but are instead assigned by argument-introducers (as discussed in chapter 2). In a simple ditransitive sentence like (102), I assume that the AGENT θ-role is assigned by Voice, not by V. Similarly, I assume that the RECIPIENT θ-role of the first (i.e. higher) object in double-object constructions is assigned by Appl. The θ-role assigned to the direct object might be assigned directly by V, or it might be assigned by an intermediary head (see e.g. Lohndal 2014). For notational convenience, I will assume it is assigned by *v* here.

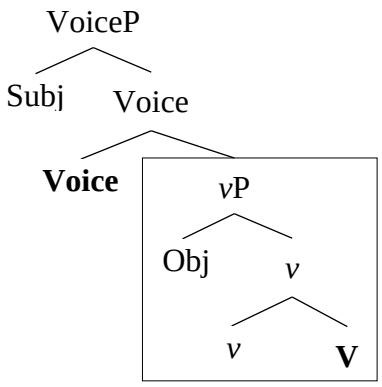
(102) Terry handed Lee the baton.

I will assume that θ-assigners include argument-introducers (Voice, Appl, *v*) and certain prepositions. Specifically, L-selected prepositions are not θ-assigners, but other prepositions assign θ in a way analogous to Voice/Appl/*v*.

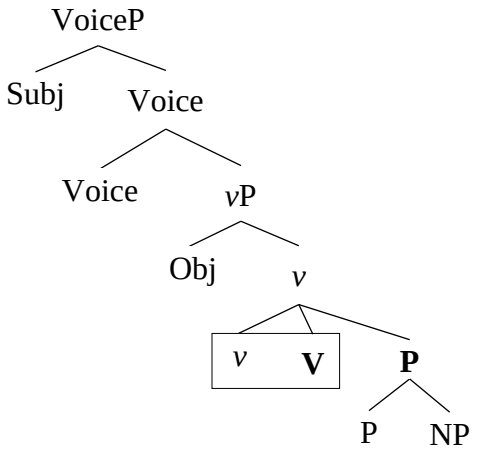
Each θ-assigner must be licensed at the CI-interface; θ-assigners need to be related to a verb (for present purposes; more generally they need to be related to a predicative root). I assume that licensing is accomplished at the CI-interface via a relation of *θ-indexing*. Each θ-assigner must participate in a relation INDEX(assigner, V) in order to be licensed. For a given θ-assigner A, I assume that the INDEX relation is established via minimal search from A's label (at the CI-interface, after labeling applies). Example (103) shows the search domain for θ-indexing by Voice, and (104) shows the search domain for θ-indexing by a low PP.[26]

[26] I assume that θ-roles are syntactic features, as suggested by Hornstein (2001, 2009) and Funakoshi (2009), such that a θ-assigner and the NP that it assigns a θ-role to share θ-features, facilitating ⟨θ,θ⟩ labeling analogous to ⟨φ,φ⟩ of Chomsky (2013, 2015). Thus, what is conventionally labeled VoiceP, with the external argument in its specifier, would be labeled ⟨θ,θ⟩. As a consequence of this, Chomsky's labeling analysis of EPP is partially weakened. According to Chomsky, one of the reasons the external argument must raise to Spec-TP is that its base-configuration {EA, *v*′}, is unlabelable. Given my assumption about ⟨θ,θ⟩, this configuration actually *is* labelable. This accords with the fact that EA remains in situ in many languages, as Chomsky (2021) notes.

(103)

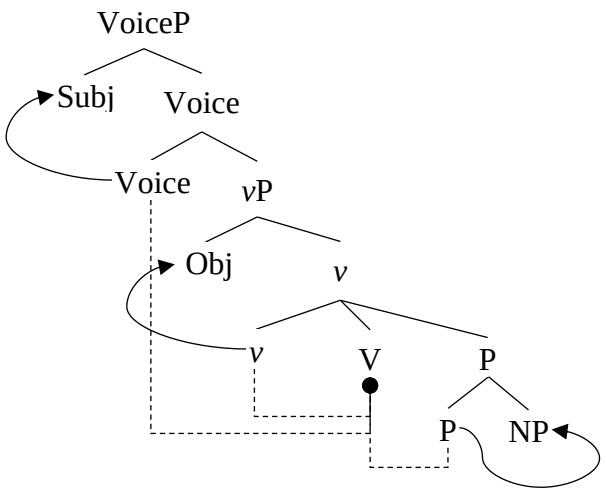


(104)



Thus, θ-assigners need to do two things, (i) they need to θ-index a verb, and (ii) they need to assign their θ-role to an NP. These two requirements are illustrated in (105). θ-assignment is represented with a solid arrow, and θ-indexing is represented with a dashed line. This example shows that Voice and *v* assign θ-roles to their specifiers, while P assigns a θ-role to its complement. All three θ-assigners index the same verb V.

(105)



I propose to define the notion "semantic predicate" within this system. As a first approximation, a semantic predicate is a verb plus a set of θ-assigners that θ-index that verb. For example, (105) might include a semantic predicate {Voice, *v*, P, V}. This enables us to say that the *dependents* of a given semantic predicate PRED are the NPs which receive a θ-role from (a member of) PRED.

(106) X is a *dependent* of semantic predicate PRED iff a member of PRED assigns a θ-role to X.

This enables the relation of "co-argument" needed to get the predicate-based approach to Condition B off the ground. Roughly speaking, two NPs are *co-arguments* if they are dependents of the same predicate. (The relation will be more precisely formulated in the following subsection.)

The critical idea is that a semantic predicate is a set of θ-assigners. I will formalize this idea with the following definition (where D(Y) denotes Y's c-command domain):

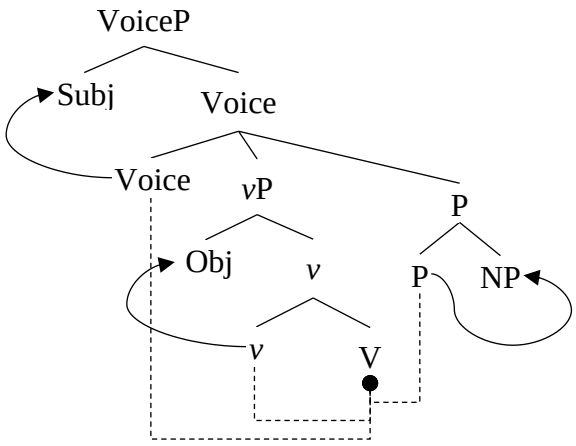
(107) SEMANTIC PREDICATE:
If Y θ-indexes V, then {Y, V} ∪ Z is a *semantic predicate* iff
Z = {X ∈ D(Y) | X θ-indexes V} ∪ {Y, V}.

For (105), this defines a semantic predicate {Voice, *v*, P, V}. Importantly, it also defines a semantic predicate {*v*, P, V}, since *v* θ-indexes V and c-commands P (which also θ-indexes V). It also defines a semantic predicate {P, V}, since P θ-indexes V and c-commands none of V's other θ-indexers. Note that these predicates stand in containment relations with one another.

(108) {Voice, *v*, P, V} ⊇ {*v*, P, V} ⊇ {P, V}

But this does not necessarily have to be the case. Suppose that the PP of (105) attached at a point higher than *v*P, as indicated in (109).

(109)



In this structure, there is a semantic predicate {Voice, *v*, P, V}, and there is a predicate {P, V}, just like in (105). But there is no predicate {*v*, P, V}, because P is not within *v*'s c-command domain here. Instead, there is a semantic predicate {*v*, V}. This means that the semantic predicates of (109) do *not* form a strict containment hierarchy. This has important consequences for the analysis I develop in the following section.

This concludes my discussion of the notion "semantic predicate" given my assumptions about θ-assignment. To summarize, my key assumptions are as follows. First, argument introducers (Voice, Appl, *v*) and prepositions are θ-assigners. Second, θ-assigners must index a verb in order to be licensed. Third, *semantic predicates* are sets of θ-assigners that index the same verb, according to the definition in (107).

6. A hybrid approach to Condition B

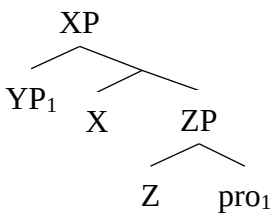
Let's now return to the discussion of Condition B. This section develops my approach to Condition B and shows how it can account for the core data of section 2. In brief, what I will propose is this. Condition B is a filter on predicates, roughly along the lines proposed by Reinhart & Reuland (1993). That is, Condition B enforces something which could be informally stated as (110).

(110) Co-arguments cannot be co-indexed.

However, in addition to this, I argue that Condition B is not a global filter on semantic predicates, but only applies at fixed points. If a pronoun meets the condition at the designated derivational moment, then the condition is fully satisfied, even if it would be violated at a later stage.

Let me first illustrate the proposal abstractly. Take the structure in (111), assuming that YP and pro count as co-arguments.

(111)



Depending on when Condition B applies, it may or may not be violated in this configuration. Say that Condition B for pro applies at XP. At this point in the derivation, YP and pro are co-arguments, so if Condition B is evaluated at a point when XP has been constructed, Condition B will be violated. But imagine that Condition B instead applies at ZP. Within this domain, YP is not present. Thus, pro and YP cannot be co-arguments at this stage. If Condition B applied at ZP, then, there would be no violation.

This is the essence of the proposal here. I suggest that some sentences, by the end of their derivation, avoid violation of Condition B, because Condition B is evaluated at a derivational point before an offending predicate is constructed. This is relevant particularly with locative and directional PPs, because of the potential presence of P_2P, which I assume to affect the point of application of Condition B.

6.1. Basic cases

To illustrate the proposal, I will first discuss my implementation of the co-argument constraint for Condition B, and then I will discuss the timing constraint that I propose Condition B is subject to.

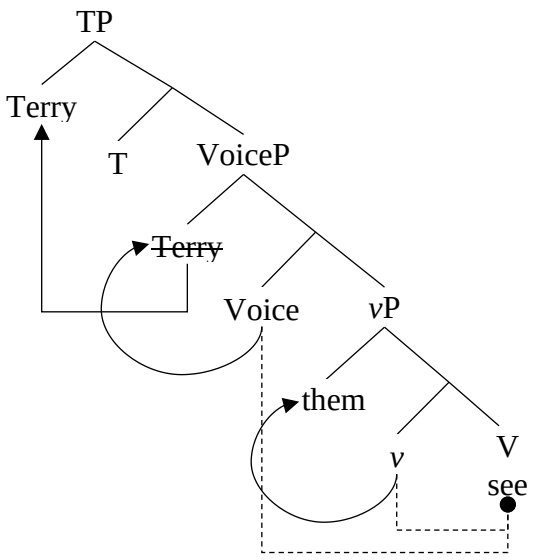
As discussed in detail above, predicate-based approaches to Condition B stipulate that pronouns cannot be co-indexed with co-arguments. I propose to implement the notion "co-argument" in terms of semantic predicates as defined in subsection 5.2 above.

(112) Hybrid Condition B (non-final):

Given a noun phrase NP and a pronoun p, p cannot be co-indexed with NP if every syntactic predicate θ-marking NP also θ-marks p.

I will now illustrate how this applies in a simple transitive clause. Take (113) for the sentence *Terry saw them*.

(113)

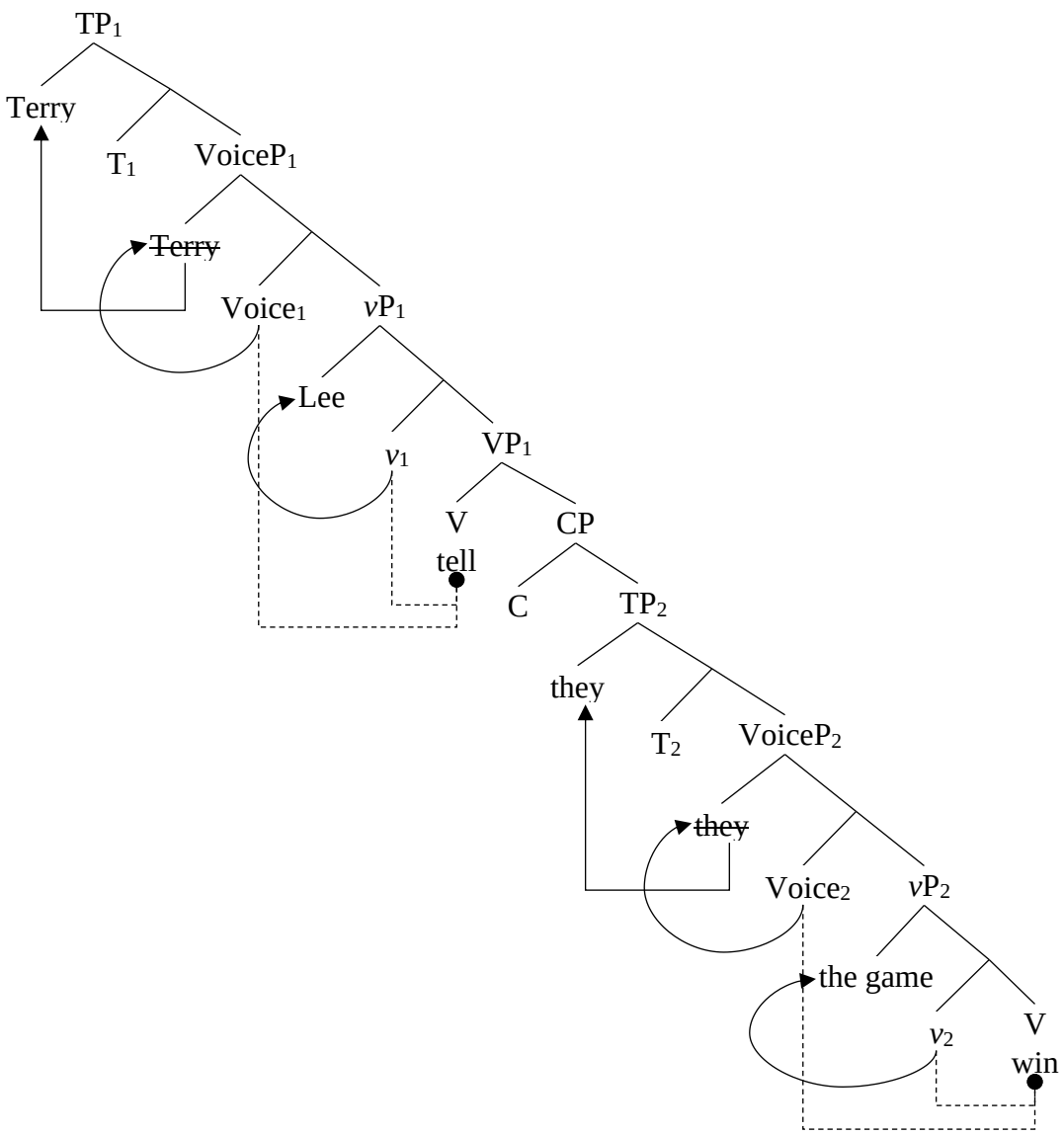


Here, Voice and *v* θ-index the verb *see*, forming the semantic predicates {Voice, *v*, see} and {*v*, see}. Voice assigns AGENT to *Terry*, and *v* assigns THEME to *them*. Thus, the semantic predicate {Voice, *v*, see} θ-marks both *Terry* and *them*. *Terry* and *them* cannot be co-indexed, because every semantic predicate which θ-marks *Terry* (i.e. only {Voice, *v*, see}) also θ-marks *them*. This captures the unacceptability of (114).

(114) *Terry$_1$ saw them$_1$.

Now consider (115) for the sentence *Terry told Lee they won*.

(115)



Here, the embedded clause and the matrix clause form two distinct semantic predicates. The matrix clause assigns θ to *Terry* and to *Lee*, but not to *they* or *the game*. There is no predicate which θ-marks both *Terry* and *they*, nor any predicate which θ-marks both *Lee* and *they*. This correctly predicts the acceptability of (116), with *they* referring to either *Terry* or *Lee* (or someone else).

(116) Terry$_1$ told Lee$_2$ they$_{1/2}$ won the game.

6.2. Directionals with *throw*-type verbs

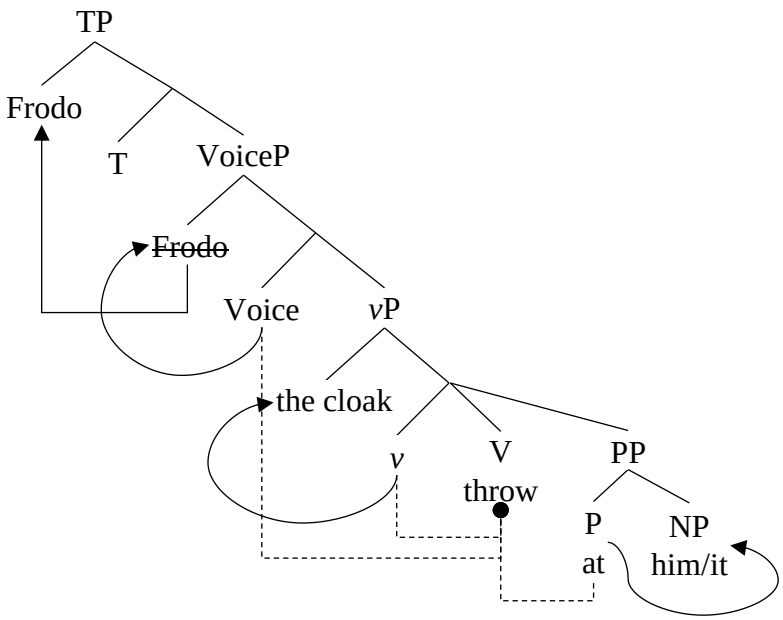
This approach can also capture the unacceptability of sentences such as those in (117).

(117) a. *Frodo$_1$ threw the cloak at him$_1$.

b. *Frodo threw the cloak$_1$ at it$_1$.

For these sentences, a structure of the form in (118) is predicted.

(118)



According to the definition in (107), {Voice, *v*, P, V} is a semantic predicate in this configuration. This is also the only predicate which θ-marks *Terry*. Since this predicate also θ-marks *him*, (112) blocks co-reference between *him* and *Terry*. Similarly, the predicates {Voice, *v*, P, V} and {*v*, P, V} are the only ones θ-marking *the cloak*. Since these also θ-mark *it*, co-reference between *the cloak* and *him* is not permitted.

However, the condition in (112) is not sufficient to rule out (119), where a pronoun co-referent with the subject is the complement of a spatial preposition.

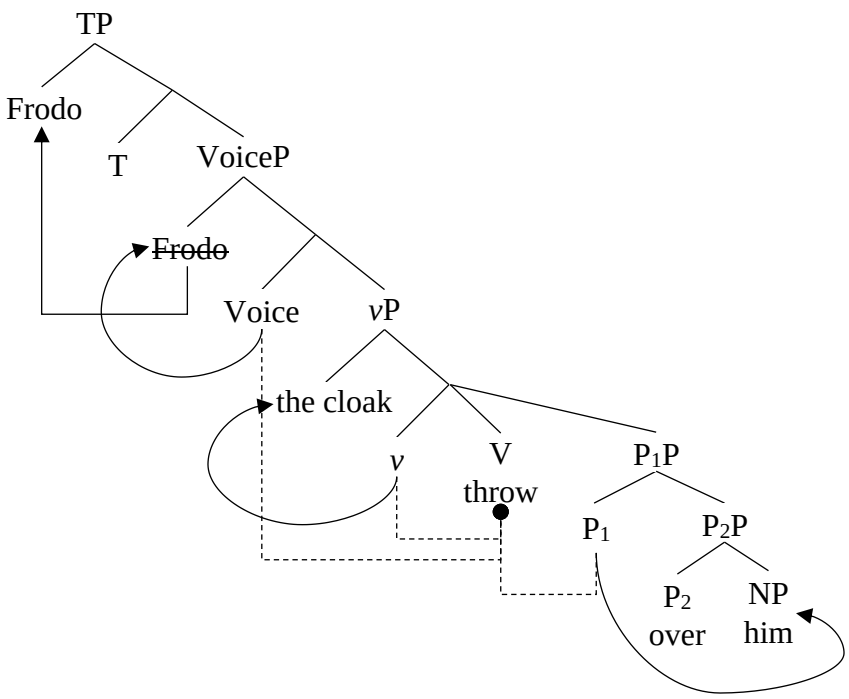
(119) Frodo$_1$ threw the cloak over him$_1$.

Given the predicted structure in (120), Condition B defined as in (112) is violated, incorrectly predicting unacceptability.[27]

[27] One might argue that the whole P_2P is what's θ-marked by P_1, not just the NP. If that were the case, then (119) would be predicted to be acceptable. The pronoun *him* would not be θ-marked by any predicate which also θ-marks *Frodo*, and so there would be no violation of Condition B. However, this would then make (i) problematic.

(i) * Frodo threw the cloak$_1$ over it$_1$.

(120)



I propose that (119) does not violate Condition B due to a timing constraint, as alluded to above. I interpret (112) as a constraint on the assignment of indices. Specifically, I take it that pronouns receive indices at the CI-interface determining their interpretation, and I take Condition B to prevent this indexation from taking place at the first appearance of a pronoun at CI. Condition B thus has two components, the ban on co-argumenthood (121a), and the timing condition (121b).

(121) Hybrid Condition B (final):

a. Given a noun phrase NP and a pronoun p, do not assign the index of NP to p if every syntactic predicate θ-marking NP also θ-marks p.

b. Do not assign an index to a pronoun when it is first transferred.

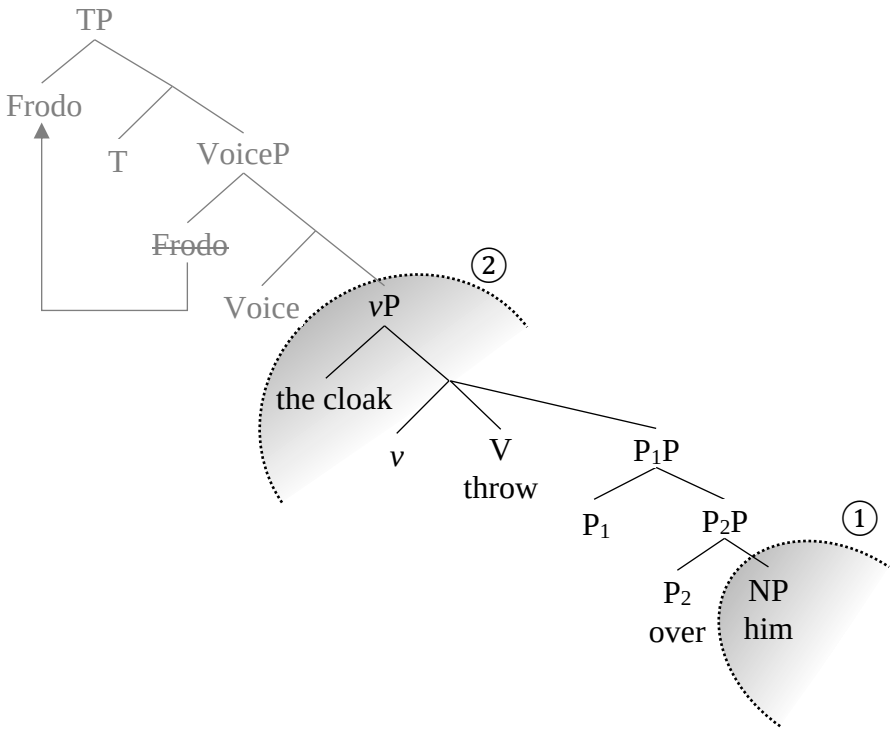
Assuming that P_2P and VoiceP are phases, and that Transfer sends the phase-head complement to the interfaces, (119) is split into three phases. First, P_2P is constructed and NP is transferred, then

By the same reasoning, *it* should not be considered to be a co-argument of *Frodo*. The whole P_2P *over it* would be a co-argument of *Frodo*, but not the pronoun itself. Therefore, (i) would not be predicted to violate Condition B. For this reason, I assume that the pronoun is in fact θ-marked by P_1 in (119) and in (i).

VoiceP is constructed and *v*P is transferred, and finally the root TP is transferred.[28] Given the timing condition (121b), an index cannot be assigned to *him* at the P_2P phase. However, an index *can* be assigned to *him* at the VoiceP phase, when *v*P is transferred. If an index is assigned at this stage, (121a) is not violated; the subject NP *Terry* is not present within the *v*P.

The diagram in (122) illustrates the way (119)/(120) is partitioned into phases as they reach CI. According to (121b), *him* cannot be assigned an index at ①. However, if the pronoun is assigned an index at ②, (121a) is satisfied.

(122)



Given this, Condition B as defined in (121) predicts co-reference as in (119) to be acceptable.

Now consider what is predicted for (123).

(123) *Frodo threw the $cloak_1$ over it_1.

This sentence is described by the same structure in (122), with *him* replaced with *it*. Again, (121b) prevents the pronoun from being assigned an index at ①. However, the earliest point at which the pronoun *could* be assigned an index, namely ②, contains the object NP *the cloak*. Every predicate

[28] Arguably the root is a CP. TP would then be transferred as the complement to the phase-head C, and the final application of Transfer would target the root CP. Alternatively, the final application of Transfer might target the root and TP together. Cf. Obata 2010.

θ-marking *the cloak* also θ-marks the pronoun at this stage. Therefore, by (121a), if the pronoun is assigned an index at ②, it cannot be coindexed with *the cloak*.

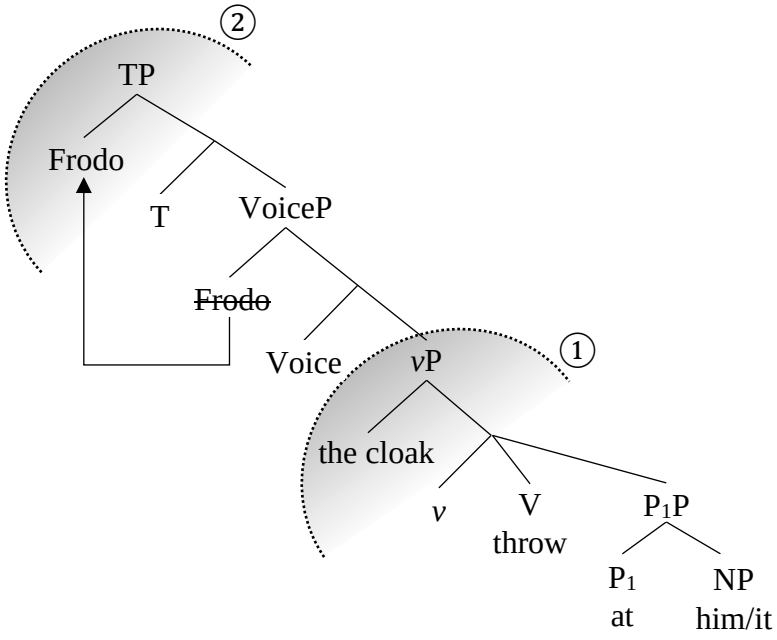
It is relevant to confirm that the updated version of Condition B in (121) can still capture unacceptability of (124).

(124) a. *Frodo$_1$ threw the cloak at him$_1$.

b. *Frodo threw the cloak$_1$ at it$_1$.

Above, I showed that the ban on co-argumenthood (121a) alone could rule these sentences out. The account is maintained with the updated version of Condition B including both the ban on co-argumenthood (121a) and the timing condition (121b). The diagram in (125) illustrates the way (124a)/ (124b) are partitioned into phases. Since P_2P is not present, the PP does not constitute a phase.

(125)



Within the first phase ①, the pronoun cannot be assigned an index, according to the timing condition (121b). By the next phase ②, both the subject *Frodo* and the direct object *the cloak* are present. Neither can be co-indexed with the pronoun, because every semantic predicate which θ-marks these NPs also θ-marks the pronoun. *Frodo* and *the cloak* are θ-marked by {Voice, *v*, P, V}, and *the cloak* is also θ-marked by {*v*, P, V}. Both predicates also θ-mark the pronoun. The

unacceptability of (124a) and (124b) is therefore accurately predicted by the version of Condition B in (121).

This approach predicts the (un)acceptability of examples like (126) as well, which use intransitive verbs.

(126) a. *Galadriel$_1$ looked at her$_1$ (in the mirror).
b. Galadriel$_1$ looked around her$_1$.

These examples could be modeled with the same structures as (117a)/(119), i.e. (125) for (126a) and (122) for (126b), modulo presence/absence of the direct object. The presence of P_2P in (126b) introduces an additional phase boundary between the pronoun and the external argument, enabling Condition B to be satisfied before the subject is introduced, just as in (122). This is not possible in (126a); the external argument is introduced in the phase immediately following the one which introduces the pronoun, just as in (125).

6.3. Directionals with *draw*-type verbs

Let's now turn to the contrast illustrated by (127).

(127) a. *Frodo$_1$ threw the cloak to him$_1$.
b. Sauron$_1$ is drawing all evil to him$_1$.

As we have seen, many verbs, including *roll*, *kick*, *push*, etc., pattern with *throw* in (127a); they disallow co-indexation of their external argument with a pronoun complement in a GOAL PP. This follows from the version of Condition B in (121), as discussed above. However, many other verbs, including *draw*, *lure*, *attract*, *pull*, *call*, etc., behave differently; they allow co-indexation of their external argument with a GOAL pronoun. If (127b) with *draw* had the same structure as (127a) (i.e. the analogue of (125)), then (127b) would be predicted to be unacceptable for the same reasons as (127a) is unacceptable.

However, there are several indications that (127b) does not have the same structure as (127a). I will discuss three such indications now. First, the verbs that pattern with *throw* share an entailment that their AGENTs share a location with their SOURCEs. This can be illustrated with *throw* by considering the semantic impossibility of (128).

(128) Terry threw the rock from the hilltop into the valley.
Terry wasn't on the hill.

Specification of the SOURCE as *the hilltop* in (128) implies that the AGENT *Terry*'s location intersects with the hilltop. The negation of this implicature in (128) is therefore infelicitous.

The verbs that pattern with *draw* do not make this implicature; their AGENTs are not necessarily tied to their SOURCEs. This is illustrated by the contrast between (128) and (129).

(129) Terry drew the enemy from the hilltop into the valley.
Terry wasn't on the hill.

The utterances in (129) could be acceptable in a variety of circumstances. Terry might be in the valley to begin with, or they might start out somewhere entirely different. This illustrates that *draw* does not entail that its AGENT's location intersects with its SOURCE.

A second difference between the verbs patterning with *throw* and those patterning with *draw* involves the type of directional PP used to introduce their GOALs. The *throw*-type verbs are often compatible with directional *at*-phrases, as in (130a), but the *draw*-type verbs are never compatible with directional *at*-phrases, as shown in (130b).

(130) a. I { threw / rolled / kicked / pushed } the ball at the wall.

b. * I { drew / lured / pulled / called } the flock at the valley.

A third difference involves the behavior of intransitives. There are intransitive verbs which display *throw*-type behavior with respect to binding. That is, some intransitive verbs permit co-indexation of the external argument with a GOAL pronoun only if the GOAL PP includes a P_2P layer. The intransitives displaying this behavior include *look*, *gesture*, *point*, *reach*, etc., as illustrated in (131).

(131) a. *I {looked / gestured / pointed / reached} {to / at} me.

b. I {looked / gestured / pointed / reached} {in front of / behind / around / beside} me.

This mirrors the behavior of *throw*-type verbs. In contrast, there are no intransitives which show the behavior of *draw*-type verbs, where the external argument can co-refer with a pronoun complement of a GOAL *to*-phrase. That is, there is no verb which fills in the VERB slot in (132a) in the way that *draw* (etc.) does for (132b).

(132) a. I will VERB to me.

b. I will VERB them to me.

I have identified four ways in which the behavior of *draw*-type verbs differs from that of *throw*-type verbs, in addition to the basic binding difference between the two types. These differences are summarized in the table below.

	Throw-type verbs	*Draw*-type verbs
Binding:	Allow co-indexation of external argument with a GOAL pronoun p only if the PP introducing p includes a P_2P layer.	Allow co-indexation of external argument with a GOAL pronoun p even if the PP introducing p does not include a P_2P layer.
AGENT/SOURCE conflation:	Conflate AGENT and SOURCE roles.	Never conflate AGENT and SOURCE roles.
Compatibility with *at*-PPs:	Are often compatible with *at*-PP GOALs.	Are never compatible with *at*-PP GOALs.
Intransitives:	Include some intransitive verbs (*look*, *gesture*, etc.)	Include no intransitive verbs.

Table 1: properties of verbs patterning with *throw* vs. verbs patterning with *draw*.

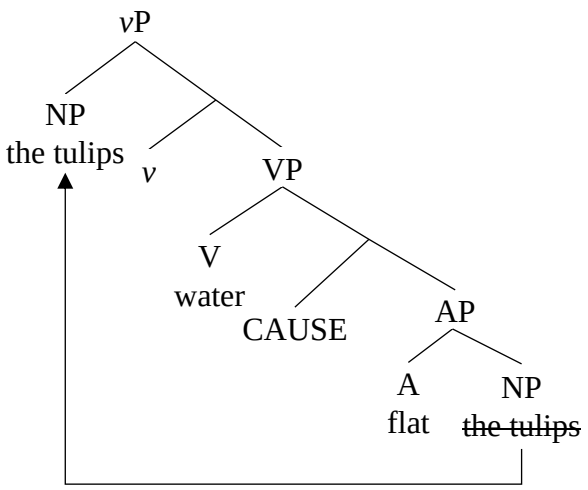
Developing an idea of Ezra Keshet's (p.c.), I propose that the correlation of these differences with the binding differences can be accounted for by analyzing *draw*-type verbs as resultatives along

the lines proposed by Kratzer (2005) or Ramchand (2008, p129ff).[29] I will adopt the basic outline of Kratzer's approach to resultatives here. She argues that resultatives like (133) consist of a main verb phrase whose complement is headed by a null CAUSE head whose complement in turn is an adjectival result.

(133) The gardener watered the tulips flat.

Kratzer's structure for the verbal domain in (133) is illustrated in (134).

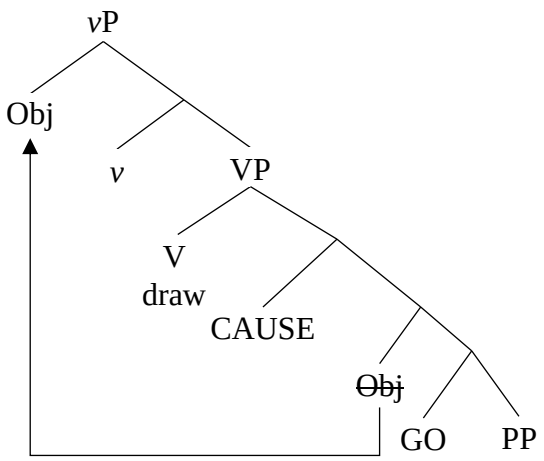
(134)



I propose that *draw*-type verbs are resultative predicates in which the result predicate is headed by a null verb GO. The proposed structure is shown in (135).

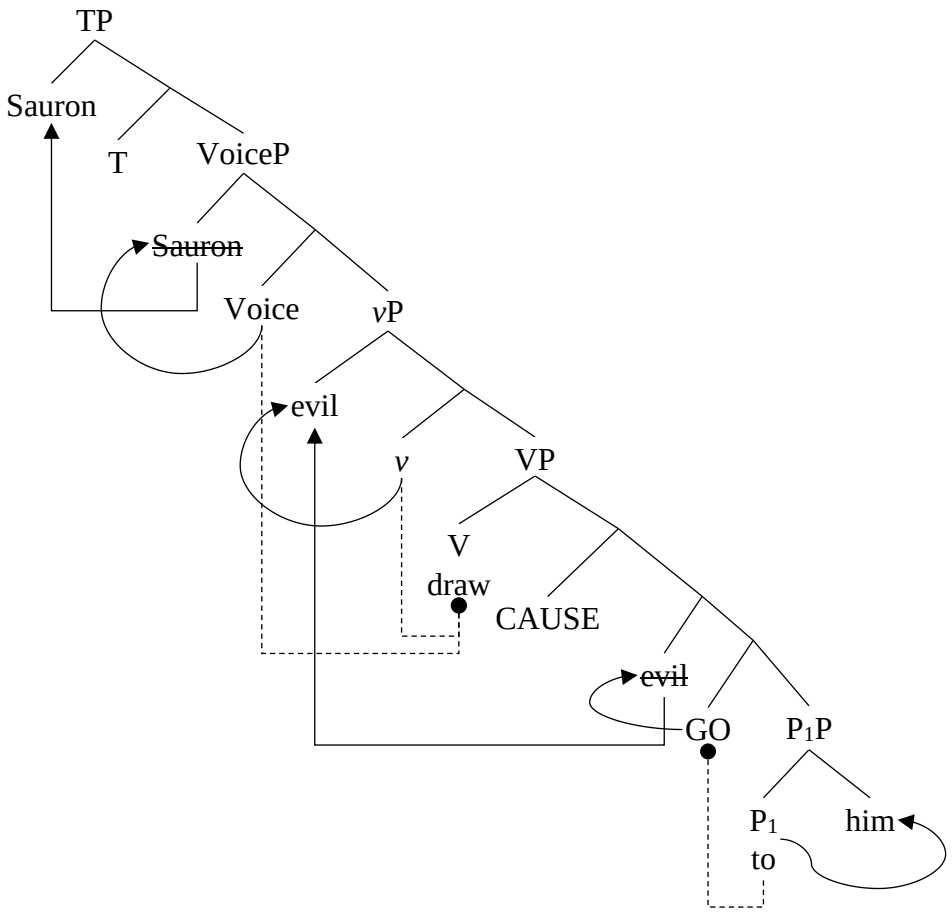
[29] It is critical that *throw*-type verbs are not analyzed along these lines. As I show below, the resultative analysis predicts *draw*-type binding behavior. This analysis would thus make the wrong predictions about *throw*-type verbs. The same goes for the other properties in table 1.

(135)



I assume that GO comprises a predicate independent of *draw* for the purposes of θ-marking. GO θ-marks the direct object, and the direct object is also θ-marked by *v* in its surface position. But GO is not θ-indexed by higher θ-assigners. As such, the GOAL PP complement to GO is not a co-argument of any higher dependents. θ-indexing and θ-assignment relations in the proposed structure are illustrated in (136).

(136)



This captures the binding behavior of *draw*-type verbs. In contrast to *throw*-type verbs, the goal pronoun never counts as a co-argument of the external argument. The pronoun *him* in this example is θ-marked by *to*, which is part of a predicate {P, GO}. The external argument is θ-marked by a predicate {Voice, *v*, draw}. Since these are separate predicates, the ban on co-argumenthood (121a) is not violated if *him* and *Sauron* are co-indexed.

This structure also predicts that the direct object should not be able to be co-indexed with the GOAL pronoun. The direct object is also θ-marked by the semantic predicate {P, GO} that θ-marks the pronoun. As such, co-indexation of the pronoun and the direct object violates the ban on co-argumenthood (121a). This holds even if the pronoun is enclosed within a P_2P phase.

This analysis also captures the properties summarized in Table 1. *Draw*-type verbs cannot conflate the AGENT and SOURCE roles, because those roles are associated with two distinct predicates. With *throw*-type verbs, both the agent and source roles are linked to the main verb; I assume this is necessary for AGENT-SOURCE conflation as a lexical entailment of the verb. For *draw*-type verbs, in contrast, the SOURCE role is part of the GO predicate, but the AGENT role is part of the main predicate (e.g. *draw*). These cannot be conflated because they are not part of the same lexical entry.

Additionally, *draw*-type verbs are not compatible with *at*-phrase GOALs, because their GOALs are selected by GO. Overt *go* is incompatible with *at*, as (137) shows. I assume GO shares this property. *Throw*-type verbs need not be restricted in this way, and so can be compatible with *at*.

(137) We went to/*at the park.

Finally, *draw*-type verbs are necessarily transitive, because they involve a resultative structure embedding a GO predicate. I assume that GO brings with it a THEME NP and a GOAL PP as depicted above. The THEME must raise to matrix subject or object position for Case. If it raises to object position, we get the appearance of a transitive sentence, as with *draw*. In principle, it might be possible for the THEME NP to raise to subject position instead,[30] but then *draw*-type binding behavior would still not be exhibited due to the NP's low origin as a dependent of GO.

[30] This (i.e. raising of the external argument NP of GO into matrix subject position) could arguably be what happens with verbs like *walk*, in which case the structure would be close to that proposed by Ramchand (2008).

6.4. Benefactives

I have developed an analysis of binding into directional PPs with verbs like *throw*, where the external argument can bind a GOAL pronoun only if the PP introducing it includes a P_2P layer (and where the direct object can never bind a GOAL pronoun), as well as with verbs like *draw*, where the external argument can bind a goal pronoun even if there is no P_2P (and where the direct object can never bind a GOAL pronoun).

(138) *Throw*-type verbs:

a. *Frodo$_1$ threw the cloak$_2$ at him$_1$/it$_2$.

b. Frodo$_1$ threw the cloak$_2$ over him$_1$/*it$_2$.

(139) *Draw*-type verbs:

a. Sauron$_1$ is drawing all evil$_2$ to him$_1$/*it$_2$.

a. Sauron$_1$ is drawing all evil$_2$ before him$_1$/*it$_2$.

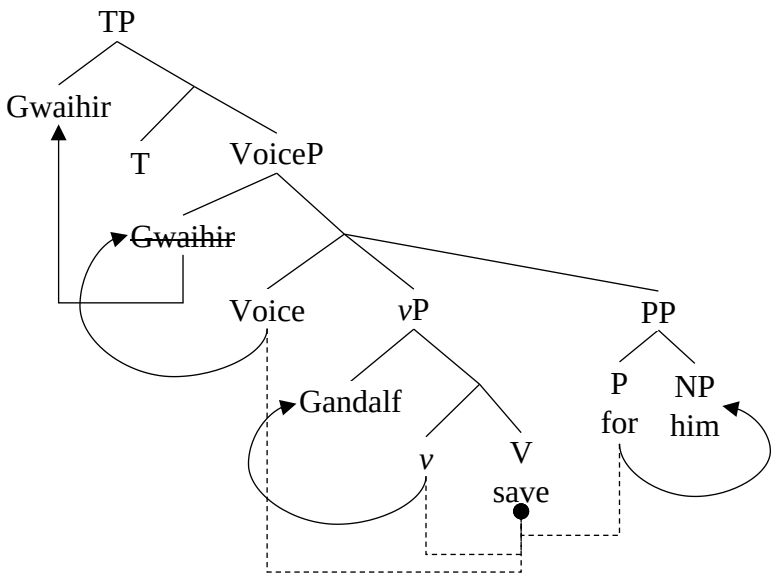
To conclude this section, I will extend the analysis to non-directional PPs, particularly benefactives. Benefactives' binding behavior contrasts with that of directionals' in that a benefactive pronoun can be co-indexed with a direct object but not with an external argument.

(140) Gwaihir$_1$ saved Gandalf$_2$ for him$_{2/*1}$.

To account for this, I propose that benefactives are merged higher than the directional PPs considered above are. Specifically, I will assume that benefactives are merged with Voice due to their close connection with agentivity (discussed in chapter 2. See Gruber 1965, Rákosi 2006).

With this assumption, a sentence like (140) would be described by a structure like (141).

(141)



With this structure, co-indexation of the subject NP *Gwaihir* and *him* violates the ban on co-argumenthood (121a). The reason is that *Gwaihir* is θ-marked by the semantic predicate {Voice, *v*, P, V}, which also θ-marks *him*. Assignment of *Gwaihir*'s index to *him* would therefore violate (121b).

However, co-indexation of the direct object NP *Gandalf* and *him* would *not* violate (121a). By the definition of semantic predicate I outline in section 5 (repeated here), it is not the case that every predicate θ-marking *Gandalf* also θ-marks *him*.

(142) SEMANTIC PREDICATE:

If Y θ-indexes V, then {Y, V} ∪ Z is a *semantic predicate* iff

Z = {X ∈ D(Y) | X θ-indexes V} ∪ {Y, V}.

By (142), this structure contains the semantic predicates {Voice, *v*, P, V}, {*v*, V}, and {P, V}. It does not contain a semantic predicate {*v*, P, V}, because the preposition *for* is not in the c-command domain of *v*. Therefore, although *v* and P both θ-index the same verb, they don't form a semantic predicate with each other (without Voice). Thus, not every predicate which θ-marks *Gandalf* also θ-marks *him*. This satisfies Condition B as formulated in (121).

6.5. Apparent A/AD effects

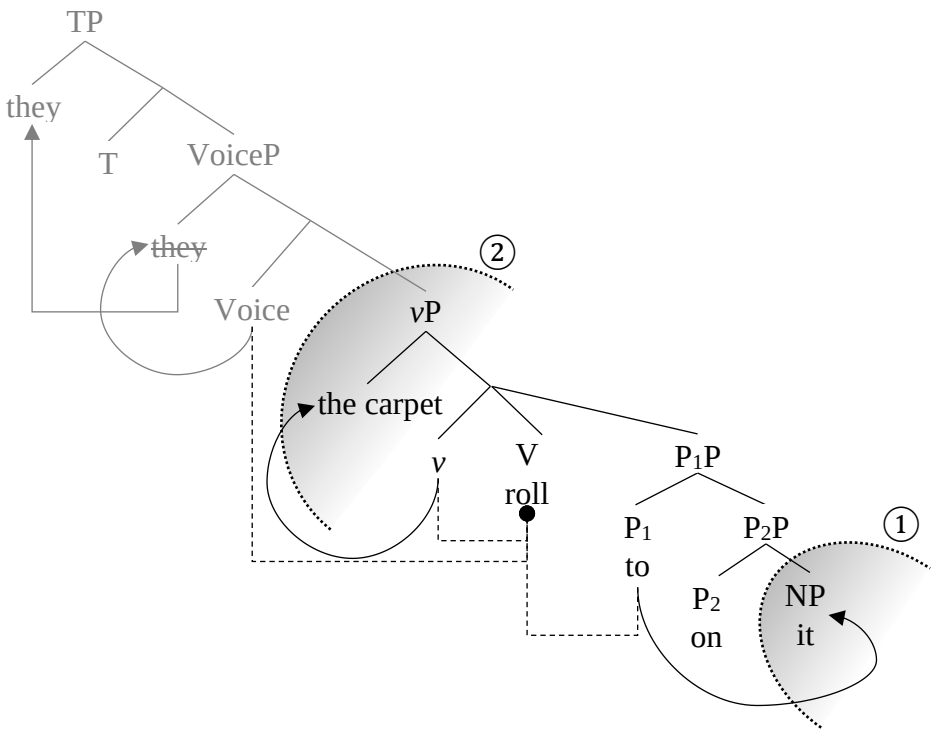
In section 2, I pointed out that certain binding contrasts, characterizable as Condition B effects, could be construed as suggesting a role for the A/AD. This section concludes by showing how these contrasts are accounted for with the A/AD-free analysis developed above.

First, consider the contrast in (143).

(143) a. They rolled the carpet$_1$ underneath it$_1$. (canonical adjunct interpretation)
b. *They rolled the carpet$_1$ onto it$_1$. (canonical argument interpretation)

The oblique pronoun can co-refer with the object in a conventional adjunct PP (143a) but not in a conventional argument PP (143b). I discussed examples analogous to (143b) above. This sentence would be derived along the same lines as (119), i.e. with the structure in (144).

(144)



The pronoun *it* cannot receive an index at phase ①, due to the timing condition (121b). The earliest point at which it can be assigned an index is ②, in which the direct object *the carpet* is also present. The ban on co-argumenthood (121a) prevents co-indexation of *the carpet* and *it* at this point. Therefore, (143b) is predicted to be unacceptable.

Importantly, the PP in (143b) represents the GOAL of *roll*. The PP in (143a) is different. It is not a goal. Instead, it is a subject locative, describing the position of the subject in the event. Maienborn (2001) argues that such PPs occupy a position higher than the direct object. I assume that, like benefactives, subject locatives are complements to Voice, due to their close connection to the external argument. It is this difference in attachment height that accounts for the contrast in (143), not the A/AD. (143a) does not violate Condition B for the same reason as (140).

Next, consider the contrast in (145).

(145) a. Frodo$_1$ displayed the ring in front of him$_1$. (canonical adjunct interpretation)
b. *Frodo$_1$ displayed the ring to him$_1$. (canonical argument interpretation)

The oblique pronoun can co-refer with the subject in a conventional adjunct PP (145a) but not in a conventional argument PP (145b). The PP in (145b) is a GOAL, and the PP in (145a) is an object locative. Neither being closely associated with the agent, I take these PPs both to occupy a structurally lower position, consistent with arguments of Maienborn (2001). The reason why the pronoun can co-refer with the subject in (145a) but not in (145b) is not the A/AD, but the internal structural difference between the two PPs. The PP in (145a) contains a P_2P layer, with *in front of*, while the PP in (145b) does not. As discussed with respect to (119)/ (124a) above, goal PPs which exhibit this structural difference show the same pattern. For example, (119), with a P_2P layer in the goal PP, permits co-reference between the subject and the pronoun, while (124a), lacking P_2P, does not. See the tree diagrams in (122) and (125) respectively.

(146) a. Frodo$_1$ threw the cloak over him$_1$.
b. *Frodo$_1$ threw the cloak at him$_1$.

Finally, I mentioned in section 2 that the contrast in (147) could be taken to implicate the A/AD.

(147) a. *Galadriel$_1$ looked at her$_1$.
b. Galadriel$_1$ looked around her$_1$.

One might take the *at*-phrase in (147a) to be an argument, and the *around*-phrase in (147b) to be an adjunct. Reinhart & Reuland (1993), for example, treat *around*-phrases like (147b) similarly to an event locative, such that the PP denotes a location which is predicated of the event variable. Ke (2019, p118) suggests that a similar difference might explain the contrast in (147). However, given

my analysis, the A/AD is not needed to explain this difference. Both PPs are GOALs of *look*, both attaching in the larger structure in the same way, i.e. in the structurally low position characteristic of GOALs. This contrast is instead analyzed in terms of the internal structural difference between the two PPs. The PP in (147b) has a P_2P layer, while the PP in (147a) does not.

This concludes my discussion of the core data outlined in section 2. In the remainder of this chapter, I will consider some potential consequences of the idea that P_2P is a phase.

7. Adpositional phrases in Phase Theory

A crucial component of the analysis developed above is that (some) adpositional phrases are phases. As mentioned in section 3, this idea is not new. Many previous authors have argued that PPs are phases (Abels 2003, 2012, Rezac 2008, Gallego 2010, Drummond et al. 2010, and many others).[31] Several different authors have also applied this idea to binding specifically (e.g. Lee-Schoenfeld 2008, Hicks 2009, Ke 2019). My analysis builds on much of this work, but diverges from it in a major respect. Previous proposals, including proposals which adopt a split PP, assume that full PPs are phases. In contrast, I assume that only the lower of the two layers, P_2P, is a phase. This section will comment briefly and speculatively on the potential consequences of this hypothesis, with special attention paid to Abels's (2012) arguments regarding p-stranding.

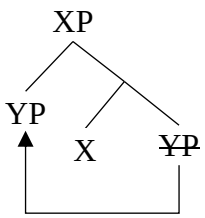
First, I will outline Abels's analysis of stranding vs. non-stranding languages in terms of anti-locality. I will then discuss how Abels's proposal might be adapted to my hypothesis that P_2P is a phase. Finally, I will note the potential problem posed by agreement (Rezac 2008, Polinsky 2016).

7.1. Phases, anti-locality, and preposition-stranding

Abels (2003) defends a principle of anti-locality according to which Internal Merge instantiating the abstract schema in (148) is blocked because it is "too local."

[31] See Citko (2014) for relevant critical discussion, including problems for PP phasehood.

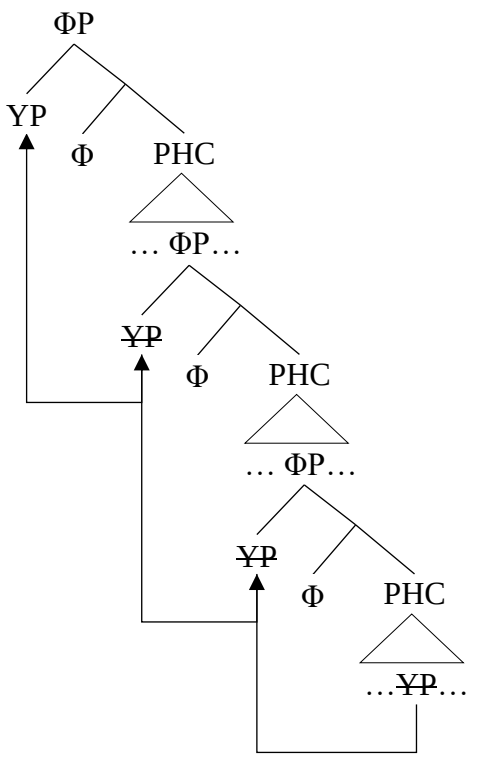
(148)



The conceptual motivation behind this constraint comes from Chomsky's (1995, 2000, 2001) argument that Merge can apply only if it satisfies the requirement of a head. Abels reasons that any requirements which YP might be able to satisfy for X could be satisfied in the base configuration [$_{XP}$ X YP], where YP is X's complement. Moving YP from Comp-X to Spec-X could not possibly satisfy a featural requirement of X, because any such requirement would already have been satisfied prior to IM.

Empirical motivation for anti-locality comes from the immobility of phase-head complements. Abels points out that, in order for a constituent C to escape the phase in which C is generated, C must first raise to the phase edge. This is due to the Phase Impenetrability Condition (PIC), which states that transferred material is inaccessible. Assuming that phase-head complements are transferred when the next phase is reached, this means long-distance movement must be successive-cyclic, with stopping points at each phase edge. The required sort of derivation is illustrated abstractly in (149), with Φ standing for a phase head, and PHC standing for the phase-head complement.

(149)

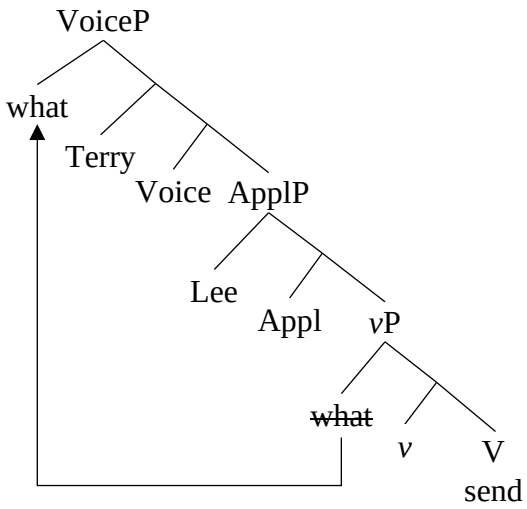


This ordinarily poses no problem for anti-locality. For example, A-bar movement of direct objects in sentences like (150) requires IM to the edge of VoiceP (assuming VoiceP is a phase), but this does not violate anti-locality.

(150) What did Terry send Lee?

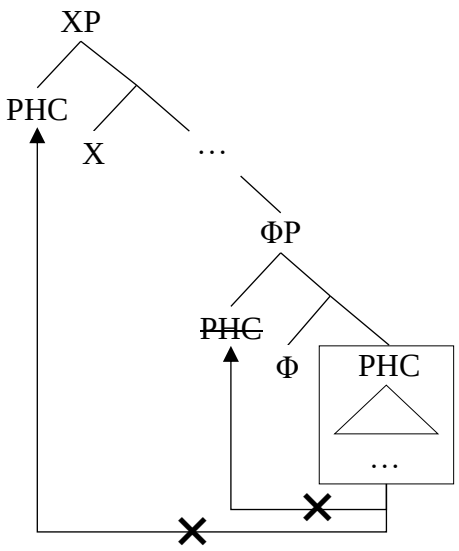
The anti-locality-compliant movement is illustrated in (151).

(151)



So, movement to the phase edge normally does not violate anti-locality. However, Abels notes that there is one such movement which *always* violates anti-locality: movement of the phase-head complement itself. In order to move out of a phase, a constituent must first move to the phase edge. Thus, if the phase-head complement is to escape a phase, it must first move to the phase edge. But this would violate anti-locality. This is illustrated in (152). The PHC cannot move directly out of the phase (represented with ΦP) without stopping at the edge (Spec-Φ). But it also can't move to the edge, because that would violate anti-locality.

(152)



Abels argues this explains the immobility of numerous different kinds of constituents. For example, TPs are typically immobile. This can be illustrated with Icelandic as in (153) from Abels (2003, p10, attributed to Halldór Sigurðsson).[32]

(153) a. ?[$_{CP}$ að María sé að lesa] heldur Jón __$_{CP}$.
that Maria is to read thinks Jon
'That Maria is reading, John thinks.'

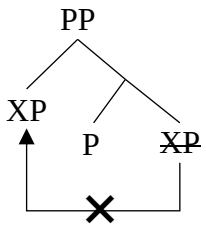
b. *[$_{TP}$ María sé að lesa] heldur Jón [$_{CP}$ að __$_{TP}$].
Maria is to read thinks Jon that
'Maria is reading, John thinks that.'

[32] Similar data could be generated in English to illustrate the same point, but Icelandic is used to control for the *that*-trace effect.

According to Abels, this is because PIC would require anti-local movement of TP from Comp-C to Spec-C.

Abels argues that, if PPs are phases, then the immobility of adpositional complements cross-linguistically can also be explained by anti-locality: in order for a prepositional complement to be extracted, it would have to raise to Spec-PP (or else be inaccessible due to PIC). This would violate anti-locality.

(154)



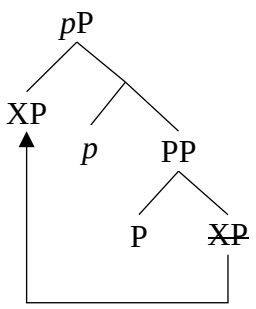
Thus, in languages that do not allow P-stranding, PP would be a phase. Critically, it would be possible to extract from PP in such languages, just not to extract the prepositional complement itself. So, in, e.g., Russian, it is possible to *sub*-extract from the prepositional complement, as (155) shows, even though p-stranding is not permitted.

(155) [za kakie presuplenija] on otkazal-sja [PP ot otvetsvennosti __]?
for which crimes he rid-REFL of responsibility
'Which crimes did he reject responsibility for?' (Abels 2012, 216)

Abels (2003) argued that in languages allowing p-stranding, like English, PP might *not* be a phase. Abels's position was later updated to hold that PP is a phase even in p-stranding languages. According to Abels 2012, p-stranding becomes possible in languages that have a multi-layered PP. The presence of an extra layer below the phase-head *p* means movement of a prepositional complement would not violate anti-locality.[33]

[33] Example (156) gives Abels's labels for the added functional structure.

(156)



7.2. Preposition-stranding with P_2P phases

The version of PP-phasehood developed in this chapter is not directly compatible with Abels's account. I have made two proposals which are particularly problematic from this perspective. First, I have argued that P_1P is not a phase; only P_2P is. This is problematic, because it appears to contradict Abels's account of p-stranding in English. According to Abels, it is the presence of additional structure within English PPs which *allows* stranding. But if P_2P is a phase, extraction from P_2P would be predicted to violate anti-locality; movement from Comp-P_2 to Spec-P_2 would be needed in examples like (157).

(157) Which big city do you live [$_{P_1P}$ $\emptyset_{P_1}$ [$_{P_2P}$ __ near __]].
↑_____| ↑_____|

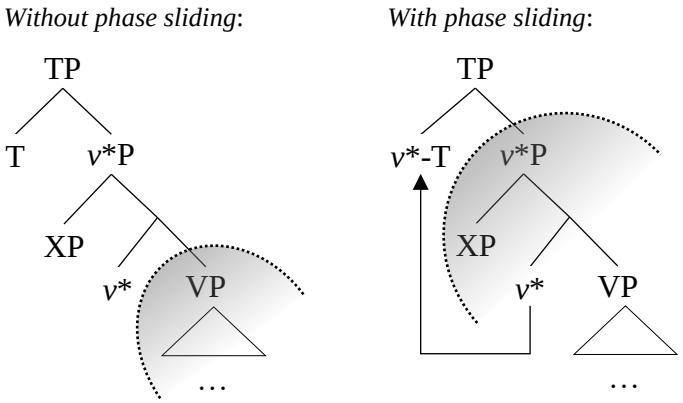
Second, even if P_1P is the phase (not P_2P), I have argued that P_2P is not always present. In section 4, I provided evidence that P_2P is not present when it is not overly expressed. If that's the case, it poses another problem for Abels's account of p-stranding in English. If P_1P is a phase, then p-stranding is predicted to violate anti-locality any time P_2P is absent, just like in Abels's account of non-p-stranding languages. That is, extraction as in (158) would be predicted to be necessary for stranding, in violation of anti-locality.

(158) Who are you talking [$_{P_1P}$ __ to __]].
↑_____| ↑____|

These are two ways in which my proposals appear to be problematic for Abels's analysis of p-stranding in terms of anti-locality. However, I argue in this subsection that, with one additional assumption adopted from the literature on phase theory, these two proposals (that P_2P not P_1P is a phase, and that P_2P is not present when not overt) actually *support* the anti-locality analysis.

The necessary assumption is phase sliding. According to Gallego (2006, 2010), movement of a phase-head into a higher head position shifts the phase domain to the higher position. For example, assuming *v** is a phase-head (this would be what I labeled Voice above), head-movement of *v** to T results in the *v**-T amalgam acting as a phase head. The Transfer domain (i.e. the PIC domain, indicated with shaded arcs in (159)) shifts from VP to *v**P.[34]

(159) Phase sliding (adapted from Gallego 2010, p108)



Now, under most circumstances in English, p-stranding is possible, and is in fact preferred to pied-piping. However, there are some situations in which p-stranding is not possible. Two such situations are illustrated in (160).

(160) a. *Which house did the ball roll [$_{PP}$ from behind __]?

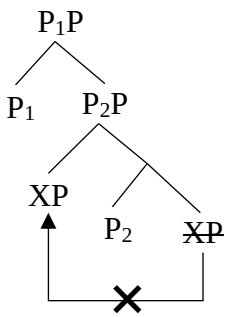
b. *How many years were you born [$_{PP}$ __ ago]?

In (160a), both layers of PP are instantiated overtly (*from* in P_1 and *behind* in P_2). In such circumstances, p-stranding is not permitted (Huddleston & Pullum 2002, p630). In (160b), there is a postposition (*ago*). These also uniformly resist p-stranding in English.

I argue that the impossibility of p-stranding in these situations is explained by Abels's anti-locality if P_2P is a phase, and if phase-sliding can take place within the PP. First, recall that if P_2P is a phase, then extraction of its complement would appear to violate anti-locality.

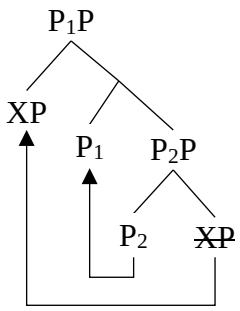
[34] In chapter 4, I mentioned that head movement can be replaced with an *amalgamation* operation. In such a system, phase sliding would be reinterpreted as a property of amalgamation instead of head movement.

(161)



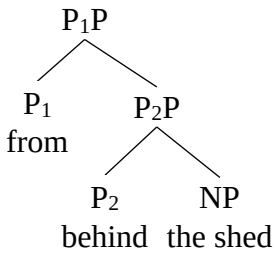
I take the availability of p-stranding P_2 in English to indicate that phase-sliding takes place within the PP. This avoids an anti-locality violation by shifting phasehood to P_1.[35]

(162)



P-stranding is predicted to be impossible if phase sliding is blocked. This is exactly what happens in the contexts in (160). P_2 cannot raise to P_1 in contexts like (160a), because P_1 is already overt. Thus, the structure of a PP like *from behind the shed* would be (163).

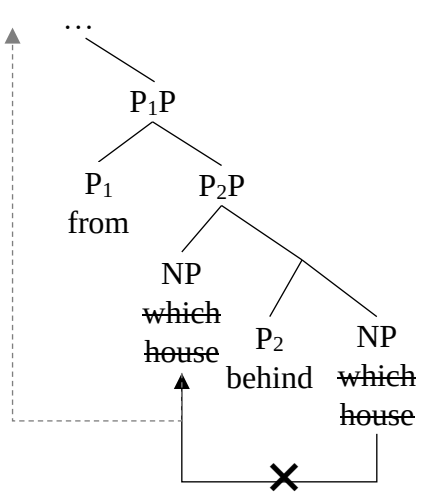
(163)



There is no phase sliding (i.e. P_2 stays in place), so extraction of the prepositional complement, as in (164), would violate anti-locality.

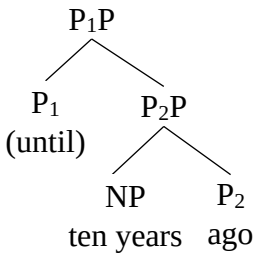
[35] Note that this does not affect the analysis of binding developed earlier.

(164)



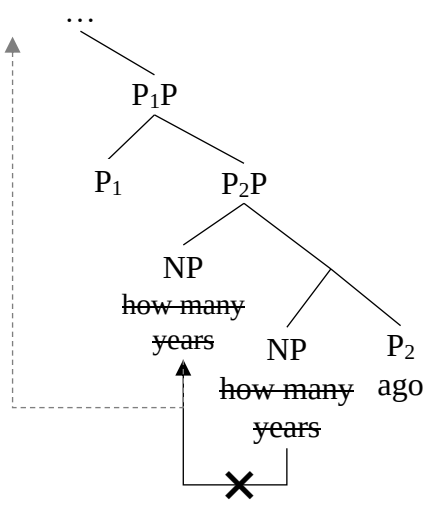
I assume that post-positions like *ago* are head-final versions of P_2. The structure of an *ago*-phrase like *(until) ten years ago* would be (165).

(165)



Phase sliding is not possible here either; P_2-to-P_1 raising would turn *ago* into a *pre*-position. Thus, extraction of the post-positional complement, as in (166), would violate anti-locality.

(166)



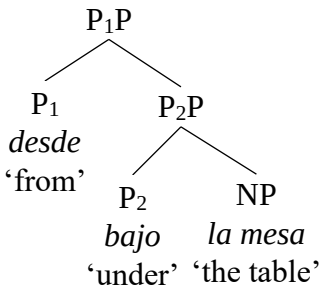
Therefore, the idea that P_2P is a phase in English appears to be compatible with Abels's anti-locality-based account of stranding, if phase sliding takes place within PP.

However, Abels's analysis is not meant to apply only to English. What about other languages? One empirically conservative hypothesis would restrict P_2P phases to English. That is, one might argue that *P_1P* is a phase in other languages, not P_2P, keeping Abels's original analysis of the impossibility of p-stranding. But there might be reason to doubt this. Recall that with a split PP, Abels's account of p-stranding does not follow straightforwardly. Yet the split analysis of PP (with P_1P and P_2P components) has been advocated for many different languages, including many languages that disallow p-stranding (see e.g. Ayano 2001 and the contributions in Cinque & Rizzi 2010).

The remainder of this subsection offers some initial cross-linguistic explorations of the possibility that P_2P may be a phase. The material is exploratory, based on gross generalizations reported in the literature. The following arguments are therefore highly tentative; further work is needed to evaluate the more detailed predictions within each of the languages mentioned below.

To begin, suppose that Spanish (chosen as a somewhat arbitrary first example of a non-p-stranding language) has a split PP, with elements such as *cerca* 'around' and *bajo* 'under' occupying P_2, and elements like *a* 'to' and *desde* 'from' occupying P_1.[36] If that were the case, then the structure of a PP like *desde bajo la mesa* 'from under the table' would be (167).

(167)



[36] I assume this structure accommodates PPs such as *desde* {*debajo de*/%*bajo*} *la mesa* 'from under the table' as depicted in (167). Note that Fraga (2020, p10) reports that *desde debajo de*, as in (i), is judged by most speakers to be preferable to just *desde bajo*. Ibarretxe-Antuñano (2012, p126) also notes that there is speaker variation.

(i) El gato me espiaba [PP desde debajo de la mesa]
the cat 1sg.O was.spying from under of the table
'The cat was spying on me from under the table.' (Fraga 2020, p9-10)

If P_1P is a phase, then extraction of the prepositional complement would not be predicted to violate anti-locality; the prepositional complement could move from Comp-P_2 to Spec-P_1. Thus, if P_1P (not P_2P) were a phase, anti-locality would not explain the impossibility of stranding as in (168).

(168) *Qué árbol pasabas el día [$_{PP}$ bajo __]?
what tree pass.2sg the day under
'Which tree did you spend the day under?'

If *P_2P* is a phase in Spanish, but Spanish differs from English in that Spanish P_2 does not raise to null P_1 (and hence does not induce phase sliding), then anti-locality *would* predict (168); PIC would require anti-local movement from Comp-P_2 to Spec-P_2.

Yet, this assumption (that P_2P is a phase in Spanish, not P_1P) would *fail* to predict the impossibility of p-stranding in examples like (169), assuming P_2P is not present there.

(169) *Quién te casarás [$_{PP}$ con __]?
who 2sg.O marry.2sg with
'Who did you marry?'

So, anti-locality cannot capture the impossibility of stranding in Spanish and other languages under both circumstances (i.e. with vs. without P_2P). Another explanation is needed for one or the other circumstance (or else a totally different solution is needed for both).

Suppose that there is an alternative explanation for the ban on stranding P_1; anti-locality is what explains when P_2 cannot be stranded. This means that languages could be of four different types with respect to p-stranding. First, a language might allow P_1-stranding (as governed by whatever it is that determines when P_1-stranding is allowed in a language) and have P_2-to-P_1 movement, yielding phase sliding which allows P_2-stranding. This would be the case for English, as discussed, as well as other languages reported to allow relatively liberal p-stranding, such as different Germanic languages (Law 2017), some varieties of Canadian French (Ott & Therrien 2020), certain Kru languages (Koopman 1984), and arguably some varieties of Nahuatl. E.g., Flores Nájera (2019) finds that, in Tlaxcala Nahuatl, interrogative and relative pronouns can be separated from an adposition in *wh*-questions and in relativization when the pronoun occurs in clause-initial position. (170) illustrates with the interrogative pronoun *tlen* 'what' and the adposition *ika* 'with.'

(170) Tlaxcala Nahuatl:

tlen ti-k-pahtiskeh ika
what 1pl.S-3sg.O-cure.IRR with
'What are we going to cure it with?' (Flores Nájera 2019, p473; gloss adapted)

If *wh*-questions in Tlaxcala Nahuatl are analyzed as involving extraction of the interrogative pronoun from within PP, then examples like (170) could be said to involve p-stranding.[37] 16th century Nahuatl also shows some evidence of p-stranding in the context of relativization.

(171) 16th century Nahuatl:

a. in tepētl [RC in [PP īcpac __] cah [NP cē calli]]
DEF mountain DEF on.top.of be.located INDEF house
'the mountain on which there's a house' (Launey 2011, p334, gloss added)

b. in to-tēucyōhuān [RC in [PP īn-tech-pa __] ti-moquixti-h]
DEF 1pl.POSS-lords DEF 3pl-TECH-from 2sg.S-exit.HON-PRET
'our lords [who] you (honorific) descended from' (Sasaki 2011, p9, gloss adapted)

c. in tlā pōchtēcah [RC in [PP īmpan __] ō-huehuetzca-c huāctli] …
DEF if merchants DEF on.PL PFV-laugh-PAST hawk
'If they were merchants at whom the white-hooded hawk laughed, …'

(Andrews 2003, p531, gloss added)

If relativization in 16th century Nahuatl involves extraction of a (null or overt) relative pronoun to the edge of the relative clause (Rosenthal 1971, 1972, 1973), then examples like (171) could be said to contain p-stranding (though see Langacker 1975, p53 for critical discussion).

In addition to this possibility (i.e. that of relatively permissive p-stranding), a second possible type of language might allow P_1-stranding but lack P_2-to-P_1 movement. This would mean that P_1 could be stranded, but that P_2 could not be stranded. The description of Gungbe in Aboh (2010) aligns closely with this description. Aboh identifies two classes of adpositional elements in Gungbe (which he labels P_1 and P_2), the higher P_1 being prepositional directional and functional

[37] Flores Nájera claims that the term "p-stranding" is inappropriate for Tlaxcala Nahuatl because there is no basic order for an adposition and its complement (p473: "no se puede hablar de *pied piping* o abandono de SR [=Sustantivo Relativo] porque no se puede determiner el orden básico entre el SR y su complemento.").

elements and the lower P_2 being post-positional spatial elements. Aboh notes that P_1 can be stranded (obligatorily so, in fact; pied-piping of P_1 is not permitted), while P_2 cannot be stranded.[38]

(172) Gungbe:

a. [$_{NP}$ távò ló]$_i$ wɛ̀ Asíbá xɛ́ [$_{PP}$ __$_i$ jí]
table Det Foc Asiba climb P
'Asiba climbed on top of the table' (Aboh 2010, p227, brackets added)

b. Àsíbá$_i$ wɛ̀ Kòfí zɛ́ kwɛ́ [$_{PP}$ xlán __i]
Asiba Foc Kofi take money P
'Kofi sent money to Asiba' (Aboh 2010, p228, brackets added)

Given the present assumptions, this follows if Gungbe permits P_1-stranding (for whatever reason that's allowed in various languages), but does not have P_2-to-P_1 movement and phase sliding. Lack of P_2-to-P_1 movement is in fact required by the linear order of elements: P_1 is prepositional, but P_2 is post-positional.

Adpositions in Hungarian, as described by Dékány & Hegedűs (2014), offer an interesting pattern in this connection. Dékány & Hegedűs find that some Hungarian adpositions allow stranding, while others do not. For example, stranding is reported to be possible with *át* 'over' but not with *alul* 'under.'

(173) Hungarian:

a. [$_{NP}$ Melyik kerítés-en]$_i$ másztak [$_{PP}$ át __$_i$] a gyerekek?
which fence-SUP climbed.3pl over the children
'Which fence did the children climb over?' (Dékány & Hegedűs 2014:7(18b))

b. *[$_{NP}$ Melyik érték-en]$_i$ maradt [$_{PP}$ __$_i$ alul] az index (alul)?
which rate-SUP stayed under the index under
'Which value did the index stay under?' (Dékány & Hegedűs 2014:7(19b))

As the notation in (173) indicates, *alul* 'under' is post-positional in Hungarian, while *át* 'over' can be *either* pre-positional *or* post-positional. The behavior of these two adpositions exemplifies a

[38] I am focusing on just a gross generalization of the Gungbe data. It is relevant to note that Aboh argues that P_2 is derived with predicate inversion in what he calls truncated possessives. This analysis is applied for Gungbe and for other languages with comparable structural elements, including English. I will not explore this more fine-grained structural possibility here.

correlation in Hungarian: most of the adpositions that allow stranding permit a pre-positional use, while all of those that disallow stranding are post-positional only. This would be predicted if Hungarian P_2 is head-final, with prepositional instances of P_2 raising to P_1 (inducing phase sliding). Post-positional P_2 would not allow stranding because, like English *ago*, they would not raise to P_1. However, according to Dékány & Hegedűs, there are some exceptions to this pattern; three post-positions which allow stranding are not accounted for under the analysis just suggested.

In addition to these first two options (i.e. (i) both allowing P_1-stranding and allowing P_2-to-P_1 raising, and (ii) allowing P_1-stranding but lacking P_2-to-P_1 raising), a third possible type of language might disallow P_1-stranding (again, assuming there are independent reasons for this) and also lack P_2-to-P_1 raising. This would be the case for prototypical non-p-stranding languages like Mandarin Chinese (and most other languages, for that matter).

(174) Mandarin Chinese:

a. *<u>Zhāngsān</u> wǒ [PP gēn __] bù shóu
Zhangsan 1sg with NEG familiar
'Zhangsan, I'm not familiar with.' (Huang 1982, p499 via Djamouri et al. 2013)

b. *<u>nà liàng qìchē</u>, [PP __ shàng] pā-zhe yī zhī māo
that CL car on lie-DUR 1 CL cat
'That car, a cat is lying on.' (Djamouri et al. 2013)

The fourth option is a language that disallows P_1-stranding but has P_2-to-P_1 movement. In such a language, phase sliding would take place, allowing stranding of P_2. One possible candidate language might be Hausa; according to Jaggar (2001, p521), "core" prepositions, including *dà* 'with,' *dàgà* 'from,' and *gà* 'to, for, etc.,' cannot be stranded, but "genitive" prepositions, including *cikin* 'inside of' can. Example (175) shows how extraction of a bare *wh*-phrase with "core" *dà* 'with' requires a resumptive pronoun in the prepositional complement position, while extraction with "genitive" *cikin* 'inside of' does not.

(175) Hausa:

a. <u>mɛ̀</u> kikà zō [PP dà shī]
what 2F.FOC-PF come with 3M
'What did you come with (it)?' (Jaggar 2001, p521)

b. mɛ̀ zā kà sakà kāyā [PP ciki __] ?
what FUT 2M put stuff in
'What will you put the stuff in?' (Jaggar 2001, p522)

This pattern is predicted if Jaggar's class of "core" prepositions instantiate P_1 while the genitives instantiate P_2 (and if Hausa has P_2-to-P_1 phase sliding while independently disallowing P_1-stranding).[39]

To summarize this subsection, I have argued that phasehood of P_2 may be compatible with Abels's (2003, 2012) account of p-stranding if P_2 can raise to P_1 and induce phase sliding. On this account, there would have to be an independent explanation for why P_1 cannot be stranded in many languages. I did not attempt to provide any explanation for the ban on P_1-stranding. However, I noted that this approach (whereby non-strandability of P_2 follows from anti-locality, and non-strandability of P_1 follows from an independent mechanism) predicts four types of gross language behavior with respect to p-stranding, crossing [$\pm P_1$-stranding] with [$\pm P_2$-to-P_1 raising]. I identified potential candidates for each type of language, e.g. English as [$+P_1$-stranding, $+P_2$-to-P_1 raising], Gungbe as [$+P_1$-stranding, $-P_2$-to-P_1 raising], Mandarin as [$-P_1$-stranding, $-P_2$-to-P_1 raising], and Hausa as [$-P_1$-stranding, $+P_2$-to-P_1 raising].

7.3. Outstanding problems

To conclude this section, I will briefly discuss several potential problems with the idea that P_2P is a phase. The first problem involves agreement. Adpositional phrases often appear to be opaque to agreement. When a PP occurs within the c-command domain of a φ-probe, it is often not possible to establish an Agree relation between the probe and (the interior of) the PP. English PP subjects do not agree with T in number, for example, even when the prepositional complement is plural.

(176) [PP Under the stairs] is/*are a good place to hide.

[39] It's not out of the question that Spanish might also partially fit this description. Campos (1991) notes that many prepositions, such as *cerca* 'near,' *detrás* 'behind,' and *encima* 'on top of,' allow what looks superficially like a form of p-stranding, as in (i).

(i) De qué edificio está cerca la facultad?
of what building is near the school
'What building is the school near (to)?' (Campos 1991, p741)

If such examples involve genuine p-stranding, we might entertain the possibility that the strandable prepositions are instances of P_2 which raise to P_1, inducing phase sliding. This hinges, though, on the idea that there really is extraction of the complement of P_2 in (i) etc. Though not impossible *a priori*, there are arguments against such an analysis (see Campos 1991, Terzi 2010).

Rezac (2008) observes that some PPs in some languages do not participate in φ-agreement, while some PPs in some languages do participate in φ-agreement. There can even be variation within a single language, as Rezac notes for Nepali: subjects marked with ergative case (which Rezac interprets as DPs enclosed in an ergative PP) can control agreement on T, but dative subjects (likewise interpreted as DPs enclosed in a dative PP) cannot. Rezac's analysis of the inter- and intra-language variation crucially involves phasehood of PP. PPs are phases, and as such they block outside probing into their interior. The ability of certain PPs to control agreement is taken to follow from the presence of a φ-probe on P itself; if P carries a φ-probe, and agrees in φ-features with its complement DP, then PP-external probes can agree with φ-bearing P itself, thus agreeing with the prepositional complement by proxy. Relevant discussion on Agree across a PP boundary can also be found in Polinsky (2016).

It is critical to Rezac's analysis that what I identified as P_1P above is the phase, not P_2P. If P_2P is a phase instead, the analysis does not follow straightforwardly. This is a potential problem for my proposal. If P_1P is not a phase, then an alternative account of the agreement phenomena is apparently required.

A second problem involves case assignment. Section 4 considered evidence that P_1 may be responsible for case assignment, not P_2. Yet case assignment is one of the characteristic properties of phase heads. If P_2 is a phase head but is not a case assigner, while P_1 is a case assigner but is not a phase head, then we would have to reject the idea that case assignment is a determining property of (non-)phasehood. Whether this is a problem for the theory of phases is not clear. See Citko (2014) for relevant discussion.

There are also various conceptual problems. First of all, why should P_2P be a phase in the first place? The justifications for phasehood of CP and *v*P offered by Chomsky (2004, p124) do not seem to apply to P_2P, at least not straightforwardly. Chomsky suggested that CP and *v*P are phases because they are "semantically and phonologically coherent and independent," which is identified with being "propositional constructions." It is certainly not obvious how these properties are shared by P_2P. Nevertheless, some have noted that Chomsky's rationale regarding CP and *v*P phasehood is not as straightforward as might sometimes be presented. See Epstein (2015, p76ff) for relevant discussion. The absence of a clear conceptual rationale for phasehood of P_2P should not necessarily preclude the hypothesis, therefore.

As a final problem (not *the* final problem, just the final one I will discuss), suppose there is a good reason why PP is a phasal domain. Why should P_2 be the phase head instead of P_1? In other domains, the phase head marks the edge of the extended projection. For instance, Voice marks the edge of the argument-structural projection. If one thinks D is a phase, then D marks the edge of the nominal projection. Here, various analogies might be drawn to other better-established phases. For example, we might compare the P_1P-P_2P sequence to TP-VoiceP, or to DP-NP (on the view that NP/*n*P not DP is a phase; Davis 2020). As with the other outstanding problems above, I will not provide any further solution here.

All these problems suggest avenues for future cross-linguistic work. I will not explore them further in this dissertation. However, my hope is that the ideas developed in this chapter might lead to further exploration of these problems, whether to add support to my proposal, or to show that it is on the wrong track.

8. Conclusion

At the beginning of this chapter, I raised two questions.

(177) a. Among PP dependents of V, exactly when can an oblique pronoun (i.e. a pronoun complement of a preposition) have a co-clausal binder?

b. Is the A/AD involved in a parsimonious account of the above?

I then reviewed predicate-based and locality-based analyses of Condition B from previous literature and subsequently developed a new analysis combining aspects of both approaches. The answer my analysis gives to question (177b) is (in line with the previous chapters) negative; the A/AD is not needed to explain Condition B effects within PP. This follows from the answer I give to (177a); I argued in section 6 that an oblique pronoun can be bound unless *two conditions* are met. Specifically, a pronoun cannot both (i) be within one phase of its binder, and (ii) be a co-argument with its binder. Pronouns fail to be licensed only if both (i) and (ii) hold. The former stipulation is a type of locality condition, and the latter is a predicate-based condition. As such, my proposal combines aspects of predicate-based and locality-based approaches to Condition B.

In building up to this analysis, I explored several other areas related to the syntax of prepositional phrases. I provided arguments that PP is split into a higher layer (P_1P) and a lower

layer (P_2P), with the lower layer syntactically realized only when overt. I also argued that P_2P is a phase, and I explored the potential consequences of that idea in the domain of p-stranding. Finally, I considered PPs in Theta Theory, arguing that prepositions and other argument-introducers must be linked to a lexical predicate (e.g. a verb) in order to ensure univocality of θ-assignment.

Condition B effects within PPs are better described *without* the A/AD than *with* it. Section 6.5 showed how apparent A/AD effects follow with no A/AD at all, and section 3.2.3 even shows that the A/AD can be a serious obstacle to successful analysis. Therefore, I take the results of this chapter to support the position defended in earlier chapters. The A/AD is not strongly motivated by syntactic or semantic evidence, even in domains where it might at first appear to be relevant.

CHAPTER 6

Prepositional Passives

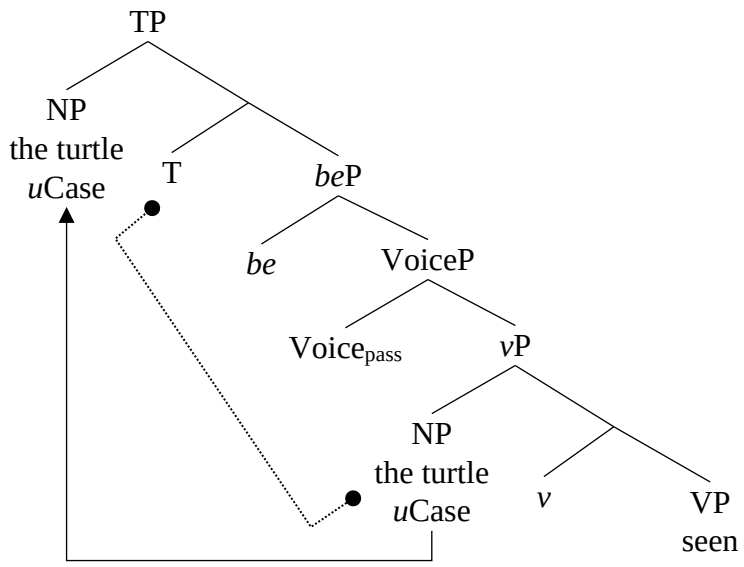
1. Introduction

This chapter develops an analysis of *prepositional passives* (or *pseudo-passives*; henceforth *P-passives*) in English. Ordinary English passives, such as those in (1), involve a transitive verb in participle form (regularly ending in *-ed*), where the external argument is suppressed (optionally expressed in a *by*-phrase) and an NP other than the external argument is promoted to structural subject position, bearing nominative case and controlling agreement on T.

(1) a. The turtle was seen (by Terry).
b. We were offered $10 (by the experimenters).
c. I was told (by HR) that I got the job.

Passive is traditionally thought to be the result of accusative-case assignment being blocked. This is often thought to be a property of the passive Voice (or *v*) head: an active transitive Voice head would assign accusative case to an NP in its c-command domain, but a passive Voice head ($\text{Voice}_{\text{pass}}$) cannot do so. As a result, the NP that *would* have received accusative case must raise to a higher position to receive Case. This higher position turns out to be structural subject position (Spec-TP); given that the external argument is suppressed in the passive, the φ-probe on T locates the next highest NP in its domain, incidentally the same one lacking case in the domain of $\text{Voice}_{\text{pass}}$.

(2)



P-passives, like those in (3), have been a persistent problem for this account of passivization.

(3) a. The turtle was looked at (by Terry).

b. We were taken advantage of (by the experimenters).

c. I was spoken with (by HR) about getting the job.

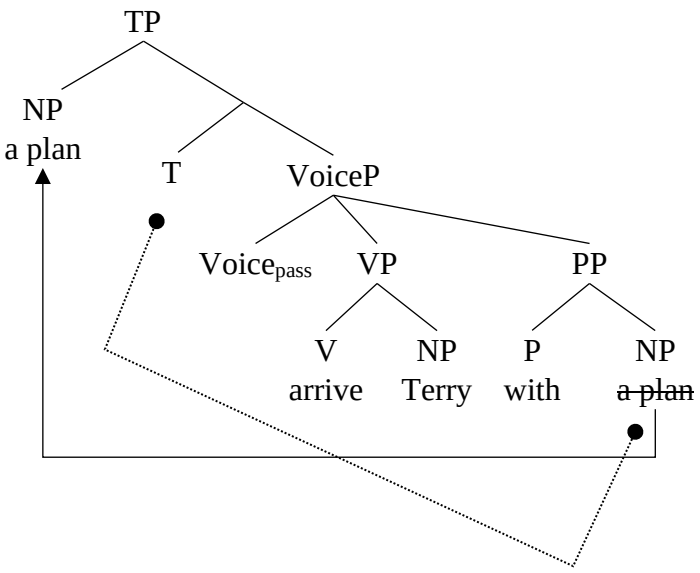
These sentences differ from those in (1) in the position of the NP which is promoted to subject-of-passive. In (1), it is a direct or indirect object (i.e. the structurally highest NP dependent of the verb). But in (3), a prepositional object is promoted to subject position.

There are two puzzling aspects to P-passives, given a conventional analysis of passives along the lines of (2). The first involves case assignment. Prepositional objects receive case within PP. The prepositional object in a P-passive should have no problem receiving Case, then; it should be able to receive case from the head of the PP (probably from P_1, to be more precise, as discussed in chapter 5).

Second, PPs are normally opaque for Agree from an outside probe.[1] For instance, with an unaccusative, prepositional objects are not potential targets for Agree by T. Otherwise, sentences such as (4) might be predicted to be acceptable, with a derivation such as (5).[2]

(4) *A plan arrived Terry with.
(Intended as synonymous with "Terry arrived with a plan")

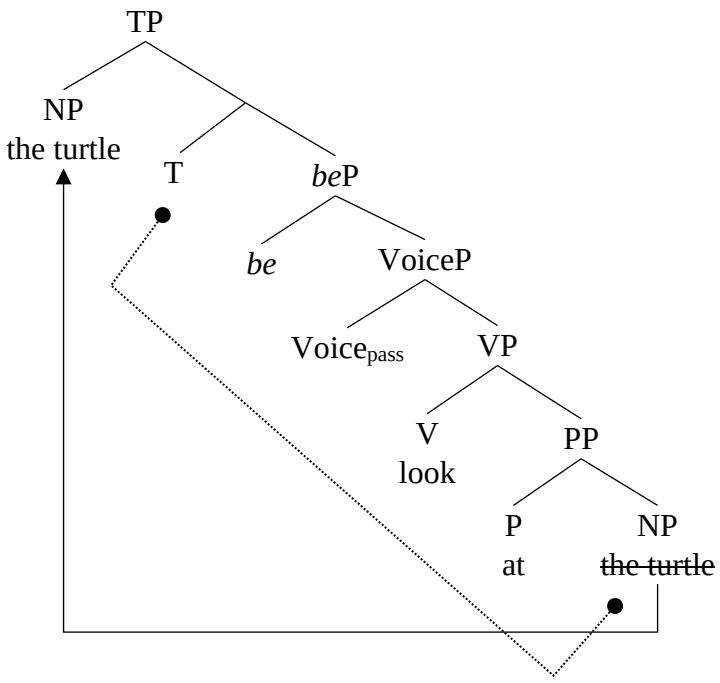
(5)



The impossibility of (4) suggests that *a plan* in Comp-PP is not accessible to Agree by T.[3] Yet in the P-passive, the prepositional object controls agreement on T, meaning Agree must be able to see inside PP. Consider (6) as a derivation for (3a), for instance.

[1] See Rezac (2008) and Polinsky (2016) for some discussion of PP-opacity in a range of languages. A potential exception for English is "intervention effects" with experiencer PPs in raising constructions, as in (i).
(i) There seems to my friend to be several people outside.
See Boeckx (1999) for relevant discussion. For the purposes of this chapter, I will assume that *my friend* does not control agreement in (i). Singular agreement may result from agreement with the expletive *there* or from psycholinguistic interference (cf. agreement attraction, e.g., Bock & Miller 1991, Lewis et al. 2006, Ke 2019, among others).
[2] The VoiceP is assumed to be constructed with the *n*-ary structure-building procedure discussed in chapter 4.
[3] The problem is restricted to the Agree relation, not movement. The complement of a preposition is typically perfectly accessible for A-bar movement in English. See chapter 5 for some discussion.

(6)



This chapter seeks to provide an analysis of P-passives which confronts the two problems just introduced, while also accounting for certain puzzling constraints on P-passivization (to be discussed in section 2).

I have chosen to explore this topic here because of its potential relevance for the A/AD, especially in the context of argument vs. adjunct PPs. Some previous literature (e.g. Hornstein & Weinberg 1981, Honda 2012) has reached the generalization that argument PPs can be targeted for P-passivization, but that adjuncts PPs cannot, purportedly explaining contrasts such as (7).

(7) a. Mary was talked to by John.

b. *Tuesday was departed on by Bill.

(Honda 2012, p109-110)

Also, anecdotally, in discussing potential evidence for the A/AD, I have found that constraints on P-passivization can be salient; data along the lines of (7b) are (in my experience) commonly cited as potential empirical evidence for the A/AD. (The idea being that (7b) might be blocked *because <u>on Tuesday</u> is an adjunct*.) The analysis of P-passives is therefore important for this dissertation. It is relevant to establish whether the A/AD is needed to explain such contrasts.

The remainder of the chapter is structured as follows. Section 2 introduces a number of different constraints on P-passivization, including discussion of the A/AD. Section 3 discusses several different accounts of P-passivization from prior literature. Section 4 then develops a new analysis. In short, the new analysis reinterprets the traditional "reanalysis" analysis of P-passivization (Chomsky 1965, Hornstein & Weinberg 1981) in terms of L-selection: I explore the hypothesis that L-selected prepositions need not be case assigners, and it is for this reason that the complement of an L-selected preposition is visible for Agree with T. Any PP can thus be targeted for P-passivization if it can be analyzed as L-selected.

Before proceeding to section 2, it is relevant to note that the analysis developed in this chapter represents a modification of the one developed in McInnerney 2020. The previous analysis, formulated in the labeling framework of Chomsky 2015, included a number of assumptions which I have not adopted in this dissertation, including feature inheritance (Richards 2007, Chomsky 2008). I also previously assumed (in McInnerney 2020) that, in the split PP, the higher layer was the phase, instead of the lower layer as argued in chapter 5. As such, the analysis here differs from that of McInnerney 2020 in significant respects. I believe the changes are improvements, as the new analysis not only utilizes a pared-down set of assumptions, but also covers a wider data set.[4]

2. Constraints on P-passivization

This section introduces four constraints on P-passivization. In brief: (i) prepositions instantiating P_1 tend to be more susceptible to P-passivization than prepositions instantiating P_2 are, (ii) PPs with a relatively low attachment site tend to be more susceptible to P-passivization than PPs with a relatively high attachment site, with L-selected PPs being most susceptible, (iii) PPs which are adjacent to the passive verb tend to be more susceptible to P-passivization than PPs which are separated from the verb by an NP, another PP, or an adverb, and (iv) P-passivization is degraded with expletive (*there*) subjects. These properties will all be taken into consideration in the analysis developed in section 4.

It should be noted that there is considerable variation in the acceptability of some P-passives. Throughout this section, I report data with diacritics indicating my own judgments.

[4] As noted in McInnerney 2020, the earlier analysis left certain phenomena aside for future work, such as V-NP-PP idioms, verb-particle constructions, and much of the variation in judgments among different speakers. These data are all addressed by the new analysis developed in this chapter.

However, in a number of cases, some authors have reported sentences as acceptable which I would find unacceptable. Though points of variation will be noted throughout, this section focuses on establishing preferences in the directions indicated above (e.g. P_1-passives > P_2-passives, etc.). The potential for variation will also be discussed in section 4 when I develop my proposal.

Before introducing these core properties, I will discuss the potential relevance of the A/AD, demonstrating that PP-passivization is possible both with some PPs which are conventionally considered arguments and with some PPs which are conventionally considered adjuncts, and vice versa (P-passivization is *im*possible with some conventional argument and adjunct PPs). In addition, after discussing the core properties just mentioned, I will discuss some other properties which do not factor significantly in the analysis I develop in section 4.

2.1. The Argument/Adjunct Distinction

As mentioned above, the A/AD has been cited in some prior literature as relevant for P-passivization (Hornstein & Weinberg 1981, Baker 1985, Kageyama & Ura 2002, Honda 2012). This would appear at first glance to explain the unacceptability of sentences like (8), for instance.

(8) a. *Monday is overslept on nearly every week.
b. *The same way is walked in by everyone with bad knees.
c. *Zest is always sung with in the shower by Linda.

(Baker 1985, p394)

In contrast, much of the literature focuses on examples involving P-passives from canonical argument PPs.

(9) a. Terry was talked to by Lee.
b. This problem should be looked into.
c. I don't appreciate being yelled at.

However, the possibility of P-passivization from what would conventionally be considered adjunct PPs is well known (see e.g. Ramchand & Svenonius 2004, Tseng 2006, Schueler 2011, Drummond & Kush 2015, Findlay 2017). Several examples which are acceptable in my judgment are given in (10). The PPs targeted by P-passivization in these examples are all locatives.

(10) a. The bed was slept in.

b. That's the first time our dinner table has ever been eaten at.

c. Libraries should never be yelled in.

d. The couch was cried on for hours.

Moreover, it also seems clear that many canonical argument PPs resist P-passivization. Consider the examples in (11), all of which are unacceptable in my judgment, despite the fact that they involve P-passivization from a goal PP.

(11) a. *The painting was looked behind by the detective.
(Cf. The detective looked behind the painting.)

b. *The target was pointed next to by the instructor.
(Cf. The instructor pointed next to the target.)

c. *The room was walked around.
(Cf. Someone walked around the room.)

Therefore, argumenthood seems not to be a necessary condition for P-passivization (given (10)), nor a sufficient one (given (11)).

The fact that some canonical adjunct PPs permit P-passivization, and that some canonical arguments do not, is not an argument *against* the A/AD. The data could be *compatible* with a version of the A/AD. For example, some have suggested that "high" adjuncts (e.g. temporals) resist P-passivization, while "lower" adjuncts (e.g. locatives) permit P-passivization more readily (see Schueler 2011, p171). Nevertheless, the data *motivate* the A/AD only if argumenthood plays a necessary role in determining which PPs permit P-passivization. Examples such as (10) and (11) suggest that argumenthood does not play such a role.

2.2. Adjacency

One of the best-known restrictions on the P-passive is that the PP targeted for P-passivization must be linearly adjacent to the verb (more specifically, it must be immediately to the verb's right).[5] For

[5] It is relevant to note that the adjacency requirement holds between the verb and the *prepositional phrase* targeted by P-passivization. The requirement is *not* that of strict linear adjacency between the verb and the head *preposition*.

example, P-passives are degraded with transitive verbs when a direct object is present. This can be seen in (12), giving minimal pairs with vs. without direct objects.

(12) a. i. This charity is more frequently donated to than any other.
ii. > This charity is more frequently donated books to than any other.

b. i. This table has never been eaten at before.
ii. > This table has never been eaten dinner at before.

c. i. I don't like being pointed at.
ii. > I don't like being pointed dangerous weapons at.

In my judgment, the ii-sentences of (12) are unacceptable, and the i-sentences acceptable. In general, an NP object cannot occur between the verb and the PP targeted for P-passivization. This generalization is subject to exceptions; though I find the sentences in (12) unacceptable, some authors have reported similar sentences as acceptable. For example, (13) is acceptable according to Mills (2008, p9), and (14) is acceptable according to Honda (2012, p115). Similar examples can be found in Kageyama & Ura (2002), Tseng (2006), and Findlay (2017). ('*' indicates my judgment.)

(13) *This cutting-board was chopped a habanero on.

(14) a. *This violin can be played any sonatas on.
b. *This pub should not be smoked hash in.

I will proceed under the assumption that, even if some examples like (13)-(14) are acceptable for some speakers, their acceptability is not productive. I return to this shortly, when I discuss the behavior of VP idioms.

The adjacency requirement also applies for PPs. Even if two PPs could be permuted outside of the P-passive, if one of them is P-passivized, that one must occur closer to the verb. This can be seen from the contrasts in (15) and (16).

This can be seen from the fact that PP-modifiers like *right* can occur in the P-passive, as in (i) from Tseng (2006, p149).

(i) Mr. Cellophane can be looked right through.

(15) a. i. Lee was talked to about Terry.
ii. > Lee was talked about Terry to.

b. i. Lee was talked about to Terry.
ii. > Lee was talked to Terry about.

(16) a. i. Lee is rarely danced with for Terry.
ii. > Lee is rarely danced for Terry with.

b. i. Lee is rarely danced for with Terry.
ii. > Lee is rarely danced with Terry for.

Although the PPs in (15) and (16) can be permuted in non-P-passive contexts (e.g. *Someone talked to Lee about Terry* vs. *Someone talked about Lee to Terry*), there is a clear preference for the passivized PP to come first.

Finally, the preference for verb-PP adjacency in the P-passive can also be seen with certain adverbs. The i-sentences below are strongly preferred to the ii-versions.[6]

(17) a. i. We were spoken to.
ii. > We were spoken frequently to.

b. i. The bed was slept in.
ii. > The bed was slept recently in.

c. i. A new consensus was arrived at.
ii. > A new consensus was arrived reluctantly at.

However, it has been widely noted that the adjacency requirement does not treat all adverbs equally. The sentences in (18) have been reported in prior literature as acceptable ((18a) and (18b) by Culicover & Jackendoff 2005, p208 and (18c) by Drummond & Kush 2015, p432).

(18) a. ?? Sandy was relied very heavily on.
b. ?* Jill was being looked intently at by Ann.
c. ?? John was spoken sternly to.

[6] It is important that the adverbs can occur between the verb and the PP outside of the P-passive, as in (i) below.
(i) They arrived reluctantly at a new consensus.

In my judgment, the ii-sentences of (17) are unacceptable. The sentences in (18) are not at ceiling either, but they seem to be less strongly degraded (as my judgment diacritics indicate).

I will tentatively assume (following suggestions by Schueler 2011 and Drummond & Kush 2015) that adverbs may subvert the adjacency requirement if they attach low in the clause, where attachment-height is determined by semantic scope (e.g. as described by Ernst 2002). The most acceptable adverbs are what Ernst calls "pure manner adverbs," which he argues to be located within the VP. Ernst lists adverbs such as *quietly*, *slowly*, and *politely* in this class. (19) shows that these adverbs are marginal when disrupting verb-PP adjacency in P-passives.

(19) a. ?? The table was eaten politely at.
b. ?? The toys should be played quietly with.
c. ?? They need to be spoken slowly to.

Higher adverbs are more sharply degraded. (17a) and (17b) above illustrate with temporal adverbs, and (17c) with what Ernst labels a subject-oriented mental-attitude adverb. Ernst argues that these types of adverbs attach higher in the clause than pure manner adverbs (i.e., outside VP). (19) shows that several other adverbs in the latter class are unacceptable when disrupting verb-PP adjacency in the P-passive.

(20) a. *The table was eaten willingly at.
b. *The toys should be played gladly with.
c. *They need to be spoken absent-mindedly to.

In addition to manner adverbs, I know of two other cases in which verb-PP adjacency can be disrupted, (i) prepositional particles and (ii) V-NP-PP idioms.[7] Example (21) first illustrates the case of prepositional particles.

(21) a. I don't want to be talked back to.
b. Few people are so widely looked up to.
c. That offense has yet to be made up for.
d. Technical support is rarely reached out to.

[7] Though I argue shortly that these two cases can be treated in the same way.

These sentences are all acceptable, in my judgment, reflecting the general pattern for prepositional particles. V-NP-PP idioms display more complex behavior. By V-NP-PP idiom, I refer here to idioms like those in (22), where the idiomatic part (boldfaced in (22)) includes the main verb, its (apparent) NP object, and the head of the following PP.

(22) a. It just doesn't [$_{V}$ **do**] [$_{NP}$ **justice**] [$_{PP}$ **to** the story].
b. We're [$_{V}$ **making**] [$_{NP}$ **fun**] [$_{PP}$ **of** them].
c. They've been [$_{V}$ **taking**] [$_{NP}$ **advantage**] [$_{PP}$ **of** all the available options].

As Huddleston & Pullum (2002, p288-289) note, some V-NP-PP idioms have only an ordinary passive, some have only a P-passive, and some have both.[8]

(23) a. i. Justice has not yet been done to that story.
ii. *That story has not yet been done justice to.

b. i. *Fun is being made of them.
ii. They are being made fun of.

c. i. Not enough advantage was taken of all the available options.
ii. All the available options were taken advantage of.

I propose that the first group (with only an ordinary passive) has the structure of transitive VPs. The NP in the idiom is therefore accurately analyzed as an NP. That might seem obvious, but it is relevant to draw a contrast with the second group (with only a P-passive); I argue that the "NP" in these idioms is really a particle, not an NP. This can be seen from the fact that idioms of the former type allow their NP to be modified by adjectives, while the latter type does not.

(24) a. No one has managed to do (substantial) justice to that story.
b. We aren't trying to make (*significant) fun of them.

On this analysis, the reason why the P-passive is unavailable in (23a-ii) is that there is an NP between the verb and the PP. This is not allowed in the P-passive, as discussed above. The reason why the P-passive *is* available in (23b-ii) is that there is no NP between verb and the PP; the word *fun* is in fact a particle, not an NP, which is acceptable in the P-passive, as just discussed.

[8] Some also have no passive at all, such as *make friends with* (see Huddleston & Pullum 2002 p289), but those are not relevant here.

The third type of V-NP-PP idiom, i.e. those that have both an ordinary passive and a P-passive, are ambiguous between the former two types. For example, the word *advantage* in *take advantage of* can be either an NP or a particle. This analysis is supported by the fact that *advantage* can be modified as an NP in a non-passive context or in the ordinary passive, but not in the P-passive.

(25) All the available options were not taken (*enough) advantage of.

The reason is that the modification forces the NP analysis (particles cannot be modified in this way), and the NP analysis is not compatible with the P-passive.

I assume this analysis also applies to examples such as (13)-(14) above, when it is exceptionally and unproductively acceptable for an NP to disrupt verb-PP adjacency in the P-passive.[9]

2.3. Type of preposition

In addition to the requirement of verb-PP adjacency, the application of P-passivization is restricted by the type of preposition heading the targeted PP. One generalization is suggested by the minimal pairs in (26).

(26) a. i. That old table hasn't been eaten at in years.
ii. > That old table hasn't been eaten in front of in years.

b. i. The secret vault is always being snuck into.
ii. > The secret vault is always being snuck inside of.

c. i. The human statue never responds when pointed to.
ii. > The human statue never responds when pointed behind.

d. i. Which terminal is departed from most often?
ii. > Which terminal is departed from near most often?

[9] Mills (2008) reports that some speakers seem to productively accept sentences like (13)-(14) freely when the NP object is non-specific, while others tend to reject all P-passives with NP objects. I take this as a point of dialectal variation. For speakers of the dialect which accepts P-passives with indefinite NP objects, Mills's analysis may be appropriate.

As discussed in chapter 5, PP can be split into two layers. The higher layer, which I refer to as P_1P, is headed by functional or directional prepositions like *at*, *(in)to*, and *from*, while the lower layer is headed by narrowly spatial prepositions, like *in front of*, *inside of*, *behind*, and *near*. The prepositions in the i-examples are instances of P_1, and the prepositions in the ii-examples are instances of P_2. The exception is (26d-ii), where both P_1 and P_2 are overtly realized (*from* and *near* respectively).

Chapter 5 motivated the idea that P_2P is present only when overtly realized. The preferred i-examples of (26) thus share the property that the PP targeted for P-passivization contains the P_1P layer only. The contrasts in (26) thus suggest that P-passivization may be degraded for PPs containing P_2P. Contrasts like those in (27) support this generalization, if we assume that the prepositions *in* and *on* head P_1P.[10]

(27) a. i. That old sleeping bag hasn't been slept in for years.
ii. > That old sleeping bag hasn't been slept inside (of) for years.

b. i. That old chair hasn't been sat on in years.
ii. > That old chair hasn't been sat on top of in years.

c. i. Libraries should only by talked in quietly.
ii. > Libraries should only be talked inside (of) quietly.

As discussed in chapter 5, this difference does not ordinarily condition extractability in English; A-bar extraction from PP is normally possible, whether P_2P is present or absent.

Despite the pattern exhibited in (26) and (27), some authors have found that P-passives are sometimes possible with PPs which I would analyze as containing a P_2P layer. For example,

[10] I will assume for the purposes of this chapter that *in* and *on* can instantiate P_1. This idea is supported by the prosodic behavior of *in* and *on*, which mirrors that of other types of P_1, like *to* and *from*: while P_2 can bear the nuclear pitch accent, e.g. when stranded or with a pronoun complement, as in (i), *on* and *in* behave like P_1 in resisting nuclear pitch in these contexts, as in (ii). Small capitals indicate nuclear pitch accent here.

(i) The chair, I'm sitting in FRONT of. / I'm sitting in FRONT of it.

(ii) The chair, I'm SITTING $\left\{\begin{matrix}\text{in}\\\text{on}\end{matrix}\right\}$ / I'm SITTING $\left\{\begin{matrix}\text{in}\\\text{on}\end{matrix}\right\}$ it.

In and *on* may occupy P_1 with certain complex prepositions like *in front of*/*inside of* and *on top of*.

Despite this, *in* and *on* must also sometimes occupy P_2, since they can co-occur with *to* and *from* in sentences like (iii).

(iii) The noise came to/from in/on the house.

I take this to suggest that *in* and *on* may be ambiguous on their own, with various ways of disambiguating, including P-passive, which forces the P_1 structure.

Findlay (2017, p2-3) gives (28) as acceptable and reports (29) from a tweet. Drummond & Kush (2015, p436) also give (30) as acceptable. In my judgment, these are degraded to varying degrees, as indicated.

(28) a. ?* Seoul can be walked around in a day.

b. * No statue should be stood beside in this park.

(29) ?? When I'm on the bus I don't like being sat next to.

(30) * John was stood on top of.

In some other instances, examples of P-passivization involving prepositions that would appear to instantiate P_2 are readily acceptable. Two relevant examples are given in (31).

(31) a. The house is being looked after by the neighbors.

b. The case will be presided over by Lee.

The examples in (31) involve L-selection (see chapter 3 for discussion of L-selection). The prepositions *after* and *over* are part of an idiom in these examples, *look after* and *preside over* respectively. I will assume that L-selected prepositions are always generated in P_1. *After* and *over* are therefore in P_1 in (31), even though they are productively used as instances of P_2 in non-L-selection contexts.[11]

I will assume that speakers who accept sentences like (28)-(29), involving P-passivization from an apparent P_2P, reanalyze the prepositions as L-selected by the verb.[12] I discuss this in more detail in section 4.2.

[11] That *after* and *over* are in P_1 in L-selection is supported by binding. See section 4.2 below for more discussion.

(i) The house$_1$ isn't going to look after itself$_1$/*it$_1$.

(ii) The case$_1$ isn't going to preside over itself$_1$/*it$_1$.

[12] I note that this predicts that, for speakers accepting P-passivization from an apparent P_2P, judgments should become degraded when PP-modifiers are used, as these are incompatible with L-selection. For instance, *right* cannot be used with L-selected PPs, as in (i), even though it compatible with PPs outside of L-selection, as in (ii).

(i) Everyone depends (*right) on Lee.

(ii) The cat sat down right on Lee.

If P-passivization from an apparent P_2P actually involves L-selection of the P_2P, then we would expect speakers to reject (iii) with *right* present, even if they accept (iii) without *right*. (judgment diacritics suppressed).

(iii) I don't like being sat (right) next to on the bus.

2.4. Expletive subjects

The final core constraint on P-passivization which I will discuss here involves expletive passives. Ordinary passives often have a variation with an expletive subject, as (32) illustrates.

(32) a. Not enough people have been interviewed for this position.
b. There haven't been enough people interviewed for this position.

But for some speakers (myself included), P-passives do not have an expletive variant. Example (33b), for instance, is unacceptable in my judgment.

(33) a. Not enough people have been talked to about this position.
b. > There haven't been enough people talked to about this position.

Again, however, the literature reports variation on this point. Drummond & Kush (2015, p454) report (34) as acceptable (my judgment is indicated with '?*').

(34) ?* In this building there were many rebels shot at.

I have also found that some speakers reject expletive P-passives, while some speakers accept them. The analysis developed in section 4 will provide an option to derive expletive P-passives, and an option which fails to derive them.

2.5. Other conditions

The literature provides a number of other conditions that affect acceptability of P-passives. For example, Pullum (2014, p7) offers (35) as a principle governing restrictions on P-passivization (see also Huddleston & Pullum 2002, Ramchand & Svenonius 2004, and numerous others adopting a version of this condition).

(35) *Affectedness Condition*:
In prepositional passives … the VP has to denote either a salient and significant property of the entity it is predicated of, very often determining a physical state change in that entity.

To illustrate the principle, Pullum gives the contrast in (36).

(36) a. It may surprise you to learn that this chair was once sat in by Sir Winston Churchill.

b. # It may surprise you to learn that Swindon has been walked in by Sir Winston Churchill.

(Pullum 2014, p8(17))

The idea is that it is a significant property of a chair for Churchill to have sat in it, but it is not a significant property of a town for Churchill to have walked in it. In slightly different terms, *Churchill's sitting in* a chair "affects" it in some way, but *Churchill's walking in* a town does not. Pullum claims that the affectedness principle extends to cover contrasts like (37), the idea being that *sleeping in* a bed denotes a significant property of the bed, "affecting" the bed, while *sleeping near* a river does not have the same effect.

(37) a. This bed was slept in by George Washington.

b. *The river was slept beside.

(Huddleston & Pullum 2002, p1446[65])

Some principle of the general character of (35) might be required to account for contrasts like (36). However, its application to examples like (37) is only partial. Notice that the "insignificant" property of the VP in (36b) can be made significant enough to permit P-passivization, as below.

(38) a. It may surprise you to learn that Swindon was walked in by Winston Churchill more often than any other town.

b. It may surprise you to learn that Swindon is the only town walked in by both Winston Churchill and Clement Atlee at once.

But the same technique fails to significantly improve (37b).

(39) a. *This river was slept beside by Winston Churchill more often than any other river.

b. *This is the only river that was slept beside by both Winston Churchill and Clement Atlee at once.

Further, minimal pairs like (40) cannot be accounted for with (35). How could it be that sleeping *in* a sleeping bag denotes a significant property, but sleeping *inside* it doesn't?

(40) a. i. That old sleeping bag hasn't been slept in for years.

ii. > That old sleeping bag hasn't been slept inside (of) for years.

b. i. That old chair hasn't been sat on in years.

ii. > That old chair hasn't been sat on top of in years.

c. i. Libraries should only by talked in quietly.

ii. > Libraries should only be talked inside (of) quietly.

I will assume in this chapter that Pullum's (35) could be a precondition for acceptability of P-passivization, but I also assume that – however it is formally implemented[13] – it can be controlled for in many cases, as in (38)-(39) and in the other examples discussed above.

In a similar vein, Culicover & Jackendoff (2005, p208) propose that P-passives are allowed when the prepositional object serves its "proper function" in the clause.

(41) *Proper Function Condition*:
Prepositional passives seem generally possible when the verb and preposition together denote the (surface) subject's proper function.

They give the contrasts in (42) as illustration. As they point out, there is a sense in which beds are properly used "to sleep *in*," not "to sleep *under*," and in which sofas are properly used "to sit *on*," not "to sit *beside*."

(42) a. This bed has been slept in/*under.

b. The sofa has been sat on/*beside.

Like the affectedness principle, this idea may have some role to play in P-passivization, but minimal pairs like (40) indicate it cannot be the full story. How could sleeping *in* a sleeping bag fulfill its proper function, while sleeping *inside* it could not? Surely if sofas are properly used "to sit *on*," then they are properly used "to sit *on top of*." Yet (40b) is unacceptable with *on top of*.

Also, there are many acceptable cases where it is not clear that proper function is an appropriate characterization. For instance, one could say that a table is "sat on," e.g. "The table was sat on by several people at once." Yet it is not obvious that tables' proper function is "to sit on," in my judgment.

[13] As Findlay (2017, p3) points out, the literature discusses affectedness at an informal level which is "potentially so broad as to be meaningless." I assume there will be some way to state the affectedness condition formally, i.e. in such a way as to make clear predictions.

In the analysis I develop in section 4, L-selection (of P_1) is a precondition for P-passivization. It might be possible to interpret Culicover & Jackendoff's Proper Function Condition as a consequence of this requirement. For example, if *sleep* can L-select *in*, and *sit* can L-select *on*, there would be a tighter lexical connection between these verb-preposition combinations than others. These tight lexical connections might then be described as giving the proper function of certain NPs.

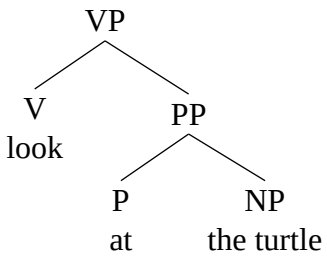
3. Previous accounts

There have been many earlier proposals to model the P-passive in generative grammar. I discuss several recent proposals in this section, as well as the highly influential Reanalysis Approach of Hornstein & Weinberg (1981). I show that existing approaches have unique drawbacks, motivating my proposal of an alternative in section 4.

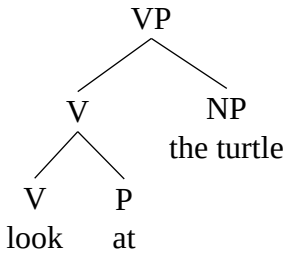
3.1. Hornstein & Weinberg 1981

Perhaps the most influential analysis of P-passives is the Reanalysis Approach (e.g. Chomsky, 1965, Hornstein & Weinberg 1981, Baker 1985), according to which a Verb-Preposition string is "reanalyzed" (by some mechanism) as a "complex verb." Hornstein & Weinberg, for example, proposed a rule of reanalysis which transforms a VP like (43) to one with the form (44).

(43)



(44)



This addresses the two core problems mentioned at the beginning of this chapter, i.e. those of case-assignment and agreement.[14] There is no longer a PP in (44); what was formerly the prepositional object is now an ordinary direct object. Therefore, after reanalysis, the P-passive is analyzed in just the same way as the ordinary passive.

This approach has several critical drawbacks. Foremost among these is the operation of reanalysis itself. Ideally, special operations and principles should be avoided. This is especially true for the reanalysis rule which would map (43) to (44). As Baltin & Postal (1996) point out, the properties of this rule would be anomalous. They noted that the transformation could not be analyzed as *movement*; if, say, P moved to V, there should be a trace/copy left in its extraction site. In a minimalist framework, it would be appropriate to conclude that reanalysis cannot be implemented by Merge. As such, it requires a special operation whose inner workings are substantially complex (see Baltin & Postal 1996 for discussion).

There are also several empirical objections. One major concern involves disruptions of verb-PP adjacency. First, some background. It is critical to Hornstein & Weinberg's account that reanalysis not be allowed to apply freely. If reanalysis were free, then we would expect extreme overgeneration. To constrain it, Hornstein & Weinberg proposed that the complex verb formed through reanalysis must be a "possible semantic word." According to them (p65-66), this would allow reanalysis only of strings which are idiomatic, e.g. (45a) but not (45b).

(45) a. Terry was [$_V$ taken advantage of] by Lee.
b. *Terry was [$_V$ taken presents to] by Lee.

However, examples of adverbs disrupting verb-PP adjacency are problematic for this view (Culicover & Jackendoff 2005, p208). If examples like (46) are acceptable (if marginal), then Hornstein & Weinberg's approach would have to analyze them as idioms. This seems unlikely; it appears that any contextually appropriate adverb classed by Ernst (2002) as a "pure manner adverb" can be substituted with roughly equivalent acceptability.

(46) a. ?? The table was eaten politely at.
b. ?? The toys should be played quietly with.

[14] The problems were understood in different terms in Hornstein & Weinberg's paper.

c. ?? They need to be spoken slowly to.

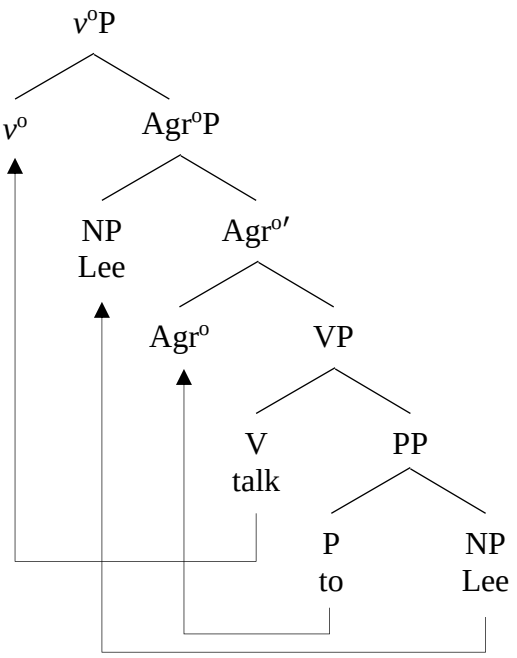
The impossibility of expletive P-passives for some speakers, as discussed in section 2.4, is also unexplained by reanalysis.

Further empirical objections can be found in Honda (2012) and Baltin & Postal (1996).[15]

3.2. Drummond & Kush 2015

Drummond & Kush (2015) argue that P-passives involve merger of a prepositional projection above V. In particular, the functional head Agr^o (responsible for Case-assignment to the internal argument) attracts P, rather than V. P thus ends up in a position higher than V. V in turn raises to *v*^{o}. (The internal argument NP further raises to surface subject position.)

(47)



[15] I should note that not all of Baltin & Postal's objections are sound. For instance, they claim that examples like (i) preclude reanalysis. (My judgment indicated with '??.' Their original is unmarked.)

(i) ??Fascism was fought for by Goebbels and then against by De Gaulle.

But this sentence could plausibly be analyzed in terms of deletion, as in (ii). This requires deletion of a sub-word, but this is independently needed for examples like (iii), as numerous authors have noted (see e.g. Chaves 2014).

(ii) Fascism was fought for by Goebbels and then ~~it was fought~~ against by De Gaulle.

(iii) They were first pro-~~communist~~ and then anti-communist.

Dummond & Kush's proposal partially inspired the proposal of McInnerney 2020, particularly in the reshuffling of the preposition and its object around V. McInnerney 2020 follows the structure in (47) closely, with the major configurational differences being that (i) McInnerney 2020 consolidates head-movement from P to Agr^{o} into a single step (P is merged directly where Agr^{o} is), and (ii) McInnerney 2020 does not assume head-movement from V to *v*^{o} (but instead assumes head movement from V to the higher P head).

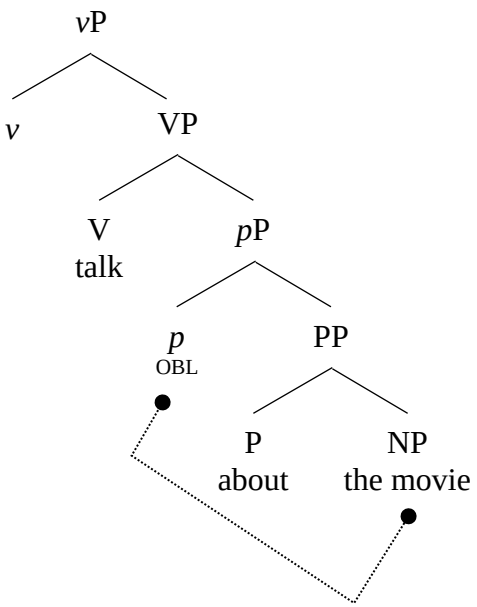
Nevertheless, the derivation (47) has some technical and empirical problems, which I seek to avoid in my analysis. For example, raising of P to Agr^{o} as in (47) is non-local; it skips the intervening head V. This violates the Head-Movement-Constraint (Travis 1984). The same applies for V-to-*v*^{o} raising, which skips Agr^{o}. Further, because Dummond & Kush assume "reanalysis" can occur in non-passive contexts, "raising to object" must be a post-syntactic (countercyclic) operation.

Empirically, the proposal does not address the adjacency requirement on P-passivization. This requirement is acknowledged, but not explained (p435-436). This is a major empirical drawback. The proposal also lacks a way of dealing with the minimal pairs noted in (26)-(27).

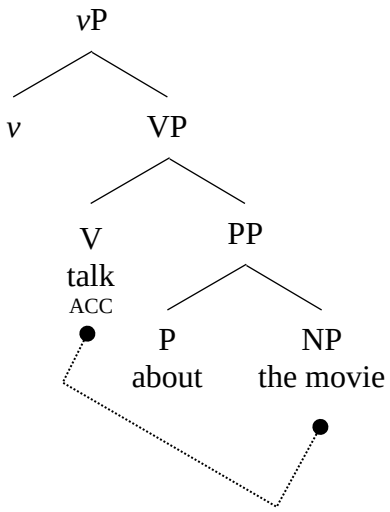
3.3. Richards 2017

Richards (2017) argues that P-passives involve θ-assignment to the oblique argument directly from V. According to him, PP involves two structural layers, with a functional projection *p*P being responsible for Case assignment to the oblique object. In English, Richards proposes, PP may optionally be "functionally impoverished," in which case the *p*P layer is omitted. The oblique argument then receives Case directly from V (for Richards, actually from *v*).

(48) a.



b.



Richards's proposal includes an important insight which I adopt below. Namely, the possibility of P-passivization depends on the possibility of case-assignment within PP. If PP can assign case, then P-passivization is not possible. But, if circumstances are right, and PP does not assign case, then P-passivization can happen. I will adapt this insight in the analysis developed in section 4: P-passivization hinges on case-assignment within PP. While Richards takes case-assignment within PP to depend on the presence of his *p*-layer, I take it to be related to L-selection.

Despite this important similarity, there are significant differences between my proposal and Richards's. First, Richards adopts different assumptions about the split structure of PP. As discussed in chapter 5, I assume that PP has two layers, with P_2P active only when a spatial preposition (like *under*, *near*, *behind*, etc.) is used. Richards assumes all prepositions are generated in the lower layer, while I assume prepositions are split between the two. See chapter 5 for details.

There are also a number of empirical drawbacks of Richards's approach which I seek to avoid. First, to explain the adjacency requirement on P-passivization, Richards appeals to Case Adjacency (Stowell 1981): the passive subject receives case twice, nominative from T as well as accusative from the verb in base position, so the case-assigning verb and the prepositional object must be adjacent. The problem with this is that the verb and the prepositional object can *never* be adjacent in the P-passive; they are always separated by a preposition.

Given this, it is also now clear how the restrictions discussed in subsections 2.3 (on type of preposition) and 2.4 (on expletive P-passives) follow under Richards's approach.

3.4. Schueler 2011

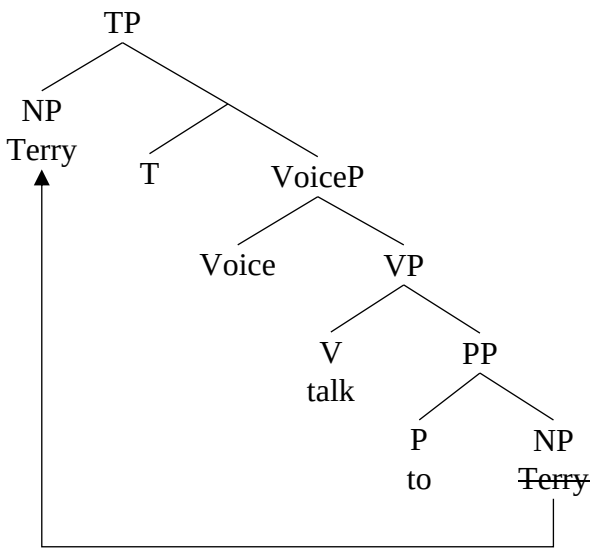
Schueler (2011) makes a proposal which is similar in spirit to that of Richards (2017). He first notes that the major case-assigning heads, T and *v* (or Voice), have "defective" forms, distinguished by an *in*ability to assign case. Schueler proposes that prepositions are no different. Just like T and *v* can be defective, so can P.[16] P-passivization happens when defective P occurs in the passive.

An apparent problem with this view is in constraining the distribution of this defective P. It would seem, at first, that a special co-occurrence requirement would be needed, so that defective P occurs only in P-passives. Otherwise, it might seem that Schueler's theory would overgenerate with sentences like (49).

(49) *Terry talked to.

If defective P were allowed in (49), then it might seem that this sentence could be derived along the lines of (50). P would not assign Case to *Terry*, leaving *Terry* available to be assigned Case by T.

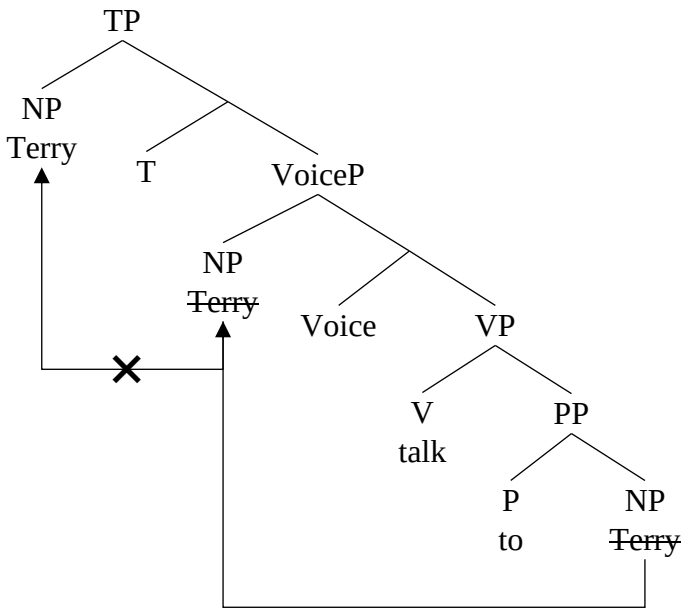
(50)



[16] Schueler notes precedent for this idea in Abels (2003).

However, Schueler argues that, actually, no co-occurrence requirement is needed to rule out (49). Critically, active Voice is a phase head. That means that the derivation (50) is illegitimate as shown. In order for *Terry* to move out of VoiceP, it must first raise to the edge of the phase.

(51)



The movement of *Terry* into Spec-Voice is an instance of A-bar movement. But movement of *Terry* into Spec-TP would be A-movement. This derivation thus requires improper movement (i.e. A-bar movement feeding A-movement), and is therefore correctly ruled out.[17]

(51) shows how defective prepositions are not possible in active transitive sentences. Scheuler also argues that they are ruled out with unaccusatives. Consider a sentence like (52).

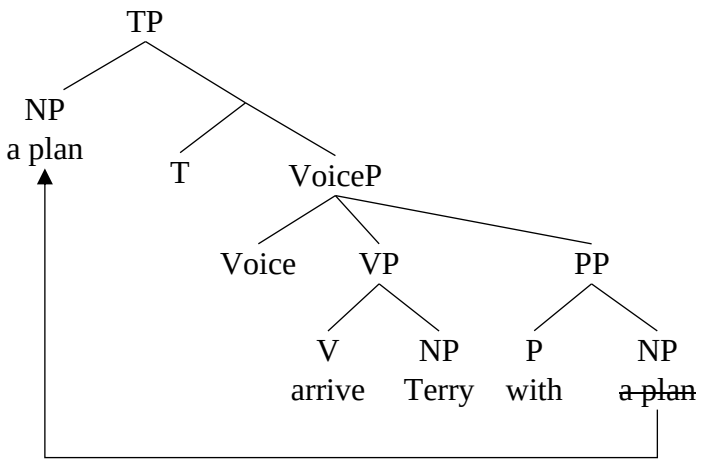
(52) *A plan arrived Terry with.

(Intended as synonymous with "Terry arrived with a plan")

Suppose that *with* is not defective. Then *with* assigns case to its complement *a plan*, and the PP is presumably opaque to probing by T. We therefore would not expect (52) to be possible. Suppose instead that *with* is defective. What rules out a derivation along the lines of (53)?

[17] Schueler rules (49) out in a slightly different way. The version presented here is more natural given the assumptions made earlier in this dissertation.

(53)



To block (53), Schueler appeals to Case-assignment. Given the standard theory of unaccusatives, accusative case is unavailable with unaccusative verbs. *Terry* does not get Case within the VoiceP, then. Further, if *with* is defective here, *a plan* does not get Case within the PP either. Both NPs need to be assigned Case, but there is only one Case-assigner in the structure, namely T. Assuming T will not agree twice, the derivation is doomed; one of the two NPs will end up without Case.

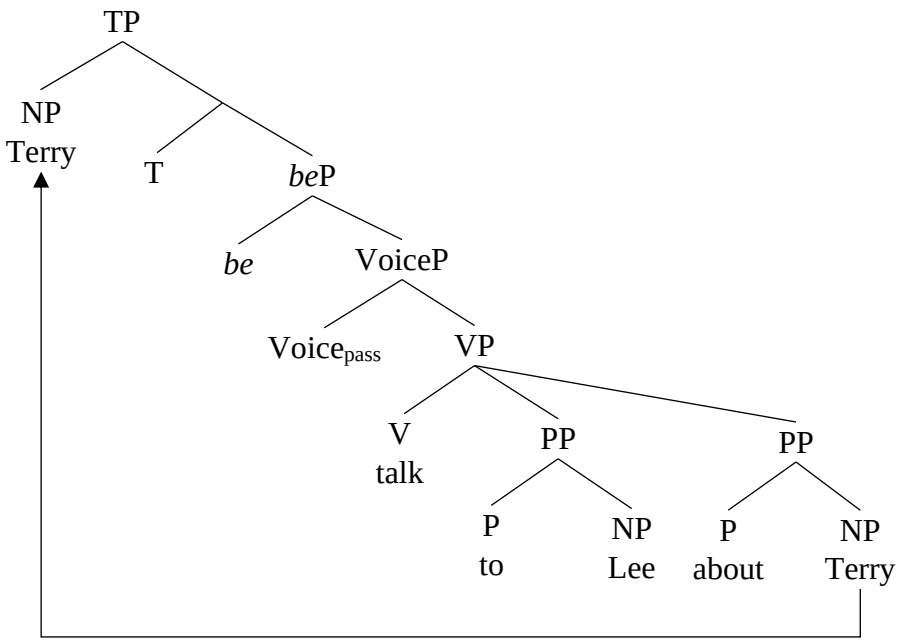
As a result of these arguments, Schueler makes a plausible case that, if P can be defective, it could be defective only in the passive.

However, this theory is not sufficient to account for the constraints on P-passivization described in section 2. If P can *freely* be defective, then we incorrectly rule in examples like (54).

(54) *Terry was talked to Lee about.

To illustrate, consider the derivation in (55).

(55)



As Schueler (p172) notes, this derivation has no problem with Case. Assuming *about* is defective, and *to* is not, then *Terry* can get Case from T, and *Lee* can get Case from *to*. There is no reason to think that (55) is ruled out via an intervention effect either; *Lee* and *Terry* are equally distant from T in this structure I assume, and would not be related by c-command even in a binary structure.

I conclude that, on its own, defectiveness of P is insufficient to model the P-passive. I propose in section 4 that what is needed is the stipulation that defectiveness of P is correlated with L-selection of P: P can be defective only when L-selected. I will show how this requirement correctly predicts the various constraints described in section 2.

4. Proposal

Section 2 discussed data motivating several constraints on P-passivization. These are summarized in (56).

(56) a. The verb and the PP targeted by P-passivization can be separated by

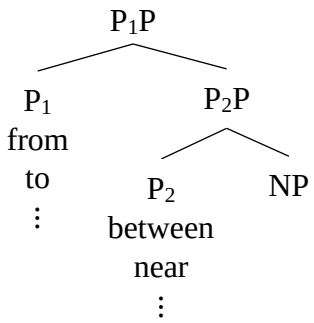
i. a prepositional particle,
ii. a pure manner adverb (marginally),
iii. nothing else.

b. The PP targeted by P-passivization cannot contain a P_2P layer.

c. Expletive subjects are disallowed in the P-passive (for some speakers).

I assume, following the arguments of chapter 5, that PP has a bipartite structure, the higher layer (P_1P) being headed by functional/directional prepositions including *from*, *to*, *with*, *for*, and so on, and the lower layer (P_2P) being headed by spatial prepositions including *between*, *near*, *over*, *around*, and so on. P_2P is a phase, and is present only when overt.

(57)



I argue that the properties of P-passives (56) follow from the hypothesis that P_1 is optionally defective when L-selected. The analysis requires two background assumptions about L-selection. First, a given verb can L-select no more than one PP (see Pesetsky 1995, p183-185 for relevant discussion). Second, L-selected PPs occupy the lowest possible position in the VP; I will assume they are complements to V. This assumption is plausible given the strong preference for adjacency between verbs and the PPs they L-select (see e.g. Hawkins 2000).

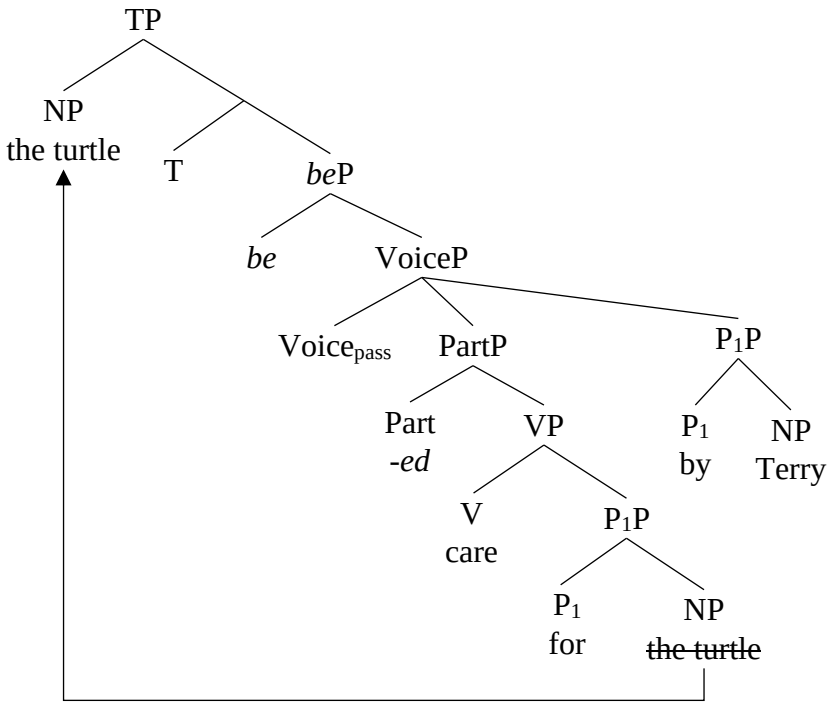
The analysis also requires an assumption about the nature of PPs in agreement. As briefly discussed in chapter 5, PPs are opaque for agreement in English. This has important consequences for agreement in the passive. If PPs were *not* opaque for agreement, they would count as interveners in the ordinary passive (and in other constructions where a PP can occur between a probe and an NP goal), as discussed with respect to examples (5) and (53) above. I assume that opacity of PP is related to their ability to assign Case. Defective PPs, which do not assign Case, are transparent for Agree by an outside probe for this reason.[18]

[18] I do not have an explanation for why internal Case-assignment makes a PP opaque to outside Agree operations. I note that this assumption is necessary for any account which holds that P-passivization involves failure of PP-internal Case-assignment, including the proposals of Richards (2017) and Schueler (2011).

I will also follow Collins (2005) in assuming that the *-ed* suffix on the passive participle is contributed by a Part head.[19] In the framework adopted by Collins, the verb moves into Part via head movement. Here, I assume Part and V form an amalgam along the lines of Chomsky (2021), as discussed in chapter 4.

With these assumptions, a P-passive like "The turtle was cared for (by Terry)" is derived as shown in (58).

(58)



The preposition *for* is L-selected by the verb *care*. As such, *for* is optionally defective here. For a successful derivation, it must be defective. If *for* is defective, then it fails to assign Case to its complement *the turtle*. Instead, *the turtle* receives Case under Agree with T, permitted because defective P_1 does not block Agree by a PP-external probe. *The turtle* then raises to Spec-TP to satisfy T's EPP feature.

It is relevant to note that, even though the PP *by Terry* is structurally closer to T than *the turtle* is, *by Terry* does not intervene for the purposes of Agree between T and *the turtle*. This is

[19] Collins (2005) also assumes that ordinary passives involve a complex reshuffling operation which he calls "smuggling." Though nothing in this chapter poses a challenge to Collins's smuggling analysis (to my knowledge), I will not engage with that idea here, for conciseness.

because of my assumption about opacity of non-defective PP. Since *by* is not defective here (as it is not L-selected), it is opaque for T's probing.

I will now show that, given the assumptions leading to P-passives along the lines of (58), the restrictions (56) are expected.

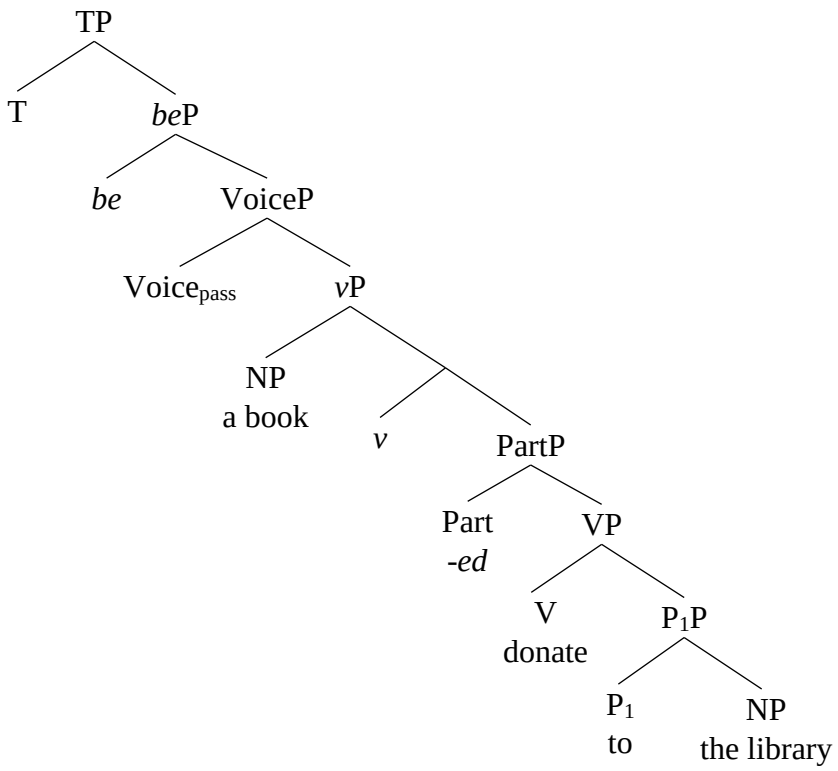
4.1. Adjacency

Take the adjacency requirements on P-passivization. I will begin by discussing what cannot disrupt verb-PP adjacency. As discussed in section 2.2, this includes NPs, PPs, and most adverbs. What blocks sentences like (59)?

(59) a. *The library was donated a book to.
b. *The painting was pointed with a stick at.
c. *The stool was sat frequently on.

Example (59a) exemplifies the impossibility of an NP coming between the verb and the PP targeted by P-passivization. Given the analysis just outlined, this follows from minimality in Agree. (59a) will have to pass through the derivational stage (60).

(60)



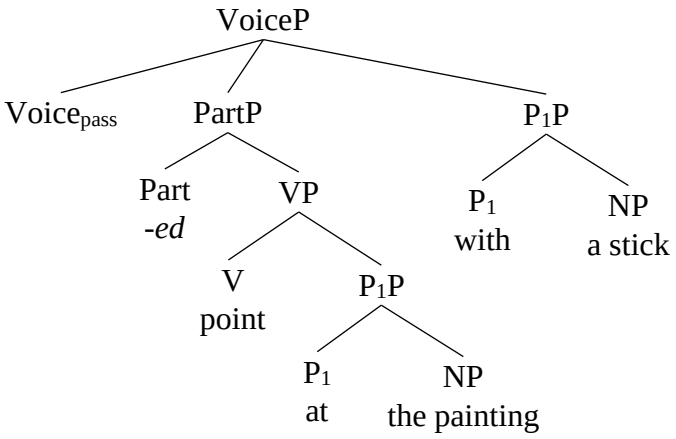
At this point, T needs to agree with an NP. Since Agree appropriates Minimal Search (Ke 2019), the NP which agrees with T must be the highest one in T's c-command domain. From the structure in (60), it is clear that the highest NP in T's c-command domain is *a book*, the direct object, not *the library*. T therefore cannot agree with *the library*, and cannot assign Case to it. The only way for this derivation to converge is if the preposition *to*, even though it might be L-selected, is *not* defective. *To* must assign Case to *the library* PP-internally.

Schueler (2011) notes a similar problem: even if Agree could somehow ignore *a book*, so that T could agree with *the library*, this would leave *a book* without Case, meaning the derivation would fail anyway.

The same problems hold for double-object constructions. We therefore predict that P-passivization is not possible when an NP-object is present.

The impossibility of PPs and adverbs between the verb and the passivized PP follows from the low position of L-selected PPs. To illustrate, consider that example (59b) would have to pass through a derivational stage along the lines of (61).

(61)



Given the ordering principles discussed in chapter 4, by default the L-selected PP *at the painting* would precede the instrumental *with a stick*. In order to produce the reverse order (*with a stick* before *at the painting*), movement must apply.[20] But this movement results in freezing effects.

[20] E.g., Ernst (2002) argues that the movement required for such re-ordering is rightward movement.

Observe that even with ordinary A-bar P-stranding, extraction from an L-selected preposition is degraded after reordering.

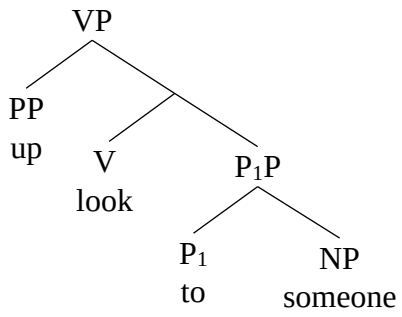
(62) a. Which house are you looking after for the family?

b. *Which house are you looking for the family after?

I assume that, whatever the mechanisms behind freezing in (62b) are (see e.g. Hofmeister et al. 2015), they also apply in P-passivization. Thus, we do not expect that PPs or adverbs generated outside the VP should be able to disrupt verb-PP adjacency.

We can now consider the instances in which verb-PP adjacency *can* be disrupted. The case of prepositional particles is straightforward: I assume they are intransitive PPs generated in Spec-V, roughly following Ernst's (2002, p212) analysis of prepositional particles.[21] A VP like *look up to someone* would have the structure (63). In the context of a full sentence, the verb would be linked to a higher head, effectively moving around the particle.

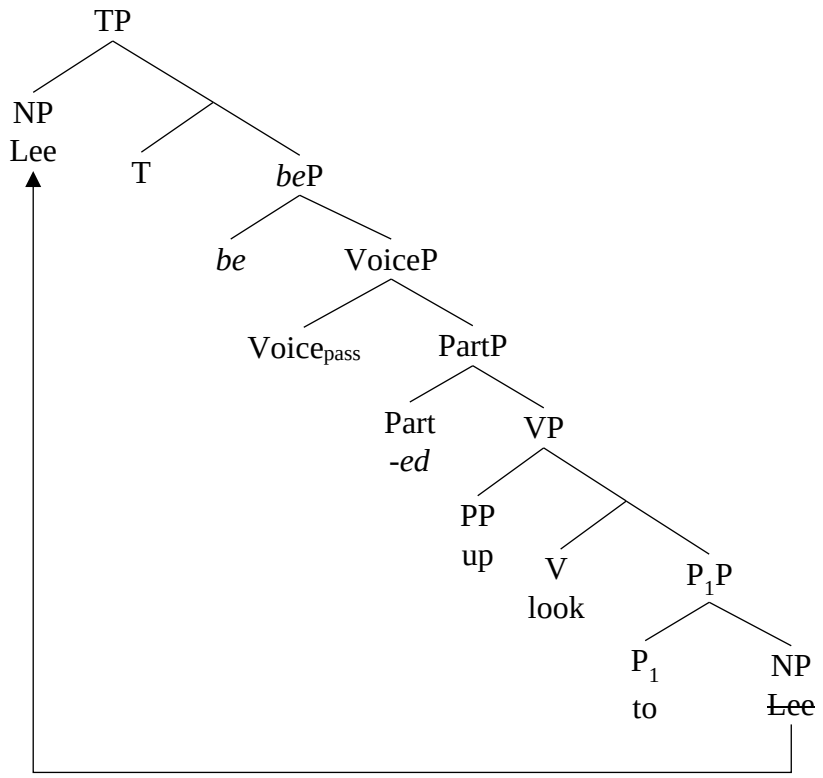
(63)



Given this, there is no reason why a particle should not be able to occur between the verb and the passivized PP in the P-passive. A sentence like "*Lee is looked up to*" could be generated through a derivation like (64), where the preposition *to* is defective.

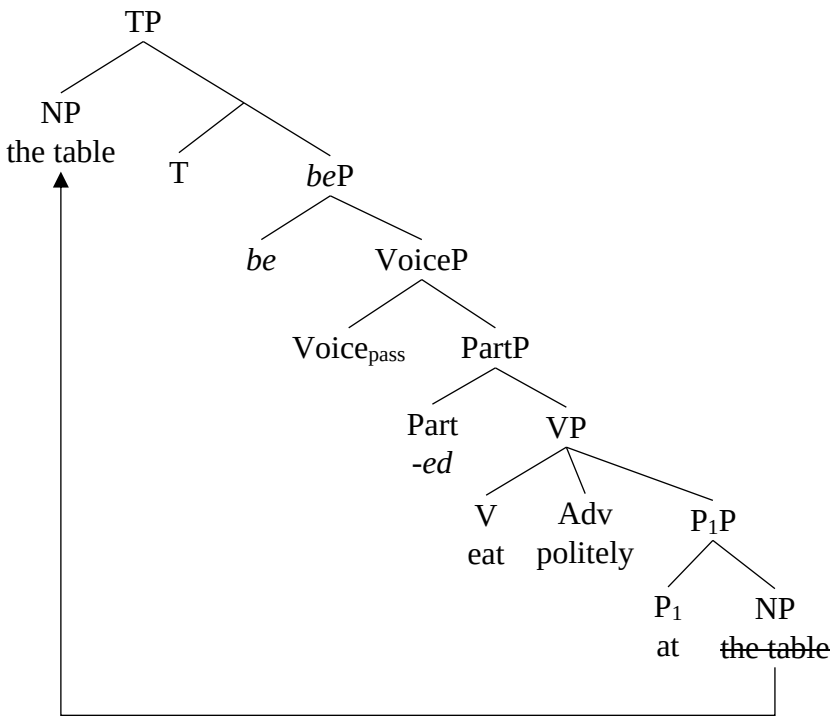
[21] Ernst specifically proposes that particles are complements to the verb, and that direct objects are specifiers. I assume that direct objects are generated higher up, and I instead place particles in Spec-V, in order to account for cases where particles occur with PPs instead of NPs.

(64)



As for manner adverbs, I assume they are also sisters to V alongside L-selected PPs (see Ernst 2002 for arguments that manner adverbs are right-adjoined to VP). As such, an adverb could appear between V and an L-selected PP in structures like (65).

(65)



This analysis thus predicts that a manner adverb can occur between the verb and the passivized PP in the P-passive. However, while this does sometimes seem to be acceptable, there does always still seem to be at least some acceptability cost in such instances. All the best examples I know from the literature are somewhat degraded, in my judgment. For instance:

(66) a. ?? The table was eaten politely at.
b. ?? The toys should be played quietly with.
c. ?? They need to be spoken slowly to.

Part of this degradation could come from weight preferences. The passivized PP is pronounced as a single preposition, which is prosodically lighter than an adverb. The preposition-adverb order (67) might be prosodically preferable in placing the relatively light preposition before the heavier adverb.

(67) a. The table was eaten at politely.
b. The toys should be played with quietly.
c. They need to be spoken to slowly.

This cannot be the whole story, however, since the corresponding degradation under A-bar extraction is much less, perhaps even undetectable:

(68) a. Which table are they eating politely at?

b. Which toys should they be playing quietly with?

c. Who are they speaking slowly to?

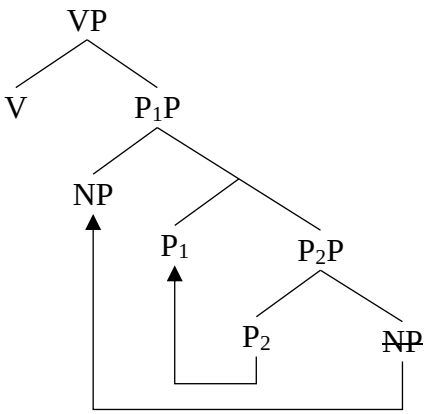
The degradation associated with adverbs between V and P in the P-passive therefore needs future study.

4.2. Type of preposition

As discussed in section 2.3, P-passivization is degraded when the targeted PP contains P_2P. This follows on the present analysis, given the assumption that P_2P is a phase, and given the ban on improper movement.

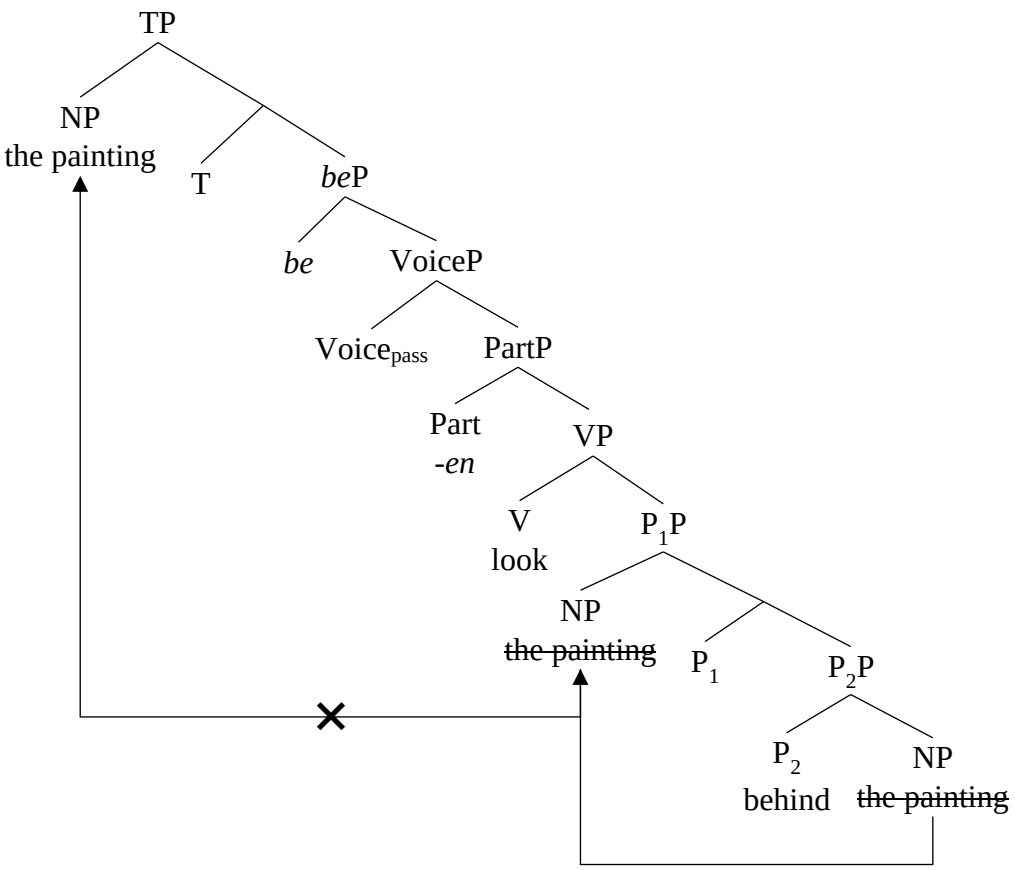
Suppose that a verb L-selects P_1, and that the P_1P contains P_2P. Since P_2P is a phase, in order for the NP complement to escape the PP, it must first move to the phase edge. Given the analysis of P-stranding outlined in chapter 5, this means movement of NP from Comp-P_2 to Spec-P_1, as depicted in (69).

(69)



From this point, if P_1 is defective (hence not assigning Case to NP), NP will have to agree with T in order to get Case, and NP will then have to move into Spec-TP to satisfy T's EPP feature. That movement is blocked, however, by the ban on improper movement. The movement from Comp-P_2 to Spec-P_1, depicted in (69), is an instance of A-bar movement. But the required later movement into Spec-T is A-movement.

(70)



Therefore, because P_2P is a phase, we would not expect P-passivization to be possible from a PP with a P_2P layer. This would necessarily violate the ban on improper movement.

Independently of these considerations, it is also possible that there is an even more basic reason why P-passivization involving P_2P is ruled out. It might be that L-selection of PP does not permit the PP to have a P_2P layer. My motivation for this suggestion is purely empirical. Namely, I am simply not aware of any examples of L-selection involving P_2. As mentioned in section 2.3, there are examples of L-selection involving prepositions which are used *independently* as instances of P_2, but there is reason to believe that in the context of *L-selection*, these prepositions are always instances of P_1.

For instance, the preposition *over* is ordinarily an instance of P_2. Evidence for this comes from co-occurrence of *over* with P_1, and from binding (assuming the arguments of chapter 5).

(71) a. We came from over the hill.

b. I threw the cloak over me.

These properties disappear when *over* is L-selected, as in *preside over*. We see that *over* cannot co-occur with P_1 here, and it shows the binding properties expected for P_1.

(72) a. *Lee is presiding to/from over the case.

b. *This case$_1$ isn't going to preside over it$_1$. (cf. over itself)

These observations could be taken to suggest that L-selection of PP always involves P_1P only, and never P_2P. This would immediately explain why P_2P is degraded in P-passives: P-passivization depends on L-selection, which would be incompatible with P_2P.

Exactly *why* P_2P might be incompatible with L-selection is unclear. Since my goal here is not to develop a theory of L-selection, I will not pursue this possibility further. I take the prediction from improper movement as sufficient to explain the degradation of P_2P in P-passivization, and leave the potential (un)availability of P_2P under L-selection for future work.

To conclude this subsection, it is important to reiterate a point made in section 2.3. There is some variation in judgments in the literature regarding the acceptability of P-passives with P_2P. To account for acceptable judgments on P-passives with P_2P, I assume that some speakers are able to analyze the P_2Ps as L-selected. For instance, example (73a), when judged acceptable, would be assigned a structure parallel to that of (73b). Both sentences involve a preposition which is an instance of P_2 *outside* the P-passive, but in both sentences this preposition is L-selected, meaning it occupies P_1 in these sentences.

(73) a. % The table was stood on top of.

b. The case was presided over by Lee.

It is relevant to ask why exactly speakers differ in their ability to analyze sentences like (73a) as involving L-selection. Though I will not resolve this question here, I note two potential approaches. One possibility is that speakers who accept, e.g., (73a) simply have had different linguistic experience from speakers who do not accept (73a); the former group's experience leads them to encode L-selection of *on top of* in their lexical entry for *stand*, while the latter group's experience does not. We might predict, therefore, that speakers' judgments would vary unsystematically. Speakers would accept P-passives with *stand on top of* if they personally have *stand* L-selecting *on top of*, they would accept P-passives with *sit next to* if they personally have *sit* L-selecting *next to*, and so on, with each case independent of the others.

A different possibility is that speakers who accept (73a) and other similar P-passives are able to accommodate novel instances of L-selection on the fly. This could be modeled as lexical "reanalysis," a reinterpretation of the classic reanalysis rule (see section 3.1). Instead of reanalysis creating a complex verb in the syntax, reanalysis would license lexical entries like (74) in the lexicon.

(74) *stand*:
phon: /stænd/
sem: λxλe. *stand*(e) & LOC(e, *on-top-of*(x))
L-select: *on.top.of*

4.3. Expletive subjects

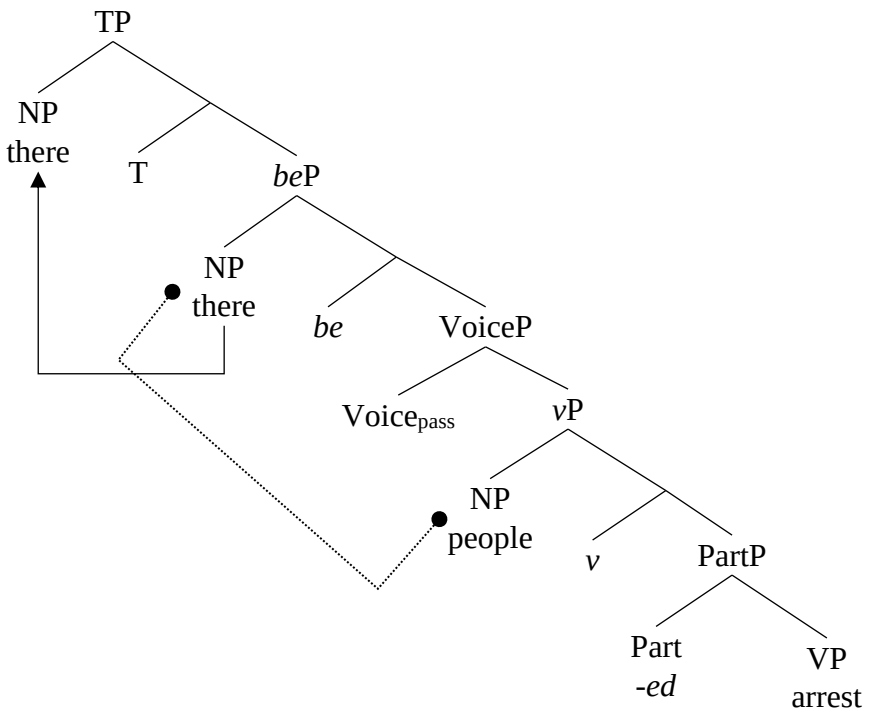
To address the behavior of expletives in the P-passive, I first adopt the key features of Deal's (2009) approach to ordinary expletive passives (and expletive constructions more generally).[22] In Deal's analysis, expletives are generated in the specifier of the verb *be*, and must agree with their associates in φ-features.[23] The derivation for a sentence like "There were people arrested" is given in (75).

[22] Goto's (2017) approach to expletive passives is also compatible with what I propose. As the differences are not relevant to the present discussion, I use Deal's analysis for convenience.

[23] Following Deal's terminology, in sentences with expletive subjects, I refer to the NP which would be the subject in an analogous non-expletive construction as the "associate" of the expletive. For example, in sentence (i), *several people* is the associate because it would be the subject of the corresponding non-expletive sentence (ii).

(i) There were several people arrested.
(ii) Several people were arrested.

(75)

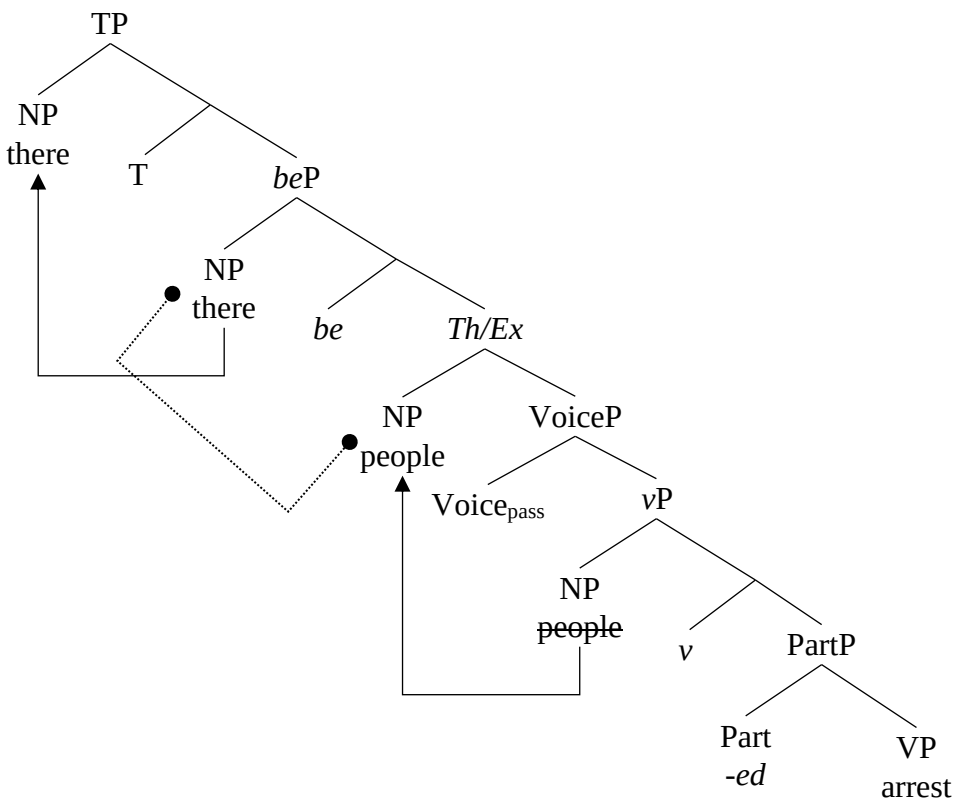


It is clear that some provision must be made to derive object-verb constituent order (Deal 2009, p305, fn33); i.e. *people* must precede *arrest*, but under standard assumptions this structure would lead to *arrest* preceding *people* (assuming *arrest* is pronounced in Voice). One option, proposed by Caponigro & Schütze (2003), is that object-verb order in expletive passives results from lack of verb raising in passive constructions. This assumption has been adopted in much other work, including Drummond & Kush 2015 and McInnerney 2020. With this sort of analysis, the verb *arrest* would raise no higher than *v* in (75).

An alternative possibility for deriving object-verb order is that there is an intermediate A-position between *be* and Voice to which the object moves to. The existence of such a position is argued for by Rezac (2006). The tree diagram in (76) illustrates how Rezac's *Th(ematization)/Ex(traction)* position would be integrated with Deal's analysis of expletive constructions.[24]

[24] Further structure is assumed but not shown in the Th/Ex position. I leave these additional structural details implicit partly because they are not relevant to the analysis of P-passives, meaning I can remain agnostic on their precise nature, as well as for conciseness.

(76)



Both of these options factor into the analysis I propose. Specifically, I argue that speakers who reject expletive P-passives have the former structure (75), while those who accept expletive P-passives have the latter structure (76).

To illustrate the proposal, first consider how the P-passive would work given the structure (75) based on Caponigro & Schütze (2003). Imagine that we want to derive the expletive version of the P-passive sentence (77).

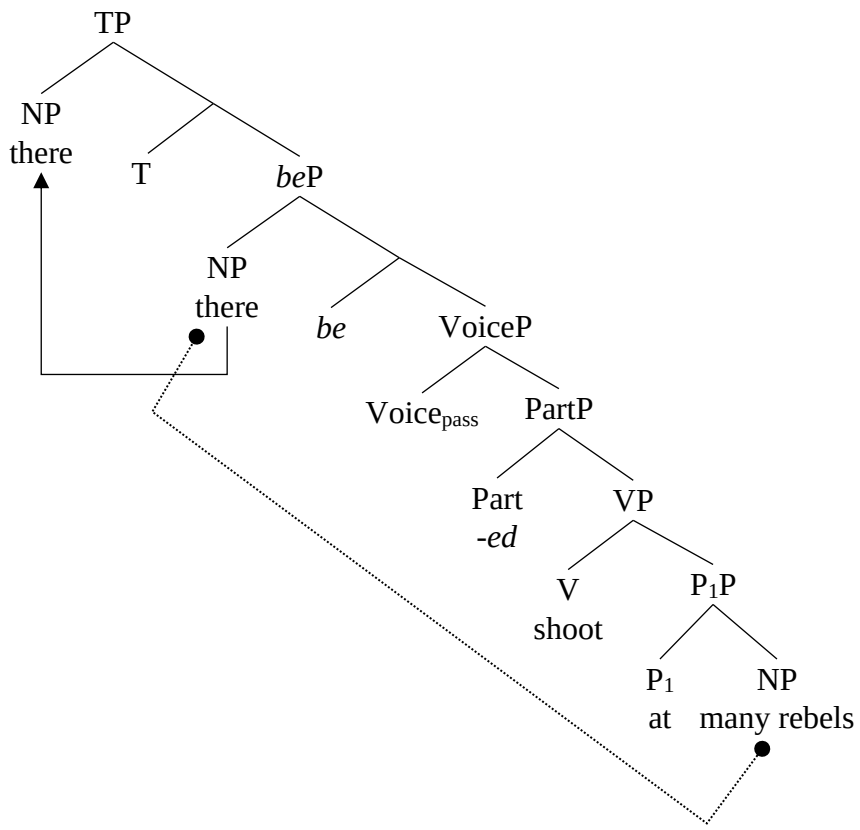
(77) Many rebels were shot at.

Given the analysis of P-passives developed in this chapter so far, and given the analysis of expletive passives illustrated by (75), we would expect to derive expletive P-passives along the lines of (78).

The argument-structural base, the VoiceP, is the same here as it would be in the non-expletive P-passive. the P_1P *at many rebels* is defective. The preposition *at* does not assign Case to its complement, meaning the PP is transparent for external φ-probing. Since this is an expletive construction, expletive *there* appears in Spec-*be*, and (following Deal 2009), it probes its c-

command domain for φ-features before raising to Spec-TP. This probing is successful when *there* finds the prepositional object *many rebels*.

(78)



Critically, following Caponigro & Schütze's (2003) proposal for expletive non-P-passives, the associate of *there* (*many rebels* here) remains in situ. However, this derivation yields the surface string (79).

(79) *There were shot at many rebels.

As discussed in section 2.4 above, some speakers accept expletive P-passives like (80), where the associate precedes the verb, but none accept expletive constructions like (80), where the associate is pronounced in situ (see Drummond & Kush 2015, p454).

(80) %There were many rebels shot at.

Derivations like (78) are predicted to be syntactically well-formed according to my analysis of P-passives. Drummond & Kush (2015) face this problem as well. I adopt their solution here, which

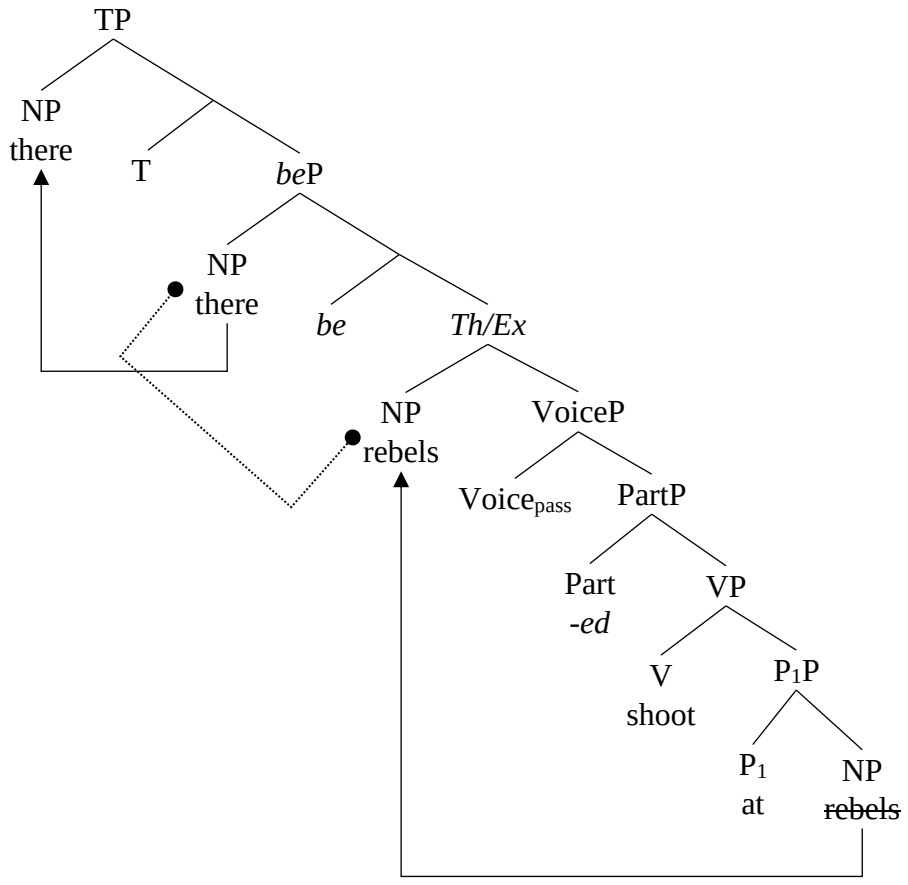
is to presuppose that the ill-formedness of (79) has a prosodic explanation (though what exactly the prosodic explanation is is not explicit).

If we follow Drummond & Kush (2015) in presupposing an independent prosodically-based explanation to block (79), then the acceptability of expletive P-passives depends on the availability of a preverbal A-position for the associate to move to; it cannot stay in its base position. I conclude that expletive P-passives cannot be generated along the lines of (78) based on Caponigro & Schütze (2003), since the required preverbal A-position is not available on their account.

I propose, then, that speakers who reject expletive P-passives like (80) treat the expletive P-passive along the lines of (78).

In contrast, the required preverbal A-position *is* available in the analysis represented by (76), based on Rezac (2006). Given this approach, sentence (80) could be generated as in (81).

(81)



I propose that speakers who accept expletive P-passives like (80) use this derivation instead of (78).

Summarizing this subsection, I propose that, for speakers who accept expletive P-passives like (80), a preverbal A-position is available for the expletive's associate to move to. For speakers who reject expletive P-passives, the required preverbal A-position is unavailable.

5. Conclusion

This concludes my discussion of P-passives. In this chapter, I proposed that L-selected PPs optionally fail to assign Case to their complement NP, and I showed how this hypothesis, coupled with assumptions motivated elsewhere (e.g. earlier in this dissertation and in prior literature), would derive a range of potentially puzzling constraints on P-passivization. It predicts the well-known adjacency requirement while leaving room for its exceptions, it predicts P-passives should be ruled out when built from P_2P, and it can model variation in acceptability of expletive P-passives.

I judged it important to engage with this topic due to the apparently salient correlation between a PP's argumenthood and its ability to participate in the P-passive. Constraints on P-passivization have been mentioned to me personally as evidence for the A/AD, and much of the literature assumes the A/AD has a role to play in this construction.

Section 2 of this chapter demonstrated that the constraints on P-passivization can be characterized independently of the A/AD. If the arguments of section 4 are accepted, the chapter also showed that the A/AD need not enter into the formal analysis of P-passives. This chapter therefore supports the overall thesis of this dissertation: the A/AD is not needed to accurately describe the phenomena of English syntax, including phenomena in whose analysis it has traditionally played an important role.

CHAPTER 7

Conclusion

1. Summary

I conclude this dissertation by briefly reviewing the content of the previous chapters, and then considering the outlook for the argument/adjunct distinction (A/AD) given the results here.

In chapter 1, I set two goals. One aim was to evaluate the evidence for a syntactic or semantic implementation of the A/AD as part of linguistic theory. Given my conclusion that the evidence is insufficient to motivate such implementations, a second goal was to consider the consequences for syntactic theory of eliminating the A/AD.

Chapter 2 focused on the semantic implementation of the A/AD proposed by Koenig et al. (2003) and others. The core hypothesis (the Lexical Encoding Hypothesis, LEH) is that the categories "argument" and "adjunct" are defined by lexical encoding of thematic information: θ-roles comprising part of the lexical meaning of a verb are arguments of the verb, while θ-roles introduced by independent elements are adjuncts. I considered three properties purportedly diagnosing lexical encoding along the lines predicted by the LEH. Specifically, semantic obligatoriness, compatibility, and unique entailment have previously been proposed as evidence that conventional arguments must be lexically encoded, while conventional adjuncts are not lexically encoded. I found, instead, that the categories identified by these properties are quite different than the expected categories of the conventional A/AD.[1] As such, I concluded that lexical encoding of thematic information is a property in its own right; it is not empirically justified to identify this distinction with the A/AD.

[1] To the extent that these properties *do* require lexical encoding. They might not actually require it.

Chapter 3 turned to the syntactic implementations of the A/AD. This understanding of the A/AD has been motivated in prior literature by a varied set of diagnostics purported to identify key structural correlates of argumenthood. I evaluated nine of these: omissibility, VP-anaphora, VP-fronting, islandhood, iterability, extractability (from weak islands), reconstruction (for Condition C), variability (of head preposition), and permutability. Each diagnostic was evaluated against two criteria. The *heuristic criterion* requires that diagnostics draw the argumenthood boundary roughly along conventional lines. The *no-independent-motivation criterion* holds that diagnostics must each identify a property requiring an appeal the A/AD for parsimonious description (thus *motivating* the A/AD as a component of syntactic knowledge). I found that none of the diagnostics meet these criteria. There is therefore insufficient evidence to posit syntactic mechanisms which would differentiate arguments from adjuncts.

Chapters 2 and 3 dealt with the first question of the dissertation: what is the evidence for the A/AD as a component of knowledge of language? In sum, I found that the evidence is lacking. The phenomena that traditionally motivate the A/AD, at least in this dissertation's domain of focus (i.e. PPs within the VP in English), are understood better as being independent of one another, rather than stemming from a single, overarching component of linguistic knowledge. I posit that theoretical accounts of the relevant empirical domains will be more successful when understood in this way, as distinct phenomena instead of as consequences of the A/AD.

Chapters 4-6 then turned to the second question of the dissertation: what would be the consequences of rejecting the A/AD? The chapters each dealt with a different issue involving the syntax of PPs, arguing for analyses that do not require reference to the A/AD.

Chapter 4 first took on the configuration of PP dependents within the VP, a topic in which the A/AD has traditionally played an important role. I pointed out that many contemporary accounts of VP structure face a difficult technical problem: they require generation of structures which are unlabelable in the framework of Labeling Theory. I explored the possibility of resolving the labeling problem with an analysis treating PPs (conventional arguments and adjuncts alike) as complements. Specifically, PPs would be treated as complements of functional heads in the VP, in potentially *n*-ary-branching configurations.

Chapter 5 considered Condition B effects within PPs. Licensing of pronouns within PPs has historically been difficult to analyze. While the A/AD might superficially appear to play a role, I argued that it is ultimately not relevant for an accurate description of the facts. I reviewed two sorts of prior analyses of the binding data, locality-based approaches and predicate-based approaches, showing how both approaches struggle to account for different subsets of the core binding data. I then suggested an analysis which adopts desirable aspects of both approaches: Condition B is a predicate-based constraint – it prevents pronouns from being co-arguments with their antecedents – but it is only evaluated within a syntactically limited domain. Coupled with the assumption that (some) PPs are phases, I argued that this proposal potentially captures a wider range of data than the strictly locality-based and strictly predicate-based proposals can.

Finally, chapter 6 looked at prepositional passives (P-passives). Again, P-passivization might superficially appear to be sensitive to the A/AD, but I argued in this chapter that it is not. I came to an analysis of P-passives built around the hypothesis that L-selected prepositions do not have to assign case. P-passivization always and only takes place under this condition.[2] I explored how this type of analysis could account for a range of puzzling restrictions on P-passivizations, including the adjacency condition, the restrictions on which prepositions allow P-passivization, and the resistance of P-passives to expletive subjects.

2. Outlook for the argument/adjunct distinction

I focused in this dissertation on a relatively restricted case study: English prepositional phrases in the verb phrase. If we accept the general conclusions outlined above (especially of chapters 2 and 3), then it is fair to say that the A/AD is not motivated in this domain.

Of course, the A/AD is not limited to PPs, nor to the verbal domain, nor to English. It is generally assumed to be relevant across categories and across languages. It would therefore be premature to conclude, based on the arguments of this dissertation alone, that the A/AD is not part of human linguistic knowledge. In principle, investigation of relevant properties of, say, CPs

[2] That is, P-passivization is possible *only* when an L-selected preposition does not assign case to its complement, and L-selected prepositions do not assign case to their complement *only* in the P-passive. If an L-selected preposition fails to assign case in a non-passive context, the derivations always crashes, as pointed out by Schueler (2011).

instead of PPs, or of the nominal domain instead of the verbal domain, or in another language, might yield different results.

Despite this, given trends in recent work, the prospects for a general rejection of the A/AD seem promising. This dissertation focused on the A/AD in the verbal domain, but prior work has independently cast doubt upon the A/AD in the nominal domain. Grimm & McNally (2013) find that very few if any of the constituents traditionally thought of as complements to N are non-omissible. In addition, Bruening & Al-Khalaf (2019) and Adger et al. (2017) find that none of these constituents reconstruct for Condition C, a property traditionally thought to hold only for adjuncts. Further, Payne et al. (2013) argue that the purported argument/adjunct asymmetries with *one*-substitution (which plays a role in the NP analogous to that of *do so*-substitution in the VP) are dubious. On the basis of these observations, Bruening & Al-Khalaf conclude that there are no complements to N; all NP-internal material (apart from N itself of course) is adjoined. All this challenges the idea that there is an A/AD for PPs within NP.

There is also reason to believe that rejection of the A/AD may be applicable cross-linguistically. Miliorini (2021) examines the evidence for a syntactic implementation of the A/AD in Brazilian Portuguese, and reaches similar conclusions to those of chapters 3 and 4 here. She finds that evidence for a syntactic A/AD in Brazilian Portuguese is lacking, and she considers how this conclusion could motivate a flat-structure analysis of the VP along the lines proposed by Culicover & Jackendoff (2005). The convergent conclusions drawn independently for English in this dissertation and for Brazilian Portuguese by Miliorini could be taken as initial support for a cross-linguistic conclusion. See also Przepiórkowski (1999) for earlier skepticism towards the A/AD on the basis of data from Polish.

Given the widespread acceptance of the A/AD, one might expect that its elimination would have major consequences for the analysis of a wide range of syntactic phenomena. While there certainly would be important consequences for some types of analyses (namely those that depend heavily on specialized adjunction operations like Pair Merge), many theories can do away with the A/AD quite straightforwardly. As discussed in chapter 4, prevalent accounts of VP-structure (such as VP-shell theories) already have the tools to analyze canonical arguments and canonical adjuncts in fundamentally the same way. The elimination of the A/AD might therefore offer a desirable simplification within such theories, dissolving a range of questions related to argumenthood. At

the same time, the A/AD has been claimed to play a role in many syntactic phenomena which this dissertation did not explore (Zyman 2020 represents one important recent example, for instance). The potential simplification offered by elimination of the A/AD therefore also leads to new problems for future work.

BIBLIOGRAPHY

Abels, Klaus. 2003. Successive Cyclicity, Anti-locality, and Adposition Stranding. Doctoral dissertation, University of Connecticut.

Abels, Klaus. 2012. *Phases: an essay on cyclicity in syntax*. Berlin/Boston: De Gruyter.

Aboh, Enoch O. 2010. The P Route. In *Mapping Spatial PPs*, eds. Guglielmo Cinque & Luigi Rizzi, 225-260. Oxford: Oxford University Press.

Acedo-Matellán 2010. Successive Cyclicity, Anti-locality, and Adposition Stranding. Doctoral dissertation, Universitat de Barcelona.

Adger, David, Alex Drummond, David Hall, & Coppe van Urk. 2017. Is there Condition C reconstruction? In *Proceedings of the 47th Annual Meeting of NELS*, eds. Andrew Lamont & Katerina Tetzloff, 21–30. Amherst, MA: GLSA.

Åfarli, Tor A. 2007. Do verbs have argument structure? In *Argument Structure*, eds. Eric Reuland, Tanmoy Bhattacharya, & Giorgos Spathas, 1–16. Amsterdam/Philadelphia: John Benjamins.

Ahn, Byron. 2022. Mapping *OUT*-Argument Structure. To appear in *Syntax*. ling.auf.net/lingbuzz/006009

Al-Khalaf, Eman. 2015. Coordination and linear order. Doctoral dissertation, University of Delaware.

Al-Khalaf, Eman. 2019. Floating quantifiers are autonomous phrases: A movement analysis. *Glossa: a journal of general linguistics 4*(1): 89. 1–23.

Andrews, Avery. 1983. A note on the constituent structure of modifiers. *Linguistic Inquiry 14*(4), 695–697.

Andrews, J. Richard. 2003. *Introduction to Classical Nahuatl: Revised edition*. Norman, OK: University of Oklahoma Press.

Armstrong, Sharon Lee, Lila R. Gleitman, & Henry Gleitman. 1983. What some concepts might not be. *Cognition 13*, 263–308.

Ayano, Seiki. 2001. The layered internal structure and the external syntax of PP. Doctoral dissertation, Durham University.

Baker, Mark C. 1985. Incorporation: a theory of grammatical function changing. Doctoral dissertation, MIT.

Baker, Mark C. 1988. *Incorporation: a theory of grammatical function changing*. Chicago/London: University of Chicago Press.

Baker, Mark, Ken Safir, & Justine Sikuku. 2013. In *Selected Proceedings of the 43rd Annual Conference on African Linguistics*, ed. Olanike Ola Orie and Karen W. Sanders, 196–206. Somerville, MA: Cascadilla Proceedings Project.

Bale, Alan. 2007. Quantifiers and verb phrases: An exploration of propositional complexity. *Natural Language & Linguistic Theory 25*, 447–483.

Baltin, Mark M. & Paul Postal. 1996. More on Reanalysis Hypotheses. *Linguistic Inquiry 27*(1), 127–145.

Baltin, Mark. 2006. The non-unity of VP-preposing. *Language 82*(4), 734–766.

Baltin, Mark. 2017. Extraposition. In *The Blackwell Companion to Syntax: second edition*, eds. Martin Everaert & Henk Van Riemsdijk. 237–271. Oxford: Blackwell Publishing.

Barker, Chris. 2012. Quantificational Binding Does Not Require C-Command. *Linguistic Inquiry 43*(4), 614–633.

Barss, Andrew, & Howard Lasnik. 1986. A note on anaphora and double objects. *Linguistic Inquiry 17*(2), 347–354.

Belk, Zoë & Ad Neeleman 2017. AP Adjacency as a Precedence Constraint. *Linguistic Inquiry 48*(1), 1–45.

Berwick, Robert C. & Noam Chomsky. 2016. *Why Only Us: Language and evolution*. Cambridge, MA: MIT Press.

Bešlin, Maša. 2019. The Case of Temporal Bare-NP Adverbials in Serbo-Croatian. Manuscript, University of Novi Sad.

Biskup, Petr. 2010. Decomposing Prepositional Case. Handout from New Approaches to Russian Syntax, Groningen.

Biskup, Petr. 2019. *Prepositions, Case and Verbal Prefixes: The Case of Slavic*. Amsterdam: John Benjamins.

Bock, Kathryn, & Carol A. Miller. 1991. Broken agreement. *Cognitive psychology 23*(1), 45–93.

Bode, Stefanie. 2020. *Casting a Minimalist Eye on Adjuncts*. New York/London: Taylor & Francis.

Boeckx, C. 2003. Review to 'The Syntax of Adjuncts.' *Studies in the Linguistic Sciences 32*(1), 95–101.

Bolhuis, Johan J., Ian Tattersall, Noam Chomsky, & Robert C. Berwick. 2014. How could language have evolved? *PLOS Biology 12*(8), e1001934. DOI:10.1371/journal.pbio.1002063

Borer, Hagit. 2003. Exo-Skeletal vs. Endo-Skeletal Explanations: Syntactic Projections and the Lexicon. In *The Nature of Explanation in Linguistic Theory*, eds. John Moore and Maria Polinsky, 31–67. Stanford, CA: CSLI Publications.

Bosse, Solveig. 2015. *Applicative Arguments: A Syntactic and Semantic Investigation of German and English*. New York: Peter Lang Publishing.

Bresnan, Joan & Jane Grimshaw. 1978. The Syntax of Free Relatives in English. *Linguistic Inquiry 9*(3), 331–391.

Bresnan, Joan. 1980. Polyadicity: Part I of a Theory of Lexical Rules and Representations. In *Lexical Grammar*, ed. Teun Hoekstra, 97–122. Dordrecht/Cinnaminson, NJ: Foris Publications.

Bresnan, Joan. 1994. Locative Inversion and the Architecture of Universal Grammar. *Language 70*(1), 72–131.

Bruening, Benjamin & Eman Al-Khalaf. 2019. No argument–adjunct asymmetry in reconstruction for Binding Condition C. *Journal of Linguistics 55*(2), 247–276.

Bruening, Benjamin. 2010. Double Object Constructions Disguised as Prepositional Datives. *Linguistic Inquiry 41*(2), 287–305.

Bruening, Benjamin. 2014. Precede-and-command revisited. *Language 90*(2), 342-388.

Bruening, Benjamin. 2018. CPs move rightward, not leftward. *Syntax 21*(4), 362–401.

Bruening, Benjamin. 2019. Passive *do so*. *Natural Language & Linguistic Theory 37*(1), 1–49.

Bruening, Benjamin. 2020. Idioms, collocations, and structure. *Natural Language & Linguistic Theory 38*(2), 365–424.

Büring, Daniel. 2005. *Binding Theory*. Cambridge: Cambridge University Press.

Burzio, Luigi. 1986. *Italian Syntax: A Government-Binding Approach*. Dordrecht: Reidel.

Campos, Héctor. 1991. Preposition stranding in Spanish? *Linguistic Inquiry 22*(4), 741-750.

Caponigro, Ivano & Carson T. Schütze. 2003. *Linguistic Inquiry 34*(2), 293-308.

Carstens, Vicki. 2020. Concord and labeling. In *Agree to Agree: Agreement in the Minimalist Programme*, eds. Peter W. Smith, Johannes Mursell, & Katharina Hartmann, 71–116. Berlin: Language Science Press.

Castañeda, Hector Neri. 1967. Comments. In *The Logic of Decision and Action*, ed. Nicholas Rescher, 104–1l2. Pittsburgh: University of Pittsburgh Press.

Cattell, Ray. 1976. Constraints on movement rules. *Language 52*(1), 18–50.

Chametzky, Robert A. 1996. *A Theory of Phrase Markers and the Extended Base*. Albany, NY: State University of New York Press.

Chametzky, Robert. 2003. Phrase Structure. In *Minimalist Syntax*, ed. Randall Hendrick, 192–225. Oxford: Blackwell.

Charnavel, Isabelle & Shannon Bryant. 2022. The whole picture: Disentangling locality, logophoricity and subjecthood in Picture Noun Anaphora. To appear in *Natural Language & Linguistic Theory*. ling.auf.net/lingbuzz/005620

Charnavel, Isabelle. 2020. *Locality and Logophoricity: A Theory of Exempt Anaphora*. Oxford: Oxford University Press.

Chater, Nick & Morten Christiansen. 2010. Language Acquisition Meets Language Evolution. *Cognitive Science 34*(7), 1131–1157.

Chaves, Rui P. 2014. On the disunity of right-node raising phenomena: Extraposition, ellipsis, and deletion. *Language 90*(4), 834–886

Chaves, Rui P. 2021. Island phenomena and related matters. In *Head-Driven Phrase Structure Grammar: The handbook*, eds. Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig, 665–723. Berlin: Language Science Press.

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1970. Remarks on nominalization. In *Reading in English Transformational Grammar*, eds. Roderick A. Jacobs and Peter S. Rosenbaum, 184–221. Waltham, MA: Ginn.

Chomsky, Noam. 1981. *Lectures on Government and Binding: The Pisa Lectures*. Dordrecht: Foris Publications.

Chomsky, Noam. 1986. *Barriers*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, eds. Roger Martin, David Michaels, & Juan Uriagereka, 89–155. Cambridge, MA: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. Michael Kenstowicz, 1–52. Cambridge, MA: MIT Press.

Chomsky, Noam. 2004. Beyond explanatory adequacy. In *Structures and Beyond: The cartography of syntactic structures*, ed. Adriana Belletti, 104–131. Oxford: Oxford University Press.

Chomsky, Noam. 2005. Three Factors in Language Design. *Linguistic Inquiry 36*(1), 1–22.

Chomsky, Noam. 2008. On phases. In *Foundational Issues in Linguistic Theory: Essays in honor of Jean-Roger Vergnaud*, eds. Robert Freidin, Carlos P. Otero and Maria Luisa Zubizarreta, 133–166. Cambridge, MA: MIT Press.

Chomsky, Noam. 2013. Problems of projection. *Lingua 130,* 33–49

Chomsky, Noam. 2015. Problems of projection: extensions. In *Structures, Strategies and Beyond: Studies in Honour of Adriana Belletti*, eds. Elisa Di Domenico, Cornelia Hamann, & Simona Matteini, 1-16. Amsterdam: John Benjamins

Chomsky, Noam. 2017. The language capacity: architecture and evolution. *Psychonomic Bulletin & Review 24,* 200–203.

Chomsky, Noam. 2019a. Some Puzzling Foundational Issues: The Reading Program. *Catalan Journal of Linguistics Special Issue,* 263–285.

Chomsky, Noam. 2019b. The UCLA lectures. ling.auf.net/lingbuzz/005485

Chomsky, Noam. 2020. Puzzles about phases. In *Linguistic Variation: Structure and Interpretation*, eds. Ludovico Franco and Paolo Lorusso, 163–168. Mouton: De Gruyter.

Chomsky, Noam. 2021. Minimalism: Where are we now, and where can we hope to go. *Gengo Kenkyu 160,* 1–41.

Chomsky, Noam, Ángel Gallego, & Dennis Ott. 2019. Generative Grammar and the Faculty of Language: Insights, questions, and challenges. *Catalan Journal of Linguistics, Special Issue*, 229–261.

Cinque, Guglielmo & Luigi Rizzi. 2010. *Mapping Spatial PPs*. Oxford: Oxford University Press.

Cinque, Guglielmo. 1990. *Types of Ā-Dependencies*. Cambridge, MA: MIT Press.

Cinque, Guglielmo. 1999. *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. Oxford: Oxford University Press.

Cinque, Guglielmo. 2006. Complement and adjunct PPs: Implications for clause structure. In *Restructuring and Functional Heads*, ed. G. Cinque, 145–166. Oxford: Oxford University Press.

Cinque, Guglielmo. 2010. Mapping Spatial PPs: An introduction. In *Mapping Spatial PPs*, eds. Guglielmo Cinque & Luigi Rizzi, 1-25. Oxford: Oxford University Press.

Citko, Barbara. 2014. *Phase Theory: An Introduction*. Cambridge: Cambridge University Press.

Clark, Eve V. & Herbert H. Clark. 1979. When Nouns Surface as Verbs. *Language 55*(4), 767-811.

Collins, Chris. & Edward Stabler. 2016. A Formalization of Minimalist Syntax. *Syntax 19*(1), 43-78.

Collins, Chris. 1997. *Local Economy*. Cambridge, MA: MIT Press.

Collins, Chris. 2002. Eliminating labels. In *Derivation and Explanation in the Minimalist Program*, eds. Samuel D. Epstein & T. Daniel Seely, 42-64. Oxford: Blackwell Publishing.

Collins, Chris. 2005. A smuggling approach to the passive in English. *Syntax 8*(2), 81-120.

Crain, Stephen & Mineharu Nakayama. 1987. Structure Dependence in Grammar Formation. *Language 63*(3), 522-543.

Crain, Stephen & Rosalind Thornton. 1998. *Investigations in Universal Grammar A Guide to Experiments on the Acquisition of Syntax and Semantics*. Cambridge, MA: MIT Press.

Cruse, D. A. 1973. Some thoughts on agentivity. *Journal of Linguistics 9*(1), 11-23.

Culicover, Peter W. & Ray Jackendoff. 2005. *Simpler Syntax*. Oxford: Oxford University Press.

Culicover, Peter W. & Michael S. Rochemont 1990. Extraposition and the complement principle. *Linguistic Inquiry 21*(1), 23-47.

Culicover, Peter W. & Susanne Winkler. 2019. Why topicalize VP? In *Architecture of Topic*, eds. Valéria Molnár, Verner Egerland and Susanne Winkler, 173-202. Mouton: De Gruyter.

Culicover, Peter W. 1999. *Syntactic Nuts*. Oxford: Oxford University Press.

Culicover, Peter W. 2009. *Natural Language Syntax*. Oxford: Oxford University Press.

Dalrymple, Mary & Andrew Kehler 1995. On the Constraints Imposed by *Respectively*. *Linguistic Inquiry 26*(3), 531-536.

Dalrymple, Mary. 2001. *Lexical Functional Grammar*. New York, NY: Academic Press.

Davidson, Donald. 1967. The logical form of action sentences. In *The Logic of Decision and Action*, ed. Nicholas Rescher, 81–95. Pittsburgh, PA: University of Pittsburgh Press.

Davies, Mark. 2008. The Corpus of Contemporary America English: 450 million words, 1990-present.

Davis, Colin P. B. 2020. The Linear Limitations of Syntactic Derivations. Doctoral dissertation, MIT.

Deal, Amy Rose. 2009. The Origin and Content of Expletives: Evidence from "Selection". *Syntax 12*(4), 285–323.

Dékány & Hegedűs 2014. Word Order Variation in Hungarian PPs. In *Approaches to Hungarian Volume 14: Papers from the 2013 Piliscsaba Conference*, eds. Katalin É. Kiss, Balázs Surányi |and Éva Dékány, 95-120. Amsterdam: John Benjamins.

Den Dikken, Marcel. 2006a. *Relators and Linkers The Syntax of Predication, Predicate Inversion, and Copulas*. Cambridge, MA: MIT Press.

Den Dikken, Marcel. 2006b. *Either*-float and the syntax of co-or-dination. *Natural Language & Linguistic Theory 24*(3), 689-749.

Den Dikken, Marcel. 2010. On the functional structure of locative and directional PPs. In *Mapping Spatial PPs*, eds. Guglielmo Cinque & Luigi Rizzi, 74-126. Oxford: Oxford University Press.

Den Dikken, Marcel. 2018. *Infinitivus pro participio*, active versus passive. In *The Even Yearbook 2018*, eds. Mark Newson & Péter Szigetvári. Budapest: ELTE Department of English Linguistics. http://seas3.elte.hu/even/2018.html

Den Dikken, Marcel, André Meinunger & Chris Wilder. 2000. Pseudoclefts and ellipsis. *Studia Linguistica 54*(1), 41-89.

Djamouri, Redouane, Waltraud Paul, & John Whitman. 2014. Postpositions vs. prepositions in Mandarin Chinese: The articulation of disharmony. In *Theoretical Approaches to Disharmonic Word Order*, eds. Theresa Biberauer & Michelle Sheehan, 74-105. Oxford: Oxford University Press.

Dowty, David. 1982. Grammatical relations and Montague Grammar. In *The Nature of Syntactic Representations*, eds. Pauline Jacobson & Geoffrey K. Pullum, 79-130. Dordrecht: D. Reidel Publishing Company.

Dowty, David R. 1989. On the semantic content of the notion of 'thematic role'. In *Properties, Types and Meaning, Volume II: Semantic Issues*, eds. Gennaro Chierchia, Barbara H. Partee, & Raymond Turner, 69-129. Dordrecht: Kluwer Academic Publishers.

Dowty, David. 1991. Thematic proto-roles and argument selection. *Language 67*(3), 547-619.

Dowty, David. 1994. Adjunct-to-argument reanalysis in a model of grammar growth. Paper presented at ESCOL '94, University of South Carolina.

Dowty, David. 2000. The Dual Analysis of Adjuncts/Complements in Categorial Grammar. *ZAS Papers in Linguistics 17*, 53–78.

Drummond, Alex & Dave Kush. 2015. "Reanalysis" is raising to object. *Syntax 18*(4), 425-463.

Drummond, Alex. 2009. The Unity of Extraposition and the A/A′ Distinction. In *Proceedings of the Forty-fifth Annual Meeting of the Chicago Linguistic Society: Locality in Language*, eds. M. Ryan Bochnak, Peter Klecha, Alice Lemieux, Nassira Nicola, Jasmin Urban, Christina Weaver, 43-56. Chicago, IL: Chicago Linguistic Society.

Drummond, Alex, Norbert Hornstein, & Howard Lasnik. 2010. A puzzle about P-stranding and a possible solution. *Linguistic Inquiry 41*(4), 689-692.

Epstein, Samuel D. 2015. On I(nternalist)-Functional Explanation in Minimalism. In *Explorations in Maximizing Syntactic Minimization*, Samuel D. Epstein, Hisatsugu Kitahara, & T. Daniel Seely. 71-97. London/New York: Routledge.

Epstein, Samuel D. 2016. Why Nurture Is Natural Too. *Biolinguistics 10*, 197–201.

Epstein, Samuel D., Hisatsugu Kitahara, & T. Daniel Seely. 2012. Structure building that can't be. In *Ways of Structure Building*, eds. Myriam Uribe-Etxebarria & Vidal Valama, 253-270. Oxford: Oxford University Press.

Epstein, Samuel D., Hisatsugu Kitahara, & T. Daniel Seely. 2015. From *Aspects*' 'daughterless mothers' (aka delta nodes) to *POP*'s 'motherless sets' (aka non-projection): A selective history of the evolution of Simplest Merge. In *50 Years Later: Reflections on Chomsky's* Aspects, eds. Ángel Gallego & Dennis Ott, 99-111. Cambridge, MA: MITWPL.

Epstein, Samuel D., Hisatsugu Kitahara, & T. Daniel Seely. 2016. Phase cancellation by external pair-merge of heads. *The Linguistic Review 33*(1), 87–102

Epstein, Samuel D., Hisatsugu Kitahara, & T. Daniel Seely. 2017. Merge, labeling and their interactions. In *Labels & Roots*, eds. Leah Bauke and Andreas Blümel, 17-46. Berlin: De Gruyter Mouton.

Ernst, Thomas. 1984. *Towards an integrated theory of adverb position in English*. Bloomington, IN: Indiana University Linguistics Club.

Ernst, Thomas. 1991. On the Scope Principle. *Linguistic Inquiry 22*(4), 750-756.

Ernst, Thomas. 1994. M-command and precedence. *Linguistic Inquiry 25*(2), 327-335.

Ernst, Thomas. 2002. *The Syntax of Adjuncts*. Cambridge: Cambridge University Press.

Ernst, Thomas. 2022. The adjunct condition and the nature of adjuncts. *The Linguistic Review 39*(1), 85-128.

Findlay, Jamie Y. 2017. The pseudopassive: not so phoney after all. Linguistics Departmental Seminar Series, School of Oriental and African Studies (SOAS), London. https://users.ox.ac.uk/~sjoh2787/SOAS_Presentation_p-passive.pdf

Flores Nájera, Lucero. 2019. La gramática de la cláusula simple en el Náhuatl de Tlaxcala. Doctoral dissertation, CIESAS, Mexico City.

Fox, Danny & Jon Nissenbaum. 1999. Extraposition and Scope: A case for overt QR. In *Proceedings of the West Coast Conference on Formal Linguistics 18*, eds. Sonya Bird, Andrew Carnie, Jason D. Haugen & Peter Norquest, 132–144. Somerville, Massachusetts: Cascadilla Press.

Fox, Danny & David Pesetsky 2005. Cyclic Linearization of Syntactic Structure. *Theoretical Linguistics 31*, 1–45

Fraga, Carolina. 2020. Spanish prepositions and silent place. *Glossa: a journal of general linguistics 5*(1): 123, 1–31.

Funakoshi, Kenshi. 2009. Theta-marking via Agree. *English Linguistics 26*(1), 1–32

Gallego, Ángel. 2006. Phase sliding. Manuscript, Universitat Autònoma de Barcelona/University of Maryland.

Gallego, Ángel. 2010. *Phase Theory*. Amsterdam/Philadelphia: John Benjamins.

Gehrke, Berit. 2008. *Ps in Motion: On the semantics and syntax of P elements and motion events*. LOT Dissertation Series 184. Utrecht: LOT.

Glass, Lelia. 2020. Verbs describing routines facilitate object omission in English. In *Proceedings of the Linguistic Society of America 5*(1). 44–58.

Goldberg, Adele E. & Farrell Ackerman 2001. The Pragmatics of Obligatory Adjuncts. *Language 77*(4), 798-814.

Goldberg, Adele E. 1995. *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.

Goldberg, Adele E. 2006. *Constructions at work: The nature of generalization in language*. Oxford: Oxford University Press.

Gorman, Kyle. 2013. Generative phonotactics. Doctoral dissertation, University of Pennsylvania.

Goto, Nobu & Toru Ishii. 2021. Multiple Nominative and Form Sequence: A New Perspective to MERGE and Form Set. Manuscript, Toyo University & Meiji University.

Goto, Nobu. 2017. How to label there-constructions. *Studies in English Literature: Regional Branches Combined Issue 9*, 33-43.

Grimshaw, Jane. 1979. Complement Selection and the Lexicon. *Linguistic Inquiry 10*(2), 279-326.

Gruber, Jeffrey S. 1965. Studies in grammatical relations. Doctoral dissertation, MIT.

Haegeman, Liliaene. 1994. *Introduction to Government & Binding Theory, Second Edition*. Malden, MA: Blackwell Publishing.

Haider, Hubert. 2000. Towards a Superior Account of Superiority. In Wh-*Scope Marking*, eds. Uli Lutz, Gereon Müller L· Arnim von Stechow, 231-248. Amsterdam/Philadelphia: John Benjamins.

Hale, Kenneth & Samuel Jay Keyser. 1993. On Argument Structure and the Lexical Expression of Syntactic Relations. In *The View from Building 20: Essays in Linguistics in Honor of*

Sylvain Brom berger, eds. Kenneth Hale & Samuel Jay Keyser, 53-110. Cambridge, MA: MIT Press.

Hale, Kenneth & Samuel Jay Keyser 2002. *Prolegomenon to a Theory of Argument Structure*. Cambridge, MA: MIT Press.

Halle, Morris & Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The View from Building 20: Essays in Linguistics in Honor of Sylvain Brom berger*, eds. Kenneth Hale & Samuel Jay Keyser, 111–176. Cambridge, MA: MIT Press.

Hankamer, Jorge & Ivan Sag 1976. Deep and surface anaphora. *Linguistic Inquiry 7*(3), 391-428.

Harley, Heidi & Rolf Noyer 1998. Mixed nominalizations, short verb movement and object shift in English. In *Proceedings of NELS 28*, eds. Pius N. Tamanji & Kiyomi Kusumoto, 143-157. Amherst, MA: GLSA.

Harley, Heidi. 1995. Subjects, Events and Licensing. Doctoral dissertation, MIT.

Harley 2002. Possession and the double object construction. In *Linguistic Variation Yearbook 2*, eds. Pierre Pica & Johan Rooryck, 29–68. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Harley, Heidi. 2007. *One*-replacement, unaccusativity, acategorial roots and Bare Phrase Structure. Manuscript, University of Arizona. ling.auf.net/lingbuzz/000341

Harley, Heidi. 2013. External arguments and the Mirror Principle: On the distinctness of Voice and v. *Lingua 125*, 34-57.

Harley, Heidi. 2014. On the identity of roots. *Theoretical Linguistics 40*(3/4), 225-276

Harris, Zellig S. 1970. *Papers in Structural and Transformational Linguistics*. Dordrecht: D. Reidel Publishing Company.

Hawkins, John A. 2000. The relative order of prepositional phrases in English: Going beyond Manner–Place–Time. *Language Variation & Change 11*, 231–266.

Hedberg, Nancy & Richard C. DeArmond 2009. On complements and adjuncts. *Snippets 19*, 11-12.

Heim, Irena & Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.

Hendriks, Petra. 2003. “Either” as a focus particle. Manuscript, University of Groningen.

Herburger, Elena. 2000. *On What Counts*. Cambridge, MA: MIT Press.

Hestvik, Arild. 1991. Subjectless binding domains. *Natural Language & Linguistic Theory 9*(3), 455-496.

Heycock, Caroline. 1995. Asymmetries in reconstruction. *Linguistic Inquiry 26*(4), 547-570

Hicks, Glyn. 2009. *The Derivation of Anaphoric Relations*. Amsterdam: John Benjamins

Hofmeister, Philip, Peter Culicover, & Susanne Winkler. 2015. Effects of Processing on the Acceptability of "Frozen" Extraposed Constituents. *Syntax 18*(4), 464-483.

Honda, Takahiro. 2012. The Syntax of Passive Constructions. Doctoral dissertation, Osaka University.

Hornstein, Norbert & Jairo Nunes. 2008. Adjunction and labeling in Bare Phrase Structure. *Biolinguistics 2*(1), 57-86.

Hornstein, Norbert & Amy Weinberg. 1981. Case theory and preposition stranding. *Linguistic Inquiry 12*(1), 55-91.

Hornstein, Norbert. 2001. *Move! A Minimalist Theory of Construal*. Malden, MA: Blackwell Publishers.

Hornstein, Norbert. 2009. *A Theory of Syntax: Minimal Operations and Universal Grammar*. Cambridge: Cambridge University Press.

Houser, Michael. 2010. The Syntax and Semantics of *Do So* Anaphora. Doctoral dissertation, University of California, Berkeley.

Huang, C.-T. James. 1982. Logical relations in Chinese and the theory of grammar. Doctoral dissertation, MIT.

Huang, C.-T. James, Y.-H. Audrey Li, & Yafei Li. 2009. *The Syntax of Chinese*. Cambridge: Cambridge University Press.

Huddleston, Rodney & Geoffrey K. Pullum. 2002. *The Cambridge Grammar of the English Language*. Cambridge: Cambridge University Press.

Hukari, Thomas E. & Robert D. Levine 1995. Adjunct extraction. *Journal of Linguistics 31*(2), 195-226.

Hunter, Tim. 2009. Deriving Syntactic Properties of Arguments and Adjuncts from Neo-Davidsonian Semantics. In *Proceedings of the 10th and 11th Biennial conference on The mathematics of language*, eds. Christian Ebert, Gerhard Jäger, & Jens Michaelis, 103–116. Berlin: Springer-Verlag.

Ibarretxe-Antuñano, Iraide. 2012. Placement and removal events in Basque and Spanish. In *Events of 'putting' and 'taking': A crosslinguistic perspective*, eds. Anetta Kopecka & Bhuvana Narasimhan, 123-144. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Inkelas, Sharon, & Draga Zec. 1995. Syntax/phonology interface. In *The handbook of phonological theory*, ed. John A. Goldsmith, 535–549. Oxford: Blackwell Publishers.

Ivan, Rudmila-Rodica. 2020. Talking about her(self): Ambiguity avoidance and Principle B: A Theoretical and Psycholinguistic Investigation of Romanian Pronouns. Doctoral dissertation, University of Massachusetts, Amherst.

Jackendoff, Ray S. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge, MA: MIT Press

Jackendoff, Ray. 1977. $\bar{X}$ Syntax: A Study of Phrase Structure. MIT Press, Cambridge

Jackendoff, Ray. 1983. *Semantics and Cognition*. Cambridge, MA: MIT Press.

Jackendoff, Ray. 1990a. On Larson's treatment of the double object construction. *Linguistic Inquiry 21*(3), 427-456.

Jackendoff, Ray. 1990b. *Semantic Structures*. Cambridge, MA: MIT Press.

Jackendoff, Ray. 2002. *Foundations of language: Brain, meaning, grammar, evolution*. New York, NY: Oxford University Press.

Jaggar, Philip J. 2001. *Hausa*. Amsterdam/Philadelphia: John Benjamins.

Janke, Vikki & Ad Neeleman 2012. Ascending and descending VPs in English. *Linguistic Inquiry 43*(2), 151-190.

Jayaseelan, K. A. 1990. Incomplete VP deletion and Gapping. *Linguistic Analysis 20*, 64–81.

Johnson, Kyle. 2018. Deriving Principle B. *McGill Working Papers in Linguistics 25*(1), 179-190.

Kageyama, Taro & Hiroyuki Ura. 2002. Peculiar Passives as Individual-level Predicates. *Gengo Kenkyu 122*, 181–199.

Kaplan, Ronald M. & Joan Bresnan. 1995. Lexical-Functional Grammar: A Formal System for Grammatical Representation. In Formal Issues in Lexical-Functional Grammar, eds. Mary Dalrymple, Ronald M. Kaplan, John T. Maxwell, & Annie Zaenen, 29-130. Stanford, CA: CSLI Publications.

Kayne, Richard S. 1984. *Connectedness and Binary Branching*. Dordrecht: Foris Publications.

Kayne, Richard S. 1994. *The Antisymmetry of Syntax*. Cambridge, MA: MIT Press.

Kayne, Richard S. 2002. On some Prepositions that Look DP-internal: English *of* and French *de*. *Catalan Journal of Linguistics 1*, 71-115.

Kayne 2004. Prepositions as probes. In *Structures and Beyond: The cartography of syntactic structures*, ed. A. Belletti, 192-212. Oxford: Oxford University Press.

Ke, Alan Hezao. 2019. The Syntax, Semantics and Processing of Agreement and Binding Grammatical Illusions. Doctoral dissertation, University of Michigan.

Ke, Alan Hezao. 2021. Minimal Search in Agree and Labeling. Manuscript, Michigan State University. ling.auf.net/lingbuzz/006123

Ke, Alan Hezao, Andrew McInnerney, & Yushi Sugimoto. 2022. Lack of c-command in coordinate structures: Evidence from binding. Talk at The 45th Generative Linguistics in the Old World (GLOW) Colloquium, Queen Mary University of London.

Kehler, Andrew & Gregory Ward. 1995. On the Anaphoric Status of *Do So*. Handout from the Annual Meeting of the Linguistic Society of America, New Orleans.

Kehler, Andrew & Gregory Ward 1999. On the semantics and pragmatics of 'Identifier So'. In *The Semantics/Pragmatics Interface from Different Points of View*, ed. Ken Turner, 233–256.

Kenny, Anthony. 2003. *Action, Emotion, and Will*. London/New York: Routledge.

Keshet, Ezra. 2013. Focus Binding: The interpretation of Given pronouns. Manuscript, University of Michigan.

Kim, Najoung, Kyle Rawlins, & Paul Smolensky. 2019. The complement-adjunct distinction as gradient blends: The case of English prepositional phrases. Manuscript. Johns Hopkins University. ling.auf.net/lingbuzz/004723

Kitahara, Hisatsugu. 1994. Target α: A unified theory of movement and structure-building. Doctoral dissertation, Harvard University.

Kittilä, Seppo. 2005. Recipient-prominence vs. beneficiary-prominence. *Linguistic Typology 9*, 269–297.

Koenig, Jean-Pierre, Gail Mauner, & Breton Bienvenue. 2003. Arguments for adjuncts. *Cognition 89*, 67–103.

Koopman, Hilda & Dominique Sportiche. 1991. The position of subjects. *Lingua 85*, 211–258.

Koopman, Hilda. 1984. *The Svntax of Verbs: From Verb Movement Rules in the Kru Languages to Universal Grammar*. Dordrecht: Foris Publications.

Koopman, Hilda. 2000. Prepositions, postpositions, circumpositions, and particles: The structure of Dutch PPs. In *The Syntax of Specifiers and Heads: Collected Essays of Hilda J. Koopman,* ed. Hilda Koopman, 204-260. London: Routledge.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*, eds. Johan Rooryck & Laurie Zaring, 109–137. Dordrecht: Kluwer.

Kratzer, Angelika. 2005. Building resultatives. *In Event Arguments: Foundations and Applications*, eds. Claudia Maienborn and Angelika Wöllstein, 177-212. Berlin/Boston: Max Niemeyer Verlag.

Kroch, Anthony. 1998. Amount Quantification, Referentiality, and Long Wh-Movement. *University of Pennsylvania Working Papers in Linguistics 5*, 21-36.

Kubota, Yusuke & Robert D. Levine. 2017. Pseudogapping as pseudo-VP ellipsis. *Linguistic Inquiry 48*, 213-257.

Kubota, Yusuke & Robert D. Levine. 2020. *Type-Logical Syntax.* Cambridge, MA: MIT Press.

Lakoff, George & John R. Ross. 1966. Criterion for Verb Phrase Constituency. *Report NSF-17*, The Computation Laboratory, Cambridge, MA.

Lakoff, George & John R. Ross 1976. Why you can't do so into the kitchen sink. In *Syntax and Semantics 7: Notes from the linguistic underground*, ed. James D. McCawley, 101–111. New York: Academic Press.

Lam, Chi Fung. 2013. The Cartography of Spatial Adpositional Phrases in Mandarin and Cantonese. Doctoral dissertation, Università Ca' Foscari Venezia.

Landau, Idan. 2007. Constraints on partial VP-fronting. *Syntax 10*(2), 127-164.

Landau, Idan. 2022. Duality of control in gerundive complements of P. *Journal of Linguistics 57*(4), 783–813.

Langacker, Ronald W. 1975. Relative Clauses in Classical Nahuatl. *International Journal of American Linguistics 41*(1), 46-68.

Larson, Richard K. 1988. On the double object construction. Linguistic Inquiry 19(3), 335-391.

Larson, Richard K. 1990. Double objects revisited: Reply to Jackendoff. *Linguistic Inquiry 21*(4), 589- 632.

Larson, Richard K. 2014. *On Shell Structure*. New York: Routledge.

Larson, Richard K., Svitlana Antonyuk, & Lei Liu. Superiority and scope freezing. *Linguistic Inquiry 50*(1), 233-252

Lasnik, Howard & Jeffrey L. Lidz. 2016. The Argument from the Poverty of the Stimulus. In *The Oxford Handbook of Universal Grammar*, ed. Ian Roberts, 221-248. Oxford: Oxford University Press.

Lasnik, Howard & Mamoru Saito. 1994. *Move α: Conditions on its Application and Output*. Cambridge, MA: MIT Press.

Lasnik, Howard and Tim Stowell. 1991. Weakest crossover. *Linguistic Inquiry 22*(4), 687–720.

Lasnik, Howard. 1999. Pseudogapping puzzles. *In Fragments: Studies in ellipsis and gapping*, eds. Shalom Lappin and Elabbas Benmamoun, 141–174. Oxford: Oxford University Press.

Launey, Michel. 2011. *An Introduction to Classical Nahuatl*. Cambridge, Cambridge University Press.

Law, Paul. 2017. Preposition Stranding. In *The Blackwell Companion to Syntax: second edition, Vol III*, eds. Martin Everaert & Henk Van Riemsdijk, 631-684. Oxford: Blackwell Publishing.

Lebeaux, David. 1988. Language acquisition and the form of the grammar. Doctoral dissertation, University of Massachusetts, Amherst.

Lebeaux, David. 2000. *Language Acquisition and the Form of the Grammar*. Philadelphia/Amsterdam: John Benjamins Publishing Company.

Lechner, Winfried. 2003. Phrase structure paradoxes, movement, and ellipsis. In *The Interfaces: Deriving and Interpreting Omitted Structures*, eds. Kerstin Schwabe and Susanne Winkler, 177-203. Amsterdam: John Benjamins.

Lederer, Jenny. 2009. Understanding the *Self*: The Distribution of Anaphora within Prepositional Phrases. Doctoral Dissertation, University of California, Berkeley.

Lees, Robert and E. Klima. 1963. Rules for English Pronominalization. *Language 39*, 17-28.

Lee-Schoenfeld, Vera. 2005. Beyond coherence: The syntax of opacity in German. Doctoral dissertation, University of California, Santa Cruz.

Lee-Schoenfeld, Vera. 2008. Binding, Phases, and Locality. *Syntax 11*(3), 281–298.

Legate, Julie Anne & Charles D. Yang. 2002. Empirical re-assessment of stimulus poverty arguments. *The Linguistic Review 19*, 151-162.

Levin, Beth & Malka Rappaport-Hovav. 2005. *Argument Realization*. Cambridge: Cambridge University Press.

Levin, Beth. 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. Chicago, IL: University of Chicago Press.

Levin, Beth. 2008. Dative verbs: A crosslinguistic perspective. *Lingvisticæ Investigationes 31*(2), 285–312.

Levinson, Lisa. 2005. 'To' in two places and the dative alternation. *University of Pennsylvania Working Papers in Linguistics 11*(1), 155-168.

Lewis, Richard L., Shravan Vasishth & Julie A. Van Dyke. 2006. Computational principles of working memory in sentence comprehension. *Trends in Cognitive Sciences 10*(10), 447–454.

Lohndal, Terje. 2014. *Phrase Structure and Argulllent Structure A Case Study of the Syntax-Semantics Interface*. Oxford: Oxford University Press.

Maienborn, Claudia. 2001. On the position and interpretation of locative modifiers. *Natural Language Semantics 9*(2), 191-240.

Marantz, Alec. 1984. *On the Nature of Grammatical Relations*. Cambridge, MA: MIT Press.

Marantz, Alec. 1997. No Escape from Syntax: Don't Try Morphological Analysis in the Privacy of Your Own Lexicon. *University of Pennsylvania Working Papers in Linguistics, 4*(2), 201-225.

Marelj, M. 2005. From *with* to *for*. Manuscript, Utrecht: Uil-OTS.

May, Robert. 1977. The grammar of quantification. Doctoral dissertation, MIT.

McConnell-Ginet, Sally. 1994. On the non-optionality of certain modifiers. In *Proceedings of the 4th Semantics and Linguistic Theory Conference*, eds. Mandy Harvey & Lynn Santelmann, 230- 250. Linguistic Society of America.

McInnerney, Andrew. 2017. Three approaches to workspace. Manuscript, University of Michigan.

McInnerney, Andrew. 2020. Re-evaluating the reanalysis analysis of prepositional passives. To appear in *Proceedings of the 56th Annual Meeting of the Chicago Linguistics Society*.

McInnerney, Andrew. 2022. The position of *wh*-subjects in Labeling Theory. To appear in *Linguistic Inquiry (Remarks and Replies)*.

Merchant, Jason. 2013. Voice and ellipsis. *Linguistic Inquiry 44*(1), 77–108.

Mihalicek, Vedrana & Christin Wilson. 2011. *Language Files: Materials for an Introduction to Language and Linguistics, 11th Edition*. Columbus, OH: The Ohio State University Press.

Miliorini, Rafaela. 2019. Extraction from weak islands: alternatives to the argument/adjunct distinction. *Revista Virtual de Estudos da Linguagem, edição especial 17*(16), 37-58.

Miller, Philip H. 1992. *Clitics and Constituents in Phrase Structure Grammar*. New York: Garland.

Mills, Jillian L. 2008. Non-specific objects in the pseudopassive: The syntax and semantics of english pseudo-incorporated pseudopassives. Masters Thesis, MIT.

Milway, Daniel. 2019. Explaining the resultative parameter. Doctoral dissertation, University of Toronto.

Moro, Andrea. 1997. *The Raising of Predicates: Predicative Noun Phrases and the Theory of Clause*. Cambridge: Cambridge University Press.

Moro, Andrea. 2000. *Dynamic Antisymmetry*. Cambridge, MA: MIT Press.

Needham, Stephanie & Ida Toivonen 2011. Derived arguments. In *Proceedings of LFG11*, eds. M. Butt & King, T. H., 401-421. Stanford, CA: CSLI Publications.

Neeleman, Ad & Amanda Payne. 2020. PP-Extraposition and the Order of Adverbials in English. *Linguistic Inquiry 51*, 471–520

Neeleman, Ad. 2017. PP-over-V meets Universal 20. *The Journal of Comparative Germanic Linguistics, 20*(1), 3-47.

Newmeyer, Frederick J. (2005). *Possible and Probable Languages: A Generative Perspective on Linguistic Typology*. Oxford: Oxford University Press.

Nunes, Jairo. 2004. *Linearization of Chains and Sideward Movement*. Cambridge, MA: MIT Press.

O'Grady, William. 2005. *Syntactic carpentry: An emergentist approach to syntax*. Mahwah, NJ: Erlbaum.

O'Neill, Teresa. 2015. The domain of Finiteness Anchoring without Tense in copular amalgam sentences. Doctoral dissertation, City University of New York.

Obata, Miki. 2010. Root, Successive-Cyclic and Feature-Splitting Internal Merge: Implications for Feature-Inheritance and Transfer. Doctoral dissertation, University of Michigan.

Oehrle, Richard. 1976. The Grammatical Status of the English Dative Alternation. Doctoral dissertation, MIT.

Ott, Dennis & Raymond Therrien 2020. Swiping in a variety of Ontario French. *The Canadian Journal of Linguistics 65*(1), 52-74.

Ott, Dennis. 2012. Local instability: The syntax of split topics. Doctoral dissertation, Harvard University.

Ott, Dennis. 2018. VP-fronting: Movement vs. dislocation. *The Linguistic Review 35*(2), 243-282.

Parsons, Terrence. 1990. *Events in the Semantics of English*. Cambridge, MA: MIT Press.

Partee, Barbara & Emmon Bach. 1981. Quantification, pronouns, and VP-anaphora. In *Formal methods in the study of language*, eds. Jeroen A. G. Groenendijk, Theo M. V. Janssen, Martin J. B. Stokhof. Amsterdam: Mathematisch Centrum, University of Amsterdam.

Patejuk, Agnieszka & Aadam Przepiórkowski. 2022. Category Mismatches in Coordination Vindicated. To appear in *Linguistic Inquiry*. lingbuzz.net/lingbuzz/005912

Pearl, Lisa. 2021. Poverty of the Stimulus Without Tears. *Language Learning and Development*. 10.1080/15475441.2021.1981908

Perlmutter, David M. 1978. Impersonal Passives and the Unaccusative Hypothesis. In *Proceedings of the Fourth Annual Meeting of the Berkeley Linguistics Society*, eds. Jeri J. Jaeger, Anthony C. Woodbury, Farrell Ackerman, Christine Chiarello, Orin D. Gensler, John

Kingston, Eve E. Sweetser, Henry Thompson, Kenneth W. Whistler, 157-190. Berkeley, CA: Berkeley Linguistics Society.

Pesetsky, David. 1987. *Wh*-in situ: Movement and unselective binding. In *The Representation of Indefiniteness*, eds. Eric J. Reuland & Alice ter Meulen, 98–129. Cambridge, MA: MIT Press.

Pesetsky, David. 1995. *Zero Syntax: Experiencers and Cascades*. Cambridge, MA: MIT Press.

Phillips, Colin. 2003. Linear order and constituency. *Linguistic Inquiry 34*(1), 37-90.

Polinsky, Maria. 2016. *Deconstructing Ergativity: Two Types of Ergative Languages and Their Features*. Oxford: Oxford University Press.

Pollard, Carl & Ivan A. Sag 1994. *Head-Driven Phrase Structure Grammar*. Chicago, IL: University of Chicago Press.

Preminger, Omer. 2010. Nested Interrogatives and the Locus of *wh. The complementizer phase: subjects and operators*, ed. E. Phoevos Panagiotidis, 200–235. Oxford: Oxford University Press.

Przepiórkowski, Adam. 1999. Case Assignment and the Complement/Adjunct Dichotomy: A Non-Configurational Constraint-Based Approach. Doctoral dissertation, Universität Tübingen.

Pullum, Geoffrey K. 2014. Fear and loathing of the English passive. *Language and Communication 37*, 60-74.

Pylkkänen, Liina. 2002. Introducing Arguments. Doctoral dissertation, MIT.

Pylkkänen, Liina. 2008. *Introducing Arguments*. Cambridge, MA: MIT Press.

Leech, Geoffrey, Randolph Quirk, & Sidney Greenbaum. 1985. *A Comprehensive Grammar of the English Language*. London: Longman.

Radkevich, Nina. 2010. On Location: the Structure of Case and Adpositions. Doctoral dissertation, University of Connecticut.

Rákosi, György. 2006. Dative experiencer predicates in Hungarian. Doctoral dissertation, Utrecht University.

Rákosi, György. 2012. Non-core participant PPs are adjuncts. In *Proceedings of LFG12*, eds. Miriam Butt & Tracy Holloway King, 524-543. Stanford, CA: CSLI Publications.

Ramchand, Gillian & Peter Svenonius. 2004. Prepositions and external argument demotion, handout from talk at Workshop on 'Demoting the Agent', Oslo. Dec 2004.

Ramchand, Gillian. 2008. Verb Meaning and the Lexicon: A First Phase Syntax. Cambridge: Cambridge University Press.

Rappaport-Hovav, Malka & Beth Levin 2008. The English dative alternation: The case for verb sensitivity. *Journal of Linguistics 44*(1), 129-167.

Reeve, Matthew. 2012. *Clefts and their Relatives*. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Reinhart, Tanya & Eric Reuland. 1993. Reflexivity. *Linguistic Inquiry 24*(4), 657-720.

Reinhart, Tanya. 1976. The syntactic domain of anaphora. Doctoral dissertation, MIT.

Reinhart, Tanya. 1983a. Coreference and bound anaphora: A restatement of the anaphora questions. *Linguistics and Philosophy 6*(1), 47–88.

Reinhart, Tanya. 1983b. *Anaphora and Semantic Interpretation*. Chicago, IL: University of Chicago Press.

Reinhart, Tanya. 2016. The Theta System: Syntactic Realization of Verbal Concepts. In *Concepts, Syntax, and their Interface: The Theta System*, eds. Martin Everaert, Marijana Marelj, & Eric Reuland, 1-112. Cambridge, MA: MIT Press.

Rezac, Milan. 2006. The interaction of TH/EX and locative inversion. *Linguistic Inquiry 37*(4), 685-697.

Rezac, Milan. 2008. Phi-Agree and Theta-Related Case. In *Phi Theory: Phi-Features Across Modules and Interfaces*, eds. Daniel Harbour, David Adger, Susana Béjar, 83-129. Oxford: Oxford University Press.

Richards, Marc D. 2007. On feature inheritance: An argument from the Phase Impenetrability Condition. *Linguistic Inquiry, 38*(3), 563-572.

Richards, Norvin. 2017. Multiple case assignment and the English pseudo-passive. In *A Schrift to Fest Kyle Johnson*, ed. by Nicholas LaCara, & Keir Moultonm & Anne-Michelle Tessier, 313-320. Amherst, MA: Linguistics Open Access Publications.

Richardson, John F. 1985. Agents, instruments, and predication theory. *Proceedings of the Eleventh Annual Meeting of the Berkeley Linguistics Society*, eds. Mary Niepokuj, Mary VanClay, Vassiliki Nikiforidou, & Deborah Feder, 305-315. Berkeley, CA: Berkeley Linguistics Society.

Rissman, Lilia. 2010. Instrumental with, locatum with and the argument/adjunct distinction. Instrumental with, locatum with and the argument/adjunct distinction. *LSA Meeting Extended Abstracts 2010*.

Rissman, Lilia, Kyle Rawlins, & Barbara Landau. 2015. Using instruments to understand argument structure: Evidence for gradient representation. *Cognition 142*, 266–290.

Roeper, Tom & Yohei Oseki. (2018). Recursion in the acquisition path for hierarchical syntactic structure. In *Recursion Across Domains*, eds. Luiz Amaral, Marcus Maia, Andrew Nevins, & Tom Roeper, 267-278. Cambridge: Cambridge University Press.

Rombough, Kelly & Rosalind Thornton 2019. Subject–Aux Inversion in Children with SLI. *Journal of Psycholinguistic Research 48*, 921–946.

Rooth, Mats. 1992. A Theory of Focus Interpretation. *Natural Language Semantics 1*, 75–116.

Rosenthal, Jane M. 1971. The omnipresent problem of omnipresent *in* in Classical Nahuatl. Masters thesis, University of Chicago.

Rosenthal, Jane M. 1972. On the relative clauses of Classical Nahuatl. In *The Chicago Which Hunt*, eds. Paul M. Peranteau, Judith N. Levi, & Gloria C. Phares, 246-255. Chicago, IL: Chicago Linguistic Society.

Rosenthal, Jane M. 1973. Some types of subordinate clauses in Classical Nahuatl. In *You take the high node and I'll take the low node*, eds. Claudia Corum, T. Cedric Smith-Stark, & Ann Weiser, 23-33. Chicago, IL: Chicago Linguistic Society.

Ross, J. R. 1997. The source of pseudo-cleft sentences. Handout of talk given at the University of Pennsylvania.

Safir, Ken. 2017. Weak crossover. In *The Blackwell Companion to Syntax, second edition*, eds. Martin Everaert and Henk van Riemsdijk. Oxford: Blackwell.

Sag, Ivan A., Philip Hofmeister, Inbal Arnon, Neal Snider, & Florian Jaeger. 2009. Processing Accounts for Superiority Effects. Manuscript, Stanford University.

Sailor, Craig & Carson T. Schütze 2013. Sailor, Craig. & Carson T. Schütze. 2013. What is an adjunct? Manuscrit, UCLA. ling.auf.net/lingbuzz/002180

Sailor, Craig. 2014. The variables of VP ellipsis. Doctoral dissertation, UCLA.

Saito, Mamoru. 2016. (A) Case for labeling: labeling in languages without ϕ-feature agreement. *The Linguistic Review*, *33*(1), 129–175.

Sasaki, Mitsuya. 2011. Classical Nahuatl Locatives in Typological Perspectives. *Tokyo University Linguistic Papers 31*, 287-316.

Schueler, David. 2011. A Minimalist Theory of the Pseudopassive. Proceedings of the fortieth Western Conference On Linguistics (WECOL), eds. Christina Galeano, Emrah Görgülü, & Irina Presnyakova, 161-174. Fresno, CA: Department of Linguistics, California State University, Fresno.

Schütze, Carson T. & Edward Gibson. 1999. Argumenthood and English prepositional phrase attachment. *Journal of Memory and Language 40*, 409-431.

Schütze, Carson T. 1995. PP attachment and argumenthood. *MIT Working Papers in Linguistics 26*, 95–151.

Schütze, Carson T. 2012. Implementing Argumenthood Diagnostics for Prepositional Phrases: Comments on Merlo and Esteve Ferrer. Manuscript, UCLA. ling.auf.net/lingbuzz/001956

Schwarzschild, Roger. 1999. GIVENness, AVOIDF and other constraints on the placement of accent. *Natural Language Semantics 7*, 141–177.

Schweikert, Walter. 2005. *The Order of Prepositional Phrases in the Structure of the Clause*. Amsterdam: John Benjamins.

Seely, T. Daniel. 2006. Merge, Derivational C-command, and subcategorization in a label-free syntax. In *Minimalist Essays*, ed. Cedric Boeckx, 182-217. Amsterdam: John Benjamins.

Rushen Shi, Camille Legrand & Anna Brandenberger. 2020. Toddlers track hierarchical structure dependence. *Language Acquisition 27*(4), 397-409.

Smith, Ryan Walter, & Jianrong Yu. 2021. Agentless presuppositions and the semantics of verbal roots. *Natural Language & Linguistic Theory*. doi.org/10.1007/s11049-021-09524-z

Speas, Margaret. 1990. *Phrase Structure in Natural Language*. Dordrecht: Kluwer Academic Publishers.

Starke, Michael. 2001. Move Dissolves into Merge: A Theory of Locality. PhD dissertation, University of Geneva.

Steedman, Mark. 2000. *The syntactic process*. Cambridge, MA: MIT Press.

Stowell, Timothy A. 1981. Origins of phrase structure. Doctoral dissertation, MIT.

Svenonius 2010. Spatial P in English. In *Mapping Spatial PPs*, eds. Guglielmo Cinque & Luigi Rizzi, 127-160. Oxford: Oxford University Press.

Szabolcsi, Anna. 2006. Strong vs. Weak Islands. In *The Blackwell Companion to Syntax, Vol. 4*, eds. M. Everaert and H. van Riemsdijk, 479-531. Oxford: Blackwell.

Takami, Ken-ichi. 1988. Preposition stranding: Arguments against syntactic analyses and an alternative functional explanation. *Lingua 76*, 299-335.

Takami, Ken-ichi. 1992. *Preposition Stranding: From syntactic to functional analyses*. Berlin: Mouton de Gruyter.

Tanaka, Hidekazu. 1999. Raised objects and superiority. *Linguistic Inquiry 30*(2), 317-325.

Terzi, Arhonto. 2010. Locative Prepositions and Place. In *Mapping Spatial PPs*, eds. Guglielmo Cinque & Luigi Rizzi, 196-224. Oxford: Oxford University Press.

Thoms, Gary & George Walkden 2019. *v*P-fronting with and without remnant movement. *Journal of Linguistics 55*, 161–214.

Toivonen, Ida. 2016. Argumenthood diagnostics. Manuscript, Carlton University. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.726.792&rep=rep1&type=pdf

Travis, Lisa. 1984. Parameters and effects of word order variation. Doctoral dissertation. MIT.

Truswell, Robert. 2011. *Events, Phrases, and Questions*. Oxford: Oxford University Press.

Tseng, Jesse. 2006. English prepositional passives in HPSG. In *Proceedings of FG 2006: The 11th Conference on Formal Grammar*, ed. Shuly Wintner, 171-184. Sanford, CA: CSLI Publications.

Tungseth, Mai Ellin. 2006. Verbal Prepositions in Norwegian: Paths, Places and Possession. Doctoral dissertation, University of Tromsø.

Van Valin, Robert D. & Randy J. LaPolla. 1997. Syntax: Structure, meaning, and function. Cambridge: Cambridge University Press.

Varaschin, Giuseppe. 2020. Anti-reflexivity and logophoricity: an account of unexpected reflexivization contrasts", *Glossa: a journal of general linguistics 5*(1), 28.

Villata, Sandra, Luigi Rizzi, & Julie Franck. 2016. Intervention effects and Relativized Minimality: New experimental evidence from graded judgments. *Lingua 179*, 76-96.

Ward, Gregory & Andrew Kehler 2005. Syntactic form and discourse accessibility. In *Anaphoric processing: linguistic, cognitive and computational modelling*, eds. António Branco, Tony McEnery, & Ruslan Mitkov, 365–384. Amsterdam: John Benjamins Publishing

Ward, Gregory L. 1990. The Discourse Functions of VP Preposing. *Language 66*(4), 742-763.

Wasow, Thomas. 2002. *Postverbal Behavior*. Stanford, CA: CLSI Publications.

Watanabe, Akira. 1993. AGR-based Case Theory and its interaction with the A-bar system. Doctoral dissertation, MIT.

Wiechmann, Daniel & Arne Lohmann 2013. Domain minimization and beyond: Modeling prepositional phrase ordering. *Language Variation and Change 25*, 65–88.

Williams, Edwin. 1981. Argument Structure and Morphology. *The Linguistic Review l*, 81-114

Wu, Danfeng. 2021. Syntax of *either* in *either*…*or*… sentences. To appear in *Natural Language & Linguistic Theory*. ling.auf.net/lingbuzz/004430

Yang, Charles, Stephen Crain, Robert C. Berwick, Noam Chomsky, & Johan J. Bolhuis. 2017. The growth of language: Universal Grammar, experience and principels of computation. *Neuroscience and Biobehavioral Reviews 81B*, 103-119.

Yang, Charles. 2018. Some consequences of the Tolerance Principle. *Linguistic Approaches to Bilingualism 8*(6), 797–809.

Zwart, Jan-Wouter. 2011. Structure and order: asymmetric merge. In *The Oxford Handbook of Linguistic Minimalism*, ed. Cedric Boeckx, 96-118. Oxford: Oxford University Press.

Zyman, Erik. 2020. In situ mixed wh-coordination and the argument/adjunct distinction. *Glossa: a journal of general linguistics 5*(1), 30. https://doi.org/10.5334/gjgl.1070