

BOOK CHAPTER DRAFT

Adverbs

Marcin Morzycki
Michigan State University

This is a draft of a chapter for a book, *Modification*, in preparation for the Cambridge University Press series *Key Topics in Semantics and Pragmatics*. The [full manuscript](#) is also available as a single document on [my website](#), as are some [additional chapters](#). The book is something between a textbook for people who already have a basic background in semantics and a survey of work in the area. For a fuller explanation of its purpose and scope, consult chapter 1 in the full manuscript.

Broken links, marked with ??, are to other chapters not included in this document. (You can avoid this by looking at the full manuscript.) **Comments would be extremely helpful**, so please don't hesitate to [contact me](#) if you have any, even very minor ones.

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1 Introduction

If adverbs were sentient, we might pity them. Sometimes, they are treated as nothing more than adjectives crudely tarted up with some minor ornamental morphology. At other times, they are treated as the ‘wastebasket category’, because ‘adverb’ is what you call a word when you’ve run out of other names to call it. All sorts of stray mystery particles have been described as adverbs, for the most tenuous of reasons or for no particular reason at all. Worse still, the term is often taken to include not just a motley assortment of scarcely-related lexical riffraff, but whole phrases without regard to their syntactic category. Loiter around the peripheries of a clause for too long, and you too might be accused of being an adverb.

To be mistreated unjustly is bad. It’s worse when it’s precisely what you deserve. The prototypical exemplars of adverbs are genuinely very adjective-like, and languages don’t always bother to make the distinction. And these expressions really do seem alarmingly and confoundingly promiscuous in their distribution. Even so, whatever their internal properties, the question of how they fit into the semantics of larger expressions is interesting. Equally interesting is what about their semantics accounts for their versatility. Adverbs in this more restricted sense—adjective-like things in non-adjective-like

positions—will be the focus of this chapter. For the most part, modifiers of other categories will enter the discussion only to the extent that their semantic contribution resembles that of adverbs proper. More generally, I will observe a distinction between ‘adverb’, the name of a syntactic category, and ‘adverbial’, the collective term for phrases headed by adverbs and for phrasal modifiers of verbal projections and clauses.

Part of the focus on adverbs in the more restricted sense is practical. Discussing adverbials as a class would entail discussing virtually all of formal semantics. There’s hardly any area of the field that hasn’t been concerned to a large extent with some class of adverbials in one way or another, and in certain areas—such as temporal semantics—the analysis of adverbials constitutes much of the enterprise. Unavoidably, though, I’ll briefly touch on some adverbials whose serious examination is best undertaken by looking elsewhere (say, a book on temporal semantics). Many issues that fall under the broad rubric of ‘adverbials’ will also be taken up in chapter ?? as instances of crosscategorical phenomena.

As for this chapter, section 2 considers how some taxonomical organization can be imposed on the chaos of adverbs. Section 3 then takes the first steps toward an analysis, wrestling with basic compositional questions. Section 4 examines two classes of adverbs (manner and subject-oriented) in more detail. Section 5 turns to adverbs that occur higher in the clause. Section 6 introduces some facts and tools relevant to locative adverbials. Section 7 turns to the ill-understood phenomenon of adverbs as modifiers of adjectival projections. Section 8 mostly just sets aside temporal and quantificational adverbials. Section 9 concludes by revisiting the question of the relative order of adverbs.

2 Classifying adverbials

One of the odder properties of adverbs is that their interpretation seems to change radically with their syntactic position. In (1), for example, each instance of *happily* contributes something different to the sentence (this is a version of a sentence in Jackendoff 1972):

- (1) Happily, Floyd would happily play the tuba happily.

This could be paraphrased as ‘it is fortunate that Floyd would be happy to play the tuba in a happy way’. This raises a number of puzzles. Just what are all these readings, precisely? How should they be represented? How do they come about compositionally? Is it the same lexical item in each instance? If so, what gives rise to the distinct readings?

Adverbs in general are a notoriously heterogenous class—even when you set aside non-adverb adverbials—so a natural way to begin is to divide the problem by organizing adverbs into more tractable natural classes.

A number of general classification schemes for adverbs have been proposed. Many of the finer-grained ones are due to in large measure by syntacticians (Bellert 1977, Cinque 1999, Ernst 2002; see Delfitto 2007 for a summary). Semanticists have usually focused on slightly different distinctions and, perhaps in part because of that, for the most part wound up with fewer categories (Bonami et al. 2004 is a general overview). In broad terms, we'll follow a version of the classification found in Ernst (2002)'s magisterial volume on syntax of adjuncts, which is in many respects quite semantically-oriented, but the basic distinctions we'll need to get off the ground were present in some form even in Jackendoff (1972). Ernst's first distinction is between PREDICATIONAL ADVERBS and others. All the adverbs in (1) are predicational. Ernst summarizes their properties this way:

- they are (or are related to) gradable predicates
- in English, they almost always end in *-ly*
- they typically don't quantify over individuals or events (modal quantificational adverbs such as *probably* and *certainly* do belong in this class)

This excludes quantificational adverbs like *always* and *frequently*, domain adverbs like *mathematically*, focus particles like *only*, and adverbials that do things like introduce new participants to an event (*for Floyd, with a knife*). Expressions like *almost* are among the many grammatical particles sometimes referred to as adverbs, perhaps unhelpfully, but they certainly wouldn't be predicational either (see section ??).

The predicational adverbs can be further divided into at least three classes. We'll discuss each class, but a preview might be helpful:

- The class of EVENT ADVERBIALS includes MANNER ADVERBIALS, which characterize the manner in which an event took place (such as *softly* or *tightly*). It also includes certain temporal or locative adverbials. RESULTATIVE ADVERBS such as *fatally* (in *wounded fatally*) or *coarsely* (in *chop coarsely*; Parsons 1990) might or might not be a species of manner adverb (Geuder 2000, Bonami et al. 2004).
- SUBJECT-ORIENTED ADVERBS are sensitive to properties of the subject and give rise to entailments involving it. The class includes *accidentally*, *deliberately*, and *unwillingly*. Many manner adverbs, such as *foolishly*, *cleverly*, and *rudely*, have subject-oriented readings as well.¹

¹The two readings can be distinguished by position:

Within this class, Ernst (along with Geuder 2000) distinguishes between mental-attitude adverbs (*reluctantly, calmly, willingly, anxiously*) and agent-oriented ones (*cleverly, stupidly, wisely, rudely*).

- **SPEAKER-ORIENTED ADVERBIALS** are more heterogeneous. They include **EVALUATIVE ADVERBS**, which express the attitude of the speaker towards a proposition (*amazingly, surprisingly, unfortunately*); **SPEECH ACT ADVERBS**, which characterize the speech act itself (*frankly, honestly, briefly, confidentially*); and **EPISTEMIC ADVERBS**, which include various gradable modal adverbs (*probably, certainly, clearly*).

Naturally, this brief and informal characterization is a bit fuzzy at the margins, but it serves as a reasonable first approximation.

Speaker-oriented adverbials are also often characterized syntactically as **SENTENCE ADVERBIALS**, on the grounds that they attach to a sentence rather than a VP. This is a convenient term, but it may have become less enlightening over the years. The main difficulty is that it presupposes a syntactic analysis rather than providing a pretheoretical description. This means that subject-oriented adverbials may be construed as sentence adverbials or VP adverbials, depending on one's analysis. Worse, if one has a more refined view of verbal and clausal projections in which there are more than two attachment sites, 'sentence' and 'VP' are—at best—crude proxies for 'high attachment' and 'low attachment'. Indeed, the latter two are probably more useful terms, because they don't give the impression of being anything other than vague.

It's worth noting some features of other classification systems. Some authors distinguish a category of **FRAMING** or **FRAME(-SETTING) ADVERBIALS**, a useful term for adverbials that occur very high in the clause (in English and German, on the left) and specify the general circumstances—especially spatiotemporal circumstances—with respect to which the clause should be evaluated (Maienborn 2001 provides an especially thorough semantic characterization, though the term itself is older):

- (2) a. In Japan, the elderly don't seem to be disposable.
- b. In the Middle Ages, sadism and dentistry weren't easily distinguished.
- c. In linguistics, one must choose between disappointment and delusion.

-
- (i) a. **SUBJECT-ORIENTED**: Foolishly, the senator has been talking to reporters. (Ernst 2002)
 - b. **MANNER**: The senator has been talking foolishly to reporters.

Their precise status and how one might subdivide this class is, as for the others, a matter of discussion. In this case, one can understand the issue as one of properly characterizing the notion of ‘frame-setting’.

The cartographic tradition in syntax—concerned with creating fine-grained structural maps of constructions—has arrived at a correspondingly fine-grained inventory of adverbs. Cinque (1999) is the most comprehensive undertaking of this sort, which carefully teases out many crosslinguistic distributional differences—especially correlations between adverbs and functional morphemes with which they co-occur—to arrive at the inventory in (3). Each adverb class is labeled with the label of a corresponding functional head, given here in descending order:

- (3) speech-act: *frankly*; evaluative: *fortunately*; evidential: *allegedly*;
epistemic: *probably*; past: *once*; future: *then*;
irrealis: *perhaps*; necessity: *necessarily*; possibility: *possibly*;
habitual: *usually*; repetitive: *again*; frequentative I: *often*;
volitional: *intentionally*; celerative: *quickly*; anterior: *already*;
terminative: *no longer*; continuative: *still*; perfect: *always*;
retrospective: *just*; proximative: *soon*; durative: *briefly*;
generic/progressive: *characteristically*; prospective: *almost*;
singular completive: *completely*; plural completive: *tutto* (Italian);
voice: *well*; celerative II: *fast, early*; repetitive II: *again*;
frequentative II: *often*; singular completive II: *completely*

It’s easy—too easy—to point out that this inventory is huge and may therefore fail to distill broader generalizations about adverb order or classification. But this kind of detailed crosslinguistic description is a natural first step toward distilling such broader generalizations. It’s important too that these names, arrived at on syntactic grounds, should sound so inherently semantic: it suggests that these are semantic as much as syntactic generalizations. The observation of a correlation between adverbs and functional heads with a similar meaning is obviously semantically important as well.

3 The compositional puzzle

3.1 *Modifiers of propositions?*

In chapter ??, we traced developments in thinking about adjectives from the early idea that they were generally PREDICATE MODIFIERS (functions that apply to and yield the same type), to a later consensus that more and more of them were actually INTERSECTIVE (properties that combine with other properties via conjunction). Thinking about the semantics of adverbs in some

respects paralleled that, though the connection is not generally made. Indeed, one might have imagined that adjectives and adverbs would have been a common joint object of study, but as it turns out the two are usually treated independently, though there are exceptions (including work like Geuder 2000 and Schäfer 2005, explicit and extended examinations of adjectives and adverbs in light of each other).

Early on, the most common approach was a variant of the predicate-modifier one. It treated adverbs as functions from propositions to propositions.² This idea, advanced by Clark (1970), Montague (1970), Parsons (1972), Cresswell (1973, 1974), is simply a generalization of another, better established idea: that modal adverbs like *necessarily* and *possibly* are of this type.

Here's how that works. The first step is to construe modals, classically, as quantifiers over worlds. *Necessarily* requires that the proposition it applies to be true in all relevant worlds, and *possibly* that it be true in some relevant worlds. In order to represent the contribution of such expressions, we will of course need to adopt an intensional system. That makes it possible to define *necessarily* and *possibly* as in (4), where R is an appropriate contextually-provided accessibility relation (which I've represented as a contextually-supplied function that provides a set of worlds accessible from the evaluation world; this may include worlds compatible with what is known, for example, or worlds compatible with what is required):

- (4) a. $\llbracket \textit{necessarily}_R \rrbracket = \lambda p_{\langle s, t \rangle} \lambda w . \forall w' \in R(w) [p(w')]$
 b. $\llbracket \textit{possibly}_R \rrbracket = \lambda p_{\langle s, t \rangle} \lambda w . \exists w' \in R(w) [p(w')]$

This gives rise to interpretations like (5) ($\textit{died}_w(x)$ means x died in w):

- (5) a. $\textit{Possibly}_R$, Floyd died.
 b. $\llbracket \textit{Floyd died} \rrbracket = \lambda w . \textit{died}_w(\textit{Floyd})$
 c. $\llbracket \textit{Possibly}_R \textit{Floyd died} \rrbracket = \llbracket \textit{possibly}_R \rrbracket (\llbracket \textit{Floyd died} \rrbracket)$
 $= \lambda w . \exists w' \in R(w) [\textit{died}_w(\textit{Floyd})]$

So (5) is true iff there is a world accessible from the evaluation world—say, one compatible with the known facts in the evaluation world—in which Floyd died.

²That's not so different from treating them as modifiers of predicates. It's typical to think of propositions as predicates of possible worlds: the proposition $\llbracket \textit{Floyd fell} \rrbracket$ holds of any world in which Floyd fell. More precisely, if we define 'predicate modifier' as simply anything of type $\langle \tau, \tau \rangle$ for any predicate type τ , propositional operators qualify because they are type $\langle st, st \rangle$ (where s is the type of worlds).

This is all relatively straightforward, but one would like to extend it to other adverbs. Should we treat a manner adverb like *quietly*, for example, in a similar way? If by ‘in similar way’ one means ‘using the same type’, then the answer is probably not. The idea that adverbs in general—rather than just in some specific cases—apply to propositions has been largely set aside. One reason can be perceived intuitively. It makes sense to have *possibly* combine with a proposition because we know precisely what it means for a proposition to be possible. But *quietly*? What would it mean for a proposition to be quiet? Something seems awry in this. Although the question isn’t unanswerable in principle, any answer would swim against the tide of our intuitions. It certainly doesn’t bring us any closer to a treatment in which it’s a property, which is what would be necessary to achieve a parallel with adjectives. Still, on their own, these are just general conceptual observations, not arguments. It’s possible to make the case much more explicitly, as we’ll see in the next section.

3.2 *Subject-oriented adverbs and the predicate modifier approach*

Precisely such an explicit case against treating adverbs as functions from propositions to propositions was made by Thomason & Stalnaker (1973). The empirical foundation of the argument is the behavior of subject-oriented adverbs like *intentionally*:

(6) Floyd intentionally killed Clyde.

Pursuing the analogy to *necessarily*, the natural thing would be to have *intentionally* combine with the whole sentence *Floyd killed Clyde*. But Thomason and Stalnaker notice a subtle asymmetry in how *intentionally* affects subjects and objects that militates against this view.

The key notion in this asymmetry is the DE RE/DE DICTO ambiguity, which we’ve already encountered in in chapter ???. A simple case is in (7), which involves the investment banking firm Morgan Stanley:

(7) Floyd thinks the chairman of Morgan Stanley is a jerk.

Floyd may think (7) by virtue of his opinions about investment bankers, even though he’s never met the chairman of Morgan Stanley. He may subsequently unknowingly meet this person, who has been introduced to him only by his name, which we’ll suppose is R. Clyde Weaselraptor. Floyd may find him not at all a jerk. Given that the name *R. Clyde Weaselraptor* and the definite description *the chairman of Morgan Stanley* refer to the same individual, it should be possible to substitute one for the other and wind up with a sentence true under precisely the same circumstances. But not so:

(8) Floyd thinks R. Clyde Weaselraptor is a jerk.

This, of course, is false. This failure of substitutability is called REFERENTIAL OPACITY. The problem is that (7) is ambiguous between two readings, which could be represented as in (9) (notational assumptions: @ is the actual world; **belief**_@(Floyd) is the worlds compatible with Floyd’s beliefs in @; **the** applies to a property and yields the only individual that satisfies it):

- (9) a. *de dicto*:
 $\forall w \in \mathbf{belief}_{@}(\mathbf{Floyd})[\mathbf{jerk}_w(\mathbf{the}(\mathbf{chairman-of-MS}_w))]$
b. *de re*:
 $\forall w \in \mathbf{belief}_{@}(\mathbf{Floyd})[\mathbf{jerk}_w(\mathbf{the}(\mathbf{chairman-of-MS}_{@}))]$

The *de dicto* (Latin for ‘from what is said’) reading is about whoever the chairman is in the worlds compatible with what Floyd believes. That’s why **chairman-of-MS** is subscripted with *w*, the bound variable associated with Floyd’s belief worlds. The *de re* (‘about the thing’) reading is about the person who is the chairman in the **actual** world, R. Clyde Weaselraptor. It’s this latter belief that is expressed in (8)—where **the-chairman-of-MS** is subscripted with the actual world, @—and it’s the one Floyd doesn’t hold.

This turns out to be relevant to adverbs. It’s a signature property of intensional operators that they create such referentially opaque contexts. Thomason and Stalnaker observe that *intentionally* does do this, but only with respect to the object. They provide an example that is to be interpreted against the background of *Oedipus Rex*, the plot of which revolves around failure to recognize one’s parents:

- (10) Oedipus intentionally married Jocasta.
Jocasta is Oedipus’s mother.

therefore: Oedipus intentionally married his mother. **(invalid)**

This is, of course, not a valid inference, despite the fact that the name *Jocasta* and the definite description *his mother* refer to the same person in the actual world. Oedipus was confused about Jocasta’s identity, so it’s perfectly reasonable for him to have intended to marry her but not to marry his mother. Yet in the subject position, things work differently:

- (11) Oedipus intentionally married Jocasta.
Oedipus is the son of Laius.

therefore: The son of Laius intentionally married Jocasta. **(valid)**

One might have expected a similar failure of substitutability.

Thomason and Stalnaker conclude from this that *intentionally* must be inherently intensional, but that it must apply not to the whole sentence but only to the VP, as in (12):

$$(12) \quad \llbracket \textit{intentionally} \rrbracket = \lambda P_{(e, st)} \lambda x . \textit{intentionally}(P)(x)$$

It therefore leaves the subject out of its scope and so out of the opaque context it creates. The two readings of (13a) can be represented as (13b) and (13c):

- (13) Oedipus intentionally married his mother.
- a. *de dicto*:
intentionally($\lambda x \lambda w . \textit{married}_w(\textit{his}(\textit{mother}_w))(x)$)(Oedipus)
- b. *de re*:
intentionally($\lambda x \lambda w . \textit{married}_w(\textit{his}(\textit{mother}_@))(x)$)(Oedipus)

And, of course, it's on the *de dicto* reading that the inference fails.

This is a first step toward a theory of subject-oriented adverbials. But what does this tell us about ordinary manner adverbs like *quietly*? Well, at the very least, it suggests that it may apply to a VP meaning rather than a proposition. It might also lead us to expect that it's intensional, like *intentionally*. As it turns out, though, it doesn't create opaque contexts:

- (14) Oedipus quietly married Jocasta.
 Jocasta is Oedipus's mother.
-
- therefore*: Oedipus quietly married his mother. **(valid)**

In this respect, *quietly* doesn't seem to be intensional. Perhaps that's to be expected. It's natural enough to think of *intentionally* as quantifying, say, over worlds compatible with Oedipus's intentions. But what worlds would be quantified over by *quietly*?

So we've seen good evidence that at least some adverbs should be treated as applying to properties rather than propositions. The argument was based on a fact about intensionality. Yet that same argument can't be made in the case of manner adverbs like *quietly*. That suggests an important difference. To interpret such adverbs, we need to explore a different strategy.

3.3 Problems for the intersective approach

One reason intensionality matters here is the parallel to adjectives. Many adjectives are intersective, and denote simple properties rather than predicate

modifiers. This approach isn't available, though, for intensional adjectives. *Alleged*, for example, needs to apply to the noun it combines with, because we can't think of *alleged burglar* as simply the intersection of people who are alleged and burglars (see chapter ?? for extensive discussion). It seems reasonable to suppose that the adjectival and adverbial domains are similar to each other, and so that some adverbs have intersective interpretations. Pairs such as *quiet* and *quietly* cry out for a parallel analysis. If manner adverbs are crucially intensional, though, we can't treat them as intersective—and if they aren't, perhaps we can.

The previous section revealed that indeed, *quietly* doesn't behave as though it's intensional, so let's try to do things intersectively:

- (15) a. $\llbracket \textit{quietly married Jocasta} \rrbracket$
 $= \lambda x . \llbracket \textit{quietly} \rrbracket (x) \wedge \llbracket \textit{marry Jocasta} \rrbracket (x)$
 b. $\llbracket \textit{Oedipus quietly married Jocasta} \rrbracket$
 $= \llbracket \textit{quietly} \rrbracket (\textit{Oedipus}) \wedge \llbracket \textit{marry Jocasta} \rrbracket (\textit{Oedipus})$

The combinatorics work, but the result is wrong. This would require Oedipus to be quiet, not the marriage. Even if the intensionality facts point in the right direction, it seems we still can't pull off an intersective interpretation.

There is another problem with an intersective approach. To appreciate it, it helps to consider adjectives first. Suppose we live in a world in which all linguists are professors, and all professors are linguists. This would mean that, in this world, *linguist* and *professor* have the same extension: they pick out precisely the same people. Staying in this world, then, (16a) and (16b) have the same truth conditions, as do (17a) and (17b):

- (16) a. I met a linguist.
 b. I met an professor.

 (17) a. I met a friendly linguist.
 b. I met a friendly professor.

Because *friendly* in (17) is interpreted intersectively, it can't do anything to block this effect. This seems to accord with intuitions about this (admittedly bizarre) scenario.

In light of that, let's return to adverbs. This time, we'll suppose that we live in a world in which everyone who ran also juggled and vice versa. In this world, *juggled* and *ran* have the same extension. Now (18a) and (18b) should mean the same thing, as should (19a) and (19b):

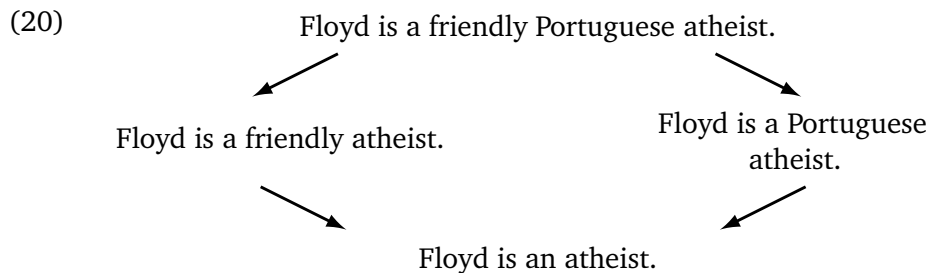
- (18) a. Floyd juggled.
 b. Floyd ran.

- (19) a. Floyd juggled quickly.
 b. Floyd ran quickly.

The judgment about (18) is that the sentences do indeed have the same truth conditions. But something odd happens in (19). If *quickly* were interpreted intersectively, these sentences should mean precisely the same thing, but in fact, they don't. Even in this bizarre world, they don't entail each other.³

This argument, modeled on McConnell-Ginet (1982) and Larson (1999), seems to suggest that *quickly* isn't intersective. Perhaps it even suggests that *quickly* must be intensional after all, contrary to the result in the previous section. The sentences in (19) might fail to entail each other in the relevantly weird world because the adverb applies to intensions of the verbs, and those differ even when their extensions are the same.

There are now two reasons to conclude manner adverbs aren't intersective. Yet there is another argument that points in precisely the opposite direction. Again, the first step is to consider adjectives. A sequence of intersective adjectives gives rise to the DIAMOND ENTAILMENT PATTERN illustrated in (20), where the arrows indicate entailment:



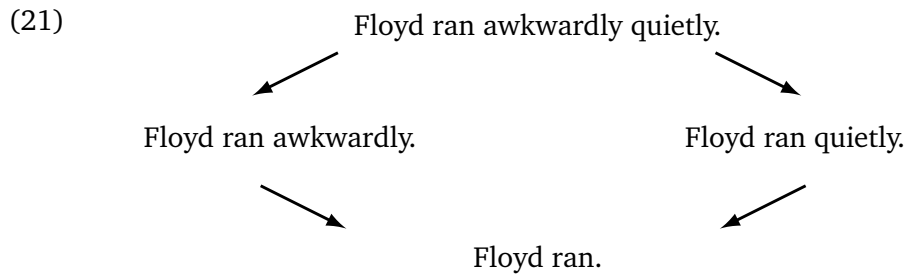
If the original sentence is true, dropping—that is, omitting—any of the adjectives will also result in a true sentence. Intersective adjectives are DROPPABLE in this way.⁴

Many adverbs give rise to the same pattern of entailments:⁵

³I've cheated slightly in replacing our previous example, *quietly*, with *quickly* to make the judgment a little easier. With a bit of contemplation, though, *quietly* should work the same way.

⁴The term seems to be due to Wyner (1994). On this definition, intersective modifiers aren't actually droppable in downward-entailing contexts. *No one is a Portuguese atheist*, for example, doesn't entail *No one is an atheist*.

⁵Adjacent adverbs that end in *-ly* tend to sound odd. That's not relevant here. This can be fixed by moving one adverb into a medial position (*awkwardly ran quietly*).



This is the same pattern, of course. As it turns out, in the right semantic environments, all intersective modifiers behave this way. It's precisely what we'd expect to happen with an interpretation framed in terms of conjunction, because this is precisely how conjunction behaves. One can verify this by dropping conjuncts from *Floyd knows Norwegian and Quechua and Dutch*.

So we now have two reasons to think manner adverbs aren't intersective and one reason to think they are. There is reason to think that they aren't intensional, and reason to think that they are. It's therefore also not clear whether to treat them as predicate modifiers either. This is real quandary.

3.4 Davidsonian events: the intersective approach redeemed

A lovely solution to all this emerges from [Davidson \(1967\)](#). He shows that in fact, manner adverbs—and many others—should in fact be analyzed intersectively. Perhaps surprisingly, the key is not to adjust our compositional assumptions, but rather our ontological ones.⁶ To make his case, Davidson often uses adverbial PPs rather than adverbs, and I'll follow him in this. The crucial conclusions generally carry over to manner adverbs.

For mysterious reasons, Davidson begins by reporting that someone seems to have perpetrated an inexplicably illicit act of clandestine buttering:

(22) Jones buttered the toast in the bathroom with the knife at midnight.

In their indictment, prosecutors from the Ministry of Baked Good Enforcement might later allege of Jones' infraction that it had the following properties:

- (23)
- a. It was done with the knife.
 - b. It was done at midnight.
 - c. It was done in the bathroom.

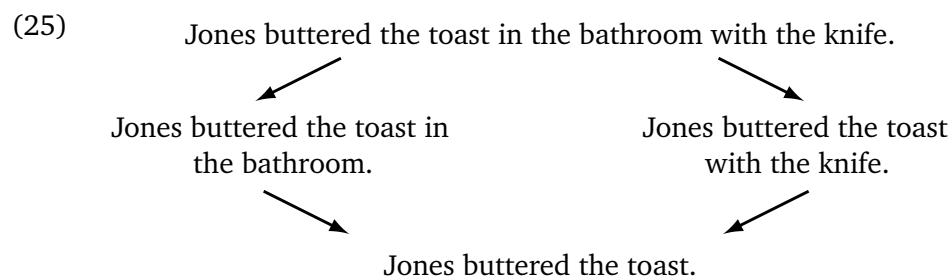
⁶This is reminiscent of the way compositional questions shed light on the ontology of degrees (see chapter ??).

The pronouns especially are worth noticing. They refer to what Jones did, whatever it was. What such pronouns refer to, Davidson proposed, is EVENTS. Events are objects in the model just as individuals or times or degrees are. Reasons for thinking so include that we can refer to them (*John's buttering the toast*), that pronouns can refer back to them (as *it* does in (23)), and—most important in the current context—that we can ascribe properties to them. That's what the prosecutors do in making the allegations in (23): they ascribe properties to John's buttering event. (See Parsons 1990 for further argumentation and discussion.)

Davidson argues that this is the crux of what adverbials do, too. The way to interpret a sentence like (22) is by predicating each adverbial not of an individual or even of a property, but rather of an event. The meaning should be rendered as in (24):

$$(24) \quad \left[\left[\text{Jones buttered the toast in the bathroom with the knife at} \right] \right] \\ \text{midnight.} \\ = \exists e \left[\begin{array}{l} \mathbf{buttered}(\mathbf{the-toast})(\mathbf{Jones})(e) \wedge \\ \mathbf{in}(\mathbf{the-bathroom})(e) \wedge \mathbf{with}(\mathbf{the-knife})(e) \wedge \\ \mathbf{at-midnight}(e) \end{array} \right]$$

Because it's framed in terms of conjunction, this instantly explains the diamond entailment pattern:



Each conjunct in the denotation of the sentence can be dropped without rendering it false, and for this reason the adverbials in (25) are droppable too.

The denotations of the individual adverbials are straightforward (e, e', \dots are variables over events):

- (26) a. $\llbracket \text{in the bathroom} \rrbracket = \lambda e . \mathbf{in}(\mathbf{the-bathroom})(e)$
 b. $\llbracket \text{with the knife} \rrbracket = \lambda e . \mathbf{with}(\mathbf{the-knife})(e)$

Manner adverbs can receive the same treatment:

(27) $\llbracket \text{quietly} \rrbracket = \lambda e . \mathbf{quiet}(e)$

This is strikingly elegant. It's simple, of course, but it also perfectly parallels the denotation of the adjective *quiet*:

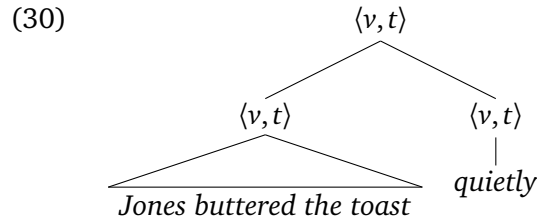
$$(28) \quad \llbracket \textit{quiet} \rrbracket = \lambda x . \mathbf{quiet}(x)$$

That seems as it should be, given the close relation between the two.

Before getting too excited, one should verify that the bits come together compositionally. To achieve this, the verb will need an event argument as well:

$$(29) \quad \llbracket \textit{battered} \rrbracket = \lambda x \lambda y \lambda e . \mathbf{battered}(x)(y)(e)$$

The types fit as in (30), where v is the type of events:⁷



At this point, these can combine intersectively by Predicate Modification, which now has to be generalized to include properties of events:

- (31) PREDICATE MODIFICATION (GENERALIZED TO EVENTS)
 If a branching node α has as its daughters β and γ , and $\llbracket \beta \rrbracket$ and $\llbracket \gamma \rrbracket$ are either both of type $\langle e, t \rangle$ or both of type $\langle v, t \rangle$, then $\llbracket \alpha \rrbracket = \lambda X . \llbracket \beta \rrbracket (X) \wedge \llbracket \gamma \rrbracket (X)$, where X is an individual or an event (whichever would be defined).

Thus:

- (32) a. $\llbracket \textit{quietly} \rrbracket = \lambda e . \mathbf{quiet}(e)$
 b. $\llbracket \textit{Jones battered the toast} \rrbracket$
 $= \lambda e . \mathbf{battered}(\mathbf{the-toast})(\mathbf{Jones})(e)$
 c. $\llbracket \textit{Jones battered the toast quietly} \rrbracket$
 $= \lambda e . \mathbf{battered}(\mathbf{the-toast})(\mathbf{Jones})(e) \wedge \mathbf{quiet}(e)$

The result is a property of events, which doesn't seem a reasonable sentence meaning. What we really want the sentence to say is that there was an event

⁷The type of events is often—indeed, probably more often—represented as s , but this can be confusing because this is also used as the type of possible worlds.

that has this property—that is, we want to introduce existential quantification over events:

(33) $\exists e[\text{battered}(\text{the-toast})(\text{Jones})(e) \wedge \text{quiet}(e)]$

One way to do this is to assume that there is an existential closure operation (Heim 1982) that automatically quantifies-off any free event arguments. A more sophisticated option, advanced in Kratzer (1998), involves attributing the existential quantifier to a particular node in the tree. She suggests it's the aspect morpheme that's responsible (which in this case is not expressed independently). Either way, the right denotation results.

What about our earlier objections to doing things intersectively? Well, one of them relied on the assumption that *quietly* would denote a property of individuals. If it had, interpreting the sentence intersectively would entail that Jones is quiet, not his buttering. But it doesn't.

The other objection is more complicated. The scenario was one in which everyone who ran juggled and vice versa. The problem was that this would mean *run* and *juggle* mean the same thing, and therefore *ran quickly* and *juggled quickly* should mean the same thing. As it turns out, though, the problem is again about framing denotations only in terms of individuals. An event analysis requires looking at things a different way. It might well be that everyone who ran juggled and vice versa, but this doesn't make the **events** of running and juggling the same. On a Davidsonian view, it would have to be both the runner-jugglers **and** the events that are identical to bring about the problem. In fact, there is now no reason to think that *quickly* is intensional. The worries have been dispelled without requiring an intensional system.

Everything has fallen into beautifully place. The simple Davidsonian move easily resolved the confusion and conflicting evidence that had plagued us in section 3.3. It provided an elegant intersective way of interpreting adverbs, assigned them denotations that mirror those of their adjectival counterparts, delivered a simpler semantics overall, and allowed us to avoid having to posit an intensional denotation in the face of evidence against it. Not a bad result for something that began with forbidden toast.

4 Manner and subject orientation

4.1 *Augmentation and passive-sensitivity*

So far, we've encountered a theory of manner adverbs based on events, and a theory of subject-oriented adverbs based on intensionality. One might wonder whether one can be assimilated to the other. It would be challenging, because the two classes of adverbs do seem to differ in nontrivial ways. But the

alternative doesn't seem ideal: assuming that subject-oriented and manner adverbs have distinct homophonous lexical entries. This certainly wouldn't be catastrophic—perhaps there is simply a null affixation process that maps from one class to the other—but even so, avoiding having to stipulate an ambiguity would be desirable.

That's the impulse that drove [McConnell-Ginet \(1982\)](#). She observes contrasts like those in (34–36):

- (34) a. *subject-oriented*: Louisa rudely answered Patricia.
 b. *manner*: Louisa answered Patricia rudely.
- (35) a. *subject-oriented*: Louisa rudely departed.
 b. *manner*: Louisa departed rudely.
- (36) a. *subject-oriented*: #Josie lavishly has furnished the house.
 b. *manner*: Josie has furnished the house lavishly.

What these examples show especially starkly is the importance of syntactic position in the contrast. The reading changes with with the position of the adverb. The point is made especially clear in (36): (36a) is odd because its sole available interpretation is the pragmatically bizarre one that it was lavish of Josie to furnish her house at all. Given everything that's been said so far, it's not clear what accounts for this.

McConnell-Ginet also homes in on another effect involving subject-oriented adverbials: PASSIVE SENSITIVITY ([Ernst 2002](#) traces the observation itself back to at least [Lakoff 1972](#)). This refers to a curious fact about how some subject-oriented adverbs behave in passives:

- (37) a. $\left. \begin{array}{l} \text{Reluctantly} \\ \text{Wisely} \\ \text{Unwillingly} \end{array} \right\}$, Joan instructed Mary.
- b. $\left. \begin{array}{l} \text{Reluctantly} \\ \text{Wisely} \\ \text{Unwillingly} \end{array} \right\}$, Mary was instructed by Joan.

Unlike (37a), (37b) is ambiguous. It has a reading on which it's Mary who's reluctant (or wise or unwilling) and another on which it's Joan.

On a straightforward predicate-modifier approach, it's certainly possible to provide an account of this fact ([Landman 2000](#)). What's less clear is how to do so in a way that simultaneously satisfies McConnell-Ginet's desire to avoid a lexical ambiguity between subject-oriented and manner adverbs.

Her diagnosis of the situation is that we've been thinking the wrong way about modification itself. On a predicate modifier approach, adverbs

are functions that take arguments. But in her estimation this overlooks the basic fact that adverbs are **additional**. They are essentially grammatical accessories, and to treat them as functions that apply to verbal meanings is to mistake them for something more. It's not entirely clear how this could be an argument against an intersective interpretation, but perhaps there is a way to finesse that point. So the question is how to do justice to the analytical intuition that adverbs should be subordinate to and dependent on verbs. Her answer is that adverbs are really arguments. The fact is easy to miss because they're almost always optional arguments—almost always, but not always. Some verbs do require an adverb:

- (38) a. Floyd behaved *(badly).
 b. Floyd treated Clyde *(badly).
 c. Floyd worded the letter *(badly).
 d. New York is situated *(on the Hudson).

This shows that it's possible in principle for verbs to take adverb arguments. If it can happen here, she asks, why not in general? Why not suppose that this is how manner modification generally works?

At least one reason to resist this is that it would require all verbs to have argument positions for adverbs, and surely that would be missing a generalization. It's also not clear how this would accord with the intuition that adverbs are in some way additional. To address this, she suggests that adverbs are arguments of a special kind: they are introduced after a verb has undergone a process of 'augmentation'. The augmentation process gives verbs additional argument slots, which adverbs can then occupy.

This idea can be expressed rather naturally in an event semantics. This is counter to her wishes, but I'll go down this road in any case. Here's how this might work. *Walk*, when modified by *quickly*,⁸ is augmented using an AUG-SPEED shift that maps it to a similar predicate that has an argument position for a speed adverb. *Quickly* itself denotes a property of rates of speed, indicated with the variable and type-label *r* in (39):

- (39) a. Floyd AUG-SPEED walked quickly.
 b. $\llbracket \text{AUG-SPEED} \rrbracket$
 $= \lambda R_{(e,vt)} \lambda P_{(r,t)} \lambda x \lambda e . R(x)(e) \wedge P(\text{speed}(e))$
 c. $\llbracket \text{quickly} \rrbracket = \lambda r : \text{is-a-speed}(r) . \text{quick}(r)$
 d. $\llbracket \text{Floyd AUG-SPEED walked quickly} \rrbracket$
 $= \llbracket \text{AUG-SPEED} \rrbracket (\llbracket \text{walked} \rrbracket)(\llbracket \text{quickly} \rrbracket)(\llbracket \text{Floyd} \rrbracket)$

⁸Further examination of the lexical semantics of *quickly* can be found in [Cresswell \(1977\)](#) and [Rawlins \(2010\)](#). It turns out to reveal interesting subtleties with broader consequences.

$$= \lambda e . \mathbf{walk}(\mathbf{Floyd})(e) \wedge \mathbf{quick}(\mathbf{speed}(e))$$

The result of the particular augmentation illustrated here is that *walked* winds up awaiting an adverb, which it will predicate of the speed of an event, indicated here with a **speed** function that maps an event to its speed. It's an interesting question whether that commits us to enriching the ontology with a new atomic type for objects such as 'speeds' or whether they can be constructed out of other objects. For speeds, degrees seem a natural alternative, but for manners it's less clear (see section 4.6). With sufficiently many augmentation relations—and there would in fact have to be many—one can imagine a process like the one in (39) working for adverbs in general. Indeed, on a Cinque (1999)-style view, this has a natural implementation: the augmentation relations might be linked to the functional heads associated with particular modifiers (Morzycki 2004a, 2005 explores something vaguely along these lines). There's certainly no shortage of such heads in a Cinquean theory.

Perhaps the most interesting aspect of this, though, is its groundbreaking treatment of passive-sensitivity. McConnell-Ginet's paraphrase of an ordinary subject-oriented adverb is in (40):

- (40) Louisa rudely departed.
'Louisa acted rudely to depart.'

For me, 'acted rudely in departing' is much more natural. Either way, this reflects that the meaning of subject-oriented *rudely* is about deliberate action. If in the middle of a conversation Louisa tripped and fell out an open window, we wouldn't think she had rudely departed, no matter how interesting the conversation she had interrupted had been. McConnell-Ginet suggests that we can reflect that aspect of the meaning of the sentence with a higher abstract ACT verb, with a meaning vaguely along the lines of normal English 'act'. This, of course, just raises the question of what *act* means.

It might be represented using two lexical-semantic ingredients that are useful in a variety of other contexts. The first is a **cause** predicate, which I will treat as a relation between events, so that **cause**(e')(e) means that e caused e' . The second is the THEMATIC ROLE PREDICATE **agent**, which maps an event to its agent (or, roughly, instigator; more on this in section 4.2). Thus:

$$(41) \quad \llbracket \text{ACT} \rrbracket = \lambda R_{(e, vt)} \lambda x \lambda e . \exists e' \left[\begin{array}{l} \mathbf{cause}(e')(e) \wedge \mathbf{agent}(e) = x \wedge \\ R(x)(e') \end{array} \right]$$

This adds into the mix a causing event, of which x is the agent. We have now gone considerably beyond McConnell-Ginet's original proposal, but it helps

spell out what *act* might actually mean and places on the table some tools that will prove useful.

If a lower, main verb can be augmented, we should expect that this higher abstract one could as well. That's precisely what she suggests happens with subject-oriented adverbs. The act predicate in (41) is augmented by adding a manner argument. Thus the syntactic representation will be as in (42a). The semantics will be built from an adverb that denotes a property of manners, as in (42b), and ultimately leads to (42c):

- (42) a. Louisa rudely AUG-MANNER ACT departed.
 b. $\llbracket \text{rudely} \rrbracket = \lambda m : \mathbf{is-a-manner}(m) . \mathbf{rude}(m)$
 c. $\llbracket \text{AUG-MANNER} \rrbracket (\llbracket \text{ACT} \rrbracket)(\llbracket \text{rudely} \rrbracket)(\llbracket \text{departed} \rrbracket)(\llbracket \text{Louisa} \rrbracket)$
 $= \lambda e . \llbracket \text{act} \rrbracket (\llbracket \text{depart} \rrbracket)(\llbracket \text{Louisa} \rrbracket)(e) \wedge$
 $\llbracket \text{rudely} \rrbracket (\mathbf{manner}(e))$
 $= \lambda e . \exists e' \left[\begin{array}{l} \mathbf{cause}(e')(e) \wedge \mathbf{agent}(e) = \mathbf{Louisa} \wedge \\ \mathbf{depart}(\mathbf{Louisa})(e') \end{array} \right] \wedge$
 $\mathbf{rude}(\mathbf{manner}(e))$

The result is a property of events whose agent is Louisa, whose manner was rude, and which caused an event that was a departing by Louisa.

This provides an alternative theory of subject-oriented readings that doesn't require distinct lexical entries for subject-oriented and manner adverbs, and that correctly makes a connection between how high an adverb is and which reading it gets.

The other challenge was providing an account of passive-sensitivity. It turns out that this can do that, too, provided we are willing to accept a single lexical ambiguity. It's in the passive form of *be*. One of its forms can be semantically vacuous, but the other is a volitional form of passive *be* that is just a way of pronouncing the ACT predicate (a similar proposal was made by Partee 1977). That being the case, two readings are possible, depending on which of passive *be* is used:

- (43) a. Reluctantly, Mary was_∅ instructed by Joan.
 b. Reluctantly, Mary was_{ACT} instructed by Joan.

In (43a), *reluctantly* gets its usual interpretation, modifying a verb of which Joan is the underlying subject. In (43b), it is interpreted as modifying a higher form of ACT, of which Mary is the subject. Reluctance is therefore correctly attributed to different people on the two readings.

4.2 *The Neo-Davidsonian strategy and thematic roles*

Adopting Davidsonian events radically changes the picture of how adverbial modification works, and it allows an elegant explanation of manner adverbs. But the only explanations of how subject-oriented adverbs work that we've encountered so far—Thomason and Stalnaker's and McConnell-Ginet's—don't depend on events. It would be nice to have an inherently event-based account of those, too, if only as a point of comparison. Articulating such an account is what [Wyner \(1998\)](#) sets out to do, in a way that builds on the insights of both McConnell-Ginet and Davidson. Before we can consider his proposal, though, we have to make a new tool available.

We've already used an **agent** thematic-role predicate (both in this chapter and in chapter ??). Thematic roles are often thought to play a major role in the syntax, but using the **agent** predicate suggests they have a semantic role, too. And indeed, it's not clear how they could be understood in any way that's not essentially semantic. What any thematic role does is group together various ways of being a participant in an event. Being an agent is one way: it typically involves acting volitionally, causing the event, and a variety of other things ([Dowty 1991](#)). Being a patient is another: it involves being affected. And so on for thematic roles like experiencer, source, goal, beneficiary, etc.

Sometimes semanticists are skeptical about thematic roles because their definitions are a bit vague and they're not actually necessary to relate predicates to their arguments—function application does that just fine. Nevertheless, it means something that we've already resorted to an **agent** predicate twice. It's also striking how easy it was to do. In describing thematic roles, I characterized them with respect to an event. If events are at the core of the semantics, extracting from them information about who played what role seems entirely natural. So in addition to **agent**, we could also treat the other thematic roles as thematic role predicates that map events to individuals. (Alternatively, we could treat them as relations, so instead of writing **agent**(e) = x we'd write **agent**(e)(x), which would avoid committing to the idea that any event has at most one agent.) The idea that thematic roles could be construed as event predicates is advocated in detail in [Parsons \(1990\)](#), and a semantics that combines thematic roles and events in this way is referred to as NEO-DAVIDSONIAN.⁹ Parsons illustrates many ways in which it might be useful. The first application of the idea, though, is in decomposing predicates to allow arguments to be added conjunctively, in much the way intersective modifiers are. Instead of *give* having a denotation like (44), it would be as in (45):

⁹The term is also sometimes used to refer to the idea that all verbs (or perhaps even all predicates) should receive an event or state argument, rather than just predicates in 'action sentences' as Davidson originally intended ([Parsons 1990](#), [Higginbotham 1985](#)).

(44) *Davidsonian*:

- a. $\llbracket \text{give} \rrbracket = \lambda x \lambda y \lambda z \lambda e . \mathbf{give}(x)(y)(z)(e)$
b. $\llbracket \text{Floyd gave cheese to the walrus} \rrbracket$
 $= \exists e [\mathbf{give}(\mathbf{cheese})(\mathbf{the-walrus})(\mathbf{Floyd})(e)]$

(45) *Neo-Davidsonian*:

- a. $\llbracket \text{give} \rrbracket = \lambda x \lambda y \lambda z \lambda e . \mathbf{give}(e) \wedge \mathbf{theme}(e) = x \wedge \mathbf{goal}(e) = y \wedge$
 $\mathbf{agent}(e) = z$
b. $\llbracket \text{Floyd gave cheese to the walrus} \rrbracket$
 $= \exists e \left[\begin{array}{l} \mathbf{give}(e) \wedge \mathbf{theme} = \mathbf{cheese} \wedge \\ \mathbf{goal}(e) = \mathbf{the-walrus} \wedge \mathbf{agent}(e) = \mathbf{Floyd} \end{array} \right]$

If nothing else, it's a bit easier to read (though if that were a concern, we should have just written 'e is an event of z giving x to y').

Another nice aspect of this approach is that it has an à la carte quality. One can pick only the thematic role predicates one cares to believe in, and reject any one finds unappetizingly vague. The leading idea in this vein is to accept only **agent** (Kratzer 1996, 2002 and many others since), a position she calls semi-neo-Davidsonian. What Kratzer actually proposes is that the all arguments but the agent are introduced in the conventional way, but that the agent is introduced indirectly. She does this in a separate syntactic node, Voice, that has come to be identified with *v* (pronounced 'little v'; Marantz 1996). It heads a functional projection above VP. The idea that the agent is special and separate from other arguments, and introduced at a higher level in the tree, seems ready-made for a theory of subject-orientation. But we don't need to adopt these syntactic assumptions quite yet.

Wyner (1998) uses these neo-Davidsonian tools to build a theory of subject-orientation. The first step is to return to the observation that the subject in sentences with subject-oriented adverbs must be volitional. Wyner illustrates this with sentences like (46):

(46) #The antibiotic reluctantly killed the infection.

The only way to make sense of this is to suppose that the antibiotic had some choice in the matter. To Wyner, this indicates that the lexical semantics of subject-oriented adverbs involve not an abstract ACT verb, but rather an **agent** predicate built into their lexical semantics.¹⁰ He frames his denotations around paraphrases like (47):

¹⁰The predicate he actually uses is **volition**, which he takes to be part of a family of predicates that collectively constitute the content of **agent**.

- (47) Floyd reluctantly killed Clyde.
 ‘Floyd was the agent of an event of killing Clyde, and Floyd was the experiencer of a state of reluctance.’

There is a minor additional variation here on the Davidsonian theme: STATES. States are like events but don’t involve anything actually happening. Rather, they’re about something just being the case. They’re of the same semantic type as events, but of a different SORT. It’s conventional to us *s* as the variable for them.

The paraphrase can be cashed out as a denotation directly in terms of thematic role predicates (I’m adjusting Wyner’s denotation nontrivially):¹¹

- (48) a. $\llbracket \textit{reluctantly} \rrbracket = \lambda P_{\langle v,t \rangle} \lambda e . P(e) \wedge \exists s [\mathbf{reluctant}(P)(s) \wedge \mathbf{experiencer}(s) = \mathbf{agent}(e)]$
 b. $\llbracket \textit{Floyd kill Clyde} \rrbracket = \lambda e . \mathbf{kill}(e) \wedge \mathbf{agent}(e) = \mathbf{Floyd} \wedge \mathbf{theme}(e) = \mathbf{Clyde}$
 c. $\llbracket \textit{reluctantly [Floyd killed Clyde]} \rrbracket = \lambda e . \mathbf{kill}(e) \wedge \mathbf{agent}(e) = \mathbf{Floyd} \wedge \mathbf{theme}(e) = \mathbf{Clyde} \wedge \exists s \left[\begin{array}{l} \mathbf{reluctant} \left(\begin{array}{l} \lambda e . \mathbf{kill}(e) \wedge \\ \mathbf{agent}(e) = \mathbf{Floyd} \wedge \\ \mathbf{theme}(e) = \mathbf{Clyde} \end{array} \right) (s) \wedge \\ \mathbf{experiencer}(s) = \mathbf{agent}(e) \end{array} \right]$

This requires that there be a state of reluctance about Floyd killing Clyde, and that the experiencer of that state be the agent of an event of Floyd killing Clyde. To achieve an account of passive-sensitivity, Wyner does something similar to McConnell-Ginet in the use of a volitional passive *be*.

What’s important about this is that it provides a theory of subject-orientation in a Davidsonian—indeed, neo-Davidsonian—event framework. One could of course quibble. If this particular configuration of thematic role predicates is simply a fact about certain lexical entries, should we also expect lexical entries that combine thematic role predicates in arbitrary different ways? Why not an adverb that targets the theme, for example, as in (49)?:

- (49) $\llbracket \textit{reluctantly} \rrbracket = \lambda P_{\langle v,t \rangle} \lambda e . P(e) \wedge \exists s [\mathbf{reluctant}(P)(s) \wedge \mathbf{experiencer}(s) = \mathbf{theme}(e)]$

That said, it’s possible to write conceivable but apparently linguistically

¹¹I’ve changed Wyner’s denotation slightly to reflect more directly that the reluctance is about the killing rather than something else by giving **reluctant** an additional predicate-of-events argument.

impossible denotations for adverbs for any predicate-modifier type, so it's debatable how much of a concern this should be.

4.3 Comparison classes and related tools

There is another insight in Wyner's approach—and the general Davidsonian one—that's worth recognizing: the connection it makes between subject-oriented adverbs and adjectives. Wyner's denotation is actually based on an adjective-like **reluctant** predicate. The connection between adverb orientation and adjectives is made especially clearly by Geuder (2000), who observes that (50a) is actually best paraphrased not with *act* but as in (50b):

- (50) a. Floyd rudely departed.
b. Floyd was rude to depart.

One reason to prefer this to the *act* paraphrase is that it's not possible to say e.g. **Floyd acted to depart*. The connection to adjectives behind (50) extends to quite a number of subject-oriented adverbs:

- (51) a. Floyd $\left\{ \begin{array}{l} \text{stupidly} \\ \text{thoughtlessly} \\ \text{gladly} \end{array} \right\}$ departed.
b. Floyd was $\left\{ \begin{array}{l} \text{stupid} \\ \text{thoughtless} \\ \text{glad} \end{array} \right\}$ to depart.

Not all subject-oriented adverbs can be paraphrased this way. The class that includes *intentionally*, *accidentally*, and *deliberately* doesn't support such paraphrases. *Anxious*, *eager*, and *(un)willing* all support them in principle, but the adjectival paraphrase lacks an entailment that its adverb counterpart has:

- (52) a. Floyd $\left\{ \begin{array}{l} \text{anxiously} \\ \text{unwillingly} \end{array} \right\}$ departed.
b. Floyd was $\left\{ \begin{array}{l} \text{anxious} \\ \text{unwilling} \end{array} \right\}$ to depart.

Only (52a) and not (52b) entails that Floyd actually departed. For Geuder, this is evidence that the theory of adverb orientation has to be built on top of a theory of **adjective** orientation, and that in particular we have to develop an understanding of the infinitival arguments these adjectives take.

I won't pursue this further here, but the connection to adjectives does present another analytical opportunity that a number of researchers have found appealing. In principle, adjective semantics provides many semantic knobs and dials one might want to twiddle, but one especially promising one is comparison classes (see chapter ??, especially sections ?? and ??). Ernst (2002) noticed that the subject-oriented adverb in (53a) and the manner adverb in (53b) differ in just this respect:

- (53) a. Rudely, she left.
 comparison class: things she might have done
 b. She left rudely.
 comparison class: ways she might have left

This insight seems so clear that it hardly needs elaborating. Ernst doesn't claim that this is all there is to subject-oriented/manner contrast. He couches his semantic component in a version of Discourse Representation Theory (DRT; Kamp 1981), which, in its classic form, has construction-specific rules for constructing semantic representations. He leverages this to create an effect in which (53a) winds up meaning that the event 'warrants positing' rudeness in the agent, whereas (53b) winds up with 'manifests' rudeness in the agent. It's the comparison class difference that we should focus on here, though.

Matsui (to appear) builds on the comparison class distinction, and Schäfer (2005) pursues an analytical course that is similar in important respects. Discussion of comparison class sensitivity in this connection can also be found in Rawlins (2004/2008). For Matsui, the starting point is the striking observation that in Japanese, the particle *mo*—which famously has a dizzying array of semantically interesting uses, including expressing universal quantification—can be suffixed to a manner adverb to create a subject-oriented one:

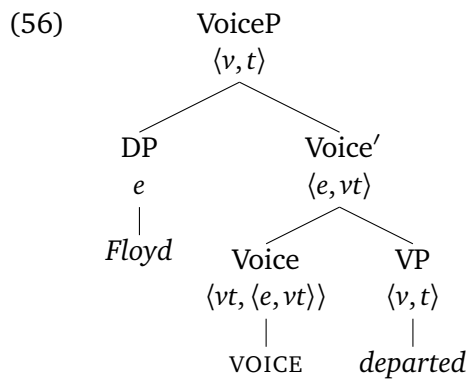
- (54) a. John-wa orokani odotta.
 John-TOP stupidly danced.
 'John danced stupidly.' (manner reading only)
 b. John-wa orokani-mo odotta.
 John-TOP stupidly danced.
 'Stupidly, John danced.' (subject-oriented reading only)

This effect persists irrespective of syntactic position. In (55), the adverb is fronted, and again, the presence or absence of *-mo* unambiguously determines the available reading:

- (55) a. Orokani John-wa odotta.
 stupidly John-TOP danced.
 ‘John danced stupidly.’ (manner reading only)
- b. Orokani-mo John-wa odotta.
 stupidly John-TOP danced.
 ‘Stupidly, John danced.’ (subject-oriented reading only)

This helps resolve an issue that, from the perspective of English alone, was unclear: should there be a lexical ambiguity between manner and subject-oriented adverbs, or should both have a single denotation whose interpretation is determined by the adverb’s position? The Japanese facts would seem to argue for a lexical distinction. But more than that: they suggest that—at least in Japanese—the manner form should be basic, and that the subject-oriented form should be derived from it.

To combine this insight with Ernst’s, she relies on an independently-motivated way of introducing the subject: namely, via a Kratzerian Voice head (Kratzer 1996; see previous section). A version of such a structure is in (56):¹²



The voice head simply introduces an agent in the Neo-Davidsonian style:

- (57) a. $\llbracket \text{VOICE} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda x \lambda e . P(e) \wedge \mathbf{agent}(e) = x$
 b. $\llbracket \text{VOICE} \rrbracket (\llbracket \text{departed} \rrbracket)(\llbracket \text{Floyd} \rrbracket)$
 $= \lambda e . \mathbf{departed}(e) \wedge \mathbf{agent}(e) = \mathbf{Floyd}$

The denotation of pure-manner *orokani* ‘stupidly’ is designed to combine with the VP, below Voice, and to be sensitive to a comparison class. The actual implementation is based on a degree-based semantics for adjectives (see

¹²Kratzer actually uses a special rule, Event Identification, rather than function application to combine the subject and VP.

chapter ??). All that's crucial here is the comparison class, so I will simply write **stupid**(e)(C) to mean e counts as stupid with respect to the comparison class C , which for convenience we can think of as a property of events (that all and only members of the comparison class have):

$$(58) \quad \llbracket \text{orokani} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda e . P(e) \wedge \mathbf{stupid}(e)(P)$$

This could adjoin directly to VP, yielding an interpretation as in (59) (I'll use English words in place of other Japanese ones):

$$(59) \quad \begin{aligned} \text{a. } \llbracket \text{orokani departed} \rrbracket &= \llbracket \text{orokani} \rrbracket (\llbracket \text{departed} \rrbracket) \\ &= \lambda e . \mathbf{departed}(e) \wedge \mathbf{stupid}(e)(\mathbf{departed}) \\ \text{b. } \llbracket \text{Floyd VOICE orokani departed} \rrbracket & \\ &= \llbracket \text{VOICE} \rrbracket (\llbracket \text{orokani departed} \rrbracket)(\llbracket \text{Floyd} \rrbracket) \\ &= \lambda e . \mathbf{departed}(e) \wedge \mathbf{stupid}(e)(\mathbf{departed}) \wedge \\ &\hspace{15em} \mathbf{agent}(e) = \mathbf{Floyd} \end{aligned}$$

Thus 'Floyd stupidly departed' is a property of events of Floyd departing that are stupid compared to departing events generally.

The subject-oriented version should, of course, occur higher. For our purposes, we can assume it's one node up, at Voice', and that it has the semantics in (60):

$$(60) \quad \llbracket \text{orokani-mo} \rrbracket = \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . R(e)(x) \wedge \mathbf{stupid}(e)(\lambda e' . R(e')(x))$$

This is very similar to its plain manner counterpart, except that it has access to the subject and it uses a comparison class sensitive to the subject. Things are clearer after the computation:

$$(61) \quad \begin{aligned} \text{a. } \llbracket \text{VOICE departed} \rrbracket &= \llbracket \text{VOICE} \rrbracket (\llbracket \text{departed} \rrbracket) \\ &= \lambda x \lambda e . \mathbf{departed}(e) \wedge \mathbf{agent}(e) = x' \\ \text{b. } \llbracket \text{Floyd orokani-mo VOICE departed} \rrbracket & \\ &= \llbracket \text{orokani-mo} \rrbracket (\llbracket \text{VOICE departed} \rrbracket)(\llbracket \text{Floyd} \rrbracket) \\ &= \lambda e . \llbracket \text{VOICE departed} \rrbracket (e)(\mathbf{Floyd}) \wedge \\ &\hspace{10em} \mathbf{stupid}(e)(\lambda e' . \llbracket \text{VOICE departed} \rrbracket (e')(\mathbf{Floyd})) \\ &= \lambda e . \mathbf{departed}(e) \wedge \mathbf{agent}(e) = \mathbf{Floyd} \wedge \\ &\hspace{10em} \mathbf{stupid}(e)(\lambda e' . \mathbf{departed}(e') \wedge \mathbf{agent}(e') = \mathbf{Floyd}) \end{aligned}$$

The result is a property of events of Floyd departing that are stupid compared to (other) events of Floyd departing. So the difference between the two readings is that the manner reading compares against other departures ('stupid as far as departures go'), whereas the subject-oriented reading compares

against other departures the subject could have performed ('stupid as far as ways Floyd could have departed'). This isn't precisely Ernst's initial characterization of the difference in terms of comparison classes, but it's certainly similar.

This account also makes possible providing a denotation for the morpheme that turns manner adverbs into subject-oriented ones:

$$(62) \quad \llbracket mo \rrbracket = \lambda f_{\langle vt, vt \rangle} \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . f(\lambda e' . R(e')(x))(e)$$

The computation that leads to the subject-oriented reading is somewhat formally gruesome, so it's in a note.¹³ The larger point, though, is the evidence for a lexical distinction between subject-oriented and manner, and an analysis of the difference driven by the intuition that comparison classes are crucial.

Schäfer (2005) approached a slightly different challenge in this domain with an analysis that has a similar structure, with a twist. He was interested in explaining enigmatic sentences like (63):

- (63) a. John painstakingly wrote illegibly. (Parsons 1990)
 b. Hans skillfully answered the questions stupidly. (Frey 2003)

Focusing on (63b), the odd effect is that *skillfully* and *stupidly*, normally at odds with each other, are perfectly compatible when one has a subject-oriented reading. The solution, Schäfer suggests, lies not in comparison classes but in something similar: an implicit argument position of *skillful(ly)* that indicates what one is skillful with respect to: surgery, arson, poker, etc (see chapter ??, especially section ??). For the adjective, it's actually possible to spell out both this argument and the comparison-class argument with *at* (or *as*) and *for*, respectively:

- (64) Floyd is skillful at surgery for a 90-year-old arthritic.

¹³Here is the gruesome computation:

$$\begin{aligned} (i) \quad & \llbracket mo \rrbracket (\llbracket orokani \rrbracket) \\ &= \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . \llbracket orokani \rrbracket (\lambda e' . R(e')(x))(e) \\ &= \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . \left[\begin{array}{l} \lambda P_{\langle vt, t \rangle} \lambda e'' . \\ P(e'') \wedge \\ \mathbf{stupid}(e'')(P) \end{array} \right] (\lambda e' . R(e')(x))(e) \\ &= \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . \left[\begin{array}{l} \lambda e'' . \\ [\lambda e' . R(e')(x)](e'') \wedge \\ \mathbf{stupid}(e'')(\lambda e' . R(e')(x)) \end{array} \right] (e) \\ &= \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . \left[\begin{array}{l} \lambda e'' . \\ R(e'')(x) \wedge \\ \mathbf{stupid}(e'')(\lambda e' . R(e')(x)) \end{array} \right] (e) \\ &= \lambda R_{\langle e, vt \rangle} \lambda x \lambda e . R(e)(x) \wedge \mathbf{stupid}(e)(\lambda e' . R(e')(x)) \end{aligned}$$

We can construe the *at*-PP argument as expressing a property of events—to be skillful at surgery, for example, one is skillful with respect to surgery events. Thus a simple sentence with *skillfully* might be interpreted as in (65):

- (65) a. Hans skillfully answered the questions.
 b. $\exists e \left[\begin{array}{l} \text{skillful}(\text{answer}(\text{the-questions}))(e) \wedge \\ \text{answer}(\text{the-questions})(e) \wedge \\ \text{agent}(e) = \text{Hans} \end{array} \right]$

To skillfully answer the questions, then, is to be the agent of a question-answering event performed in a way that's skillful at question-answering. So (64b) might be rendered as in (66):

- (66) a. Hans skillfully answered the questions stupidly.
 b. $\exists e \left[\begin{array}{l} \text{skillful} \left(\lambda e' . \text{answer}(\text{the-questions})(e') \wedge \right. \\ \left. \text{stupid}(e') \right) (e) \wedge \\ \text{answer}(\text{the-questions})(e) \wedge \\ \text{agent}(e) = \text{Hans} \wedge \text{stupid}(e) \end{array} \right]$

Hans is now the agent of a stupid question-answering event, but that event was performed in a way that's skillful at answering questions stupidly.

The importance of this result is not just in the analysis of subject-orientation, but also in the approach it provides to reconciling the the fact that intersective modifiers don't scope with respect to each other with the deeply felt intuition many have that, well, somehow they do. One option is of course to just implement *skillfully* as a predicate modifier. That would be perfectly respectable, and might resolve any tension directly. But one might imagine that the implicit argument is provided in another way, perhaps as a contextual default, one more similar to how *skillful surgeon* behaves, or perhaps—to take a more straightforward comparison-class case—*expensive BMW* (Kennedy 2007). In subsequent work (Schäfer 2008), Schäfer rejected his previous strategy. But these ideas more broadly, including implicit arguments in the analysis of adverbs and their relation in this respect to their adjectival counterparts, bear further investigation.

4.4 The bottom-up analytical strategy

There is a common methodological strategy behind all the analyses we've encountered so far: they all begin with an attempt at a general theory of subject-oriented and manner readings. There is an alternative analytical impulse worth highlighting. Rather than beginning top-down with an attempt at identifying a range of properties that extend across many adverbs, one

might begin bottom-up with a fine-grained investigation of a few carefully selected ones.

For adverbs in particular, there might be something to recommend the bottom-up strategy. To simply say that a manner adverb is a predicate of events is insightful, but ultimately doesn't delve much deeper into the lexical semantics of the adverb than saying of an adjective that it is a property of individuals. There's much more that should be said about adjectives—and about how they vary and the subclasses they fall into—and we have no reason to think adverbs are any different. Indeed, if they do vary in ways we haven't detected, we may miss important generalizations. Before attempting generalizations about fruit, it may be wise to ensure you can distinguish apples from oranges.

An especially clear example of this research strategy is [Rawlins \(2004/2008\)](#), who begins with a single adverb: *illegally*. It has three uses. The first two can be noncommittally described as 'low' and 'high' (because prematurely assigning adverbs to classes is one of dangers a bottom-up approach may help avoid), and the third is an adjective-modifying use:

- (67) a. *low*: White moved illegally.
 b. *high*: Illegally, White moved.
 c. *adjectival*: an illegally uninsured business

For (67a) and (67b), we should picture a chess game. One might say (67a) to describe violating rules about where a piece can move, and (67b) to describe moving when it's the other player's turn.

Because *illegally* is a deontic modal—it's about what is and isn't permitted—it's tractable with tools that have proven themselves in the analysis of other modals. The question then becomes how those tools need to be adapted to account for the different uses. We'll focus on the non-adjectival ones. The denotation of the high use is something like (68a) (where $\mathbf{permitted}_w$ is the set of worlds compatible with what is permitted in w), which leads to the sentence denotation in (68b):

- (68) a. $\llbracket \textit{illegally}_{\text{HIGH}} \rrbracket = \lambda p_{\langle s,t \rangle} \lambda w . p(w) \wedge \neg \exists w' \in \mathbf{permitted}_w [p(w')]$
 b. $\llbracket \textit{Illegally}_{\text{HIGH}} \text{ VOICE } \textit{White moved} \rrbracket$
 $= \lambda w . \exists e [\mathbf{move}_w(e) \wedge \mathbf{agent}_w(e) = \mathbf{White}] \wedge$
 $\neg \exists w' \in \mathbf{permitted}_w \left[\exists e' \left[\mathbf{move}_{w'}(e') \wedge \mathbf{agent}_{w'}(e') = \mathbf{White} \right] \right]$

I've omitted explicit reference to a Kratzerian conversational background ([Kratzer 1981, 1991](#)), which is actually quite important but won't figure in the brief discussion here. This also assumes a Kratzerian Voice head and that the event variable is existentially closed somewhere above it. This results

in (68b), which is true iff there was a moving by White, and there is no permitted world in which there is a moving by White. The denotation of the lower use varies mainly in its type, as in (69a), but something interesting happens when it attaches below the Voice head (and therefore below the point where existential closure occurs), as in (69b):

- (69) a. $\llbracket \textit{illegally}_{\text{LOW}} \rrbracket$
 $= \lambda P_{\langle v, st \rangle} \lambda e \lambda w . P(e)(w) \wedge \neg \exists w' \in \mathbf{permitted}_w [P(e)(w')]$
- b. $\llbracket \textit{White VOICE [moved illegally}_{\text{LOW}}] \rrbracket$
 $= \lambda w . \exists e \left[\begin{array}{l} \mathbf{move}_w(e) \wedge \mathbf{agent}_w(e) = \mathbf{White} \wedge \\ \neg \exists w' \in \mathbf{permitted}_w [\mathbf{move}_{w'}(e)] \end{array} \right]$

So (69b) is true iff there was a moving by White and there is no permitted world with such a moving. This seems to accord with the facts. Rawlins then considers ways of unifying the denotations of *illegally* and deriving the difference purely in terms of the adverb's position. One aspect of the difference between these two readings, though, should seem familiar. As in Matsui (to appear), a major part of the difference between them arises from whether the agent is present or absent in a crucial part of the denotation.

This provides an elegant theory of a high-low contrast for a single case, but one might think it wouldn't readily generalize because adverbs are only occasionally modal. But, as Rawlins points out, that's not actually so clear. Many adverbs that manifest low-high contrasts might be viewed as quantifying over worlds (or situations). *Rudely*, for example, makes reference to laws of courtesy. *Tactfully* is similar. Many others—he mentions *cleverly*, *stupidly*, *wisely*, *foolishly*, *graciously*—may be construed as varying worlds quantified over as well, all differing in subtle ways in how those worlds are determined in view of the conversational background. (Anand & Brasaveanu 2010 take some further steps in this general direction.) So, by carefully examining a single case in detail and generalizing outward, one might discover empirical parallels and analytical possibilities that wouldn't be apparent by considering the whole paradigm at once.

4.5 Topic-orientation

Analyses of subject-orientation generally agree on at least one thing: it involves something like a subject. In some cases, it is more about thematic roles than subjects as such, but the overall characterization of the facts is not generally in dispute.

Potts (2003) makes a radical departure from this consensus. He argues that subject-orientation is not about the subject at all, or even about the

agent, but rather about the DISCOURSE TOPIC. Topichood is a slightly elusive notion and comes in several flavors (Büring 1999), but it means something close to what it sounds like it means, at least in the flavor Potts intends.¹⁴ The idea that topics are relevant comes from Stump (1985)'s analysis of ABSOLUTE CONSTRUCTIONS like those in (70) (see also Portner 1992):

- (70) a. After more than a month in jail, my mother posted bond, bless her soul.
b. Signed by Columbia Records in 1999, his first album was never released.

In none of these cases is the underlined absolute construction oriented toward the subject. Indeed, in all of them, that would be pragmatically bizarre.¹⁵

Potts suggests that subject-oriented adverbs are simply special cases of this phenomenon. He offers these naturally-occurring examples of adverbs that seem to be oriented to a non-subject topic:

- (71) a. Physically, the keyboard is smaller than I expected, and extremely well built—there's no creaking or flexing. The keys look as if they will last well—including their paint. Thoughtfully, there is a clip-on cover for the connector while not in use.
b. The music, while well constructed, is rather annoying after a while, with a lack of any instantly recognizable tunes apparent. But, thoughtfully, there is an option to turn the sound off at any time during the game, so the rather twee sound effects and jauntily repetitive soundtrack won't annoy the parents
c. What is the function of the marking in the highest clause? Tentatively, it signals the left edge of a nominalized relative clause-type syntactic constituent.

Unlike for (70), there is some question about whether (71a) and (71b) are actually well-formed,¹⁶ but for the sake of argument let's accept them at face value. It's also not obvious that these are really subject-oriented adverbs.

¹⁴The term 'discourse topic' stands in only an indirect relation to sentence topics of the sort found in languages with overt topic-marking, such as Japanese.

¹⁵There is a prescriptive injunction to avoid structures such as these, in which the modifier isn't oriented toward subject (this is what leads to the morbid dread of 'dangling participles').

¹⁶They have an acceptable-ungrammaticality or grammatical-illusion quality: one parses them smoothly, but with the sensation that the parser might have smoothed over a grammatical rough spot (as it does in e.g., *?More people have been to Russia than I have*, which seems well-formed until one reflects on its meaning; Phillips et al. 2011). I wonder whether their authors would reject these sentences if presented with them. One can't, I suppose, be sure one

Certainly, one might suspect (71c) of being a speech-act adverb because it can be replaced with *speaking tentatively* (see section 5.1). *Thoughtfully* might be an evaluative adverb (see section 5.2).¹⁷ But let's set that aside as well, because the hypothesis these might seem to support is interesting—and if it's true, people have spent almost four decades barking up the wrong tree.

One way of introducing a topic in English is with a phrase such as *as for X* or *speaking of X*, so these may provide a way of testing the claim (if we grant that these involve the relevant notion of topichood):

(72) $\left\{ \begin{array}{l} \text{As for Clyde,} \\ \text{Speaking of Clyde,} \end{array} \right\}$ Floyd $\left\{ \begin{array}{l} \text{cleverly} \\ \text{stupidly} \\ \text{eagerly} \end{array} \right\}$ built a robot monkey with him.

Even though Clyde is clearly the topic, this doesn't allow construals on which it isn't Floyd that is clever or stupid or eager. The situation is even clearer in (73):

(73) $\# \left\{ \begin{array}{l} \text{As for Clyde,} \\ \text{Speaking of Clyde,} \end{array} \right\}$ there was $\left\{ \begin{array}{l} \text{cleverly} \\ \text{stupidly} \\ \text{eagerly} \end{array} \right\}$ a robot monkey built with him.

This sentence is trying really hard to let Clyde be the target of orientation. Floyd has been eliminated entirely, so that the sentence involves no conceivable alternative. And yet the result is flagrant ill-formedness. The judgments remain consistent with various other ways of establishing Clyde as a topic, such as *Who did Clyde build a robot monkey with?* Topichood is a complex and slippery notion, and the term is not always used consistently, so it might be that to defend this theory, we need to pick just the right definition. That would still leave behind the difficult task of finding an alternative explanation of the Thomason & Stalnaker (1973) subject-object opacity asymmetry (section 3.2).¹⁸

hasn't just unconsciously internalized the prescriptive injunction, but if so, that shouldn't be disregarded—if it's internalized, it's part of the language, no matter how unsavory its source.

¹⁷This would make it like the evaluative adverbs *fortunately* and *amazingly* in having paraphrases with the corresponding adjective predicated of a proposition: *It's thoughtful(/fortunate/amazing) that there is an option to turn the sound off*. If these examples are actually grammatical for their speakers, they might have simply generalized *thoughtfully* to an evaluative adverb use.

¹⁸At least some of the opacity facts for at least some adverbs may actually be due to independent contextual factors (Geuder 2000). If so, that might be a good analytical path to take in a topic-based approach.

All of this is an argument against an exclusively topic-based theory. What it is not is an argument against the broader idea that there might be a connection between orientation in adverbs and in absolute constructions. That's a good topic for further inquiry. More generally, even if subject-orientation and topic-orientation are distinct phenomena in English, their similarity presents the tantalizing possibility that in some other language, they might not be—or that there might simply be a different division of labor between them. There may also be discoveries yet to be made about how adverb(ial) interpretation overall is sensitive to discourse structure.

4.6 *Is there such a thing as a manner?*

The notion of manner has an odd ghostly status in all this, and indeed in most discussions of manner adverbials. When we talk about predicate modifiers, we obviously assume that there are predicates in the model. Likewise for propositional attitude verbs and propositions. Less obviously, when we talk of temporal or locative adverbials, we have in the back of our minds the idea that the model contains times and locations. One could go on in this vein. Yet for all our talk of manner adverbials, we don't normally have in mind a model that includes objects in it called 'manners'. Why not?

One answer is that we don't seem to need to. It's possible to arrive at a perfectly respectable theory of what manner adverbs mean without appeal to the notion of 'manners'. Another answer is that there's something dangerously ontologically precarious about it. One probably shouldn't rush headlong into adding novel abstract objects into the model. But of course, all these things can be said about events (and situations and possible worlds). Whatever metaphysical qualms or methodological reservations one might entertain, the linguist's primary responsibility is to follow the linguistic evidence. So the question we should really ask is this: if adding manners to the model isn't necessary for an account of manner modification, are there other reasons to do so?

There may be. For one thing, there are expressions like *the way he did it*, which would seem to refer to manners. Manners can also be questioned with *how* (*how did he do it?*). Indeed, in providing a semantics for questions, [Gutiérrez-Rexach \(1997\)](#) adopts an ontology with manners in it. [Landman & Morzycki \(2003\)](#) and [Anderson & Morzycki \(2012\)](#) provide further evidence from a systematic connection across several languages among manners, degrees, and kinds. In German, for example, a single word, *so*, is used as a kind anaphor with nouns, as a degree anaphor with adjectives, and as a manner anaphor with verbs:

- (74) a. *kind*: so einen Hund
 such a dog
 ‘a dog of the same kind’
- b. *degree*: Ich bin so groß
 I am such tall
 ‘I am this tall.’
- c. *manner*: so getanzt
 such danced
 ‘danced like that’

All of these have the same *wh*-word counterpart, *wie*. Precisely the same pattern is found in Polish. Even in English, there are traces of these parallels. *As* has exactly the same range of uses:

- (75) a. *kind*: such a dog as this
 b. *degree*: Clyde is as tall as Floyd.
 c. *manner*: Clyde behaved as I did.

The connection between (75b) and (75c) in particular is extremely common across languages (Haspelmath & Buchholz 1998). Rett (2011) provides an analysis of this connection that relies on the assumption that just as degrees are objects in the model, so too are manners. For similar reasons, the overall paradigm also supports this conclusion. If kinds, degrees, and manners are treated in systematically parallel ways in constructions across many languages, and if kinds and degrees are in the model, it would be odd indeed if manners weren’t.

None of this implies that manners must be atomic types. It might be possible to build them out of something else. (That’s exactly what Landman & Morzycki 2003 and Anderson & Morzycki 2012 do.) But it certainly points to recognizing ‘manner’ as something more than a descriptive convenience.

Before we leave the topic of manner modification in general, a few suggestions for further exploration in this area: for more on whether manners are objects in the model, see Maienborn & Schäfer (2011) and references there; for discussion of manner in connection with stative predicates, see Katz (2008); for more on the effect of syntactic position, see Shaer (2000, 2003), Ernst (2004), Morzycki (2004b, 2005) and Wyner (2008); for cases where subject-oriented readings are conspicuous by their absence, see Schäfer (2002).

5 Speaker-oriented adverbials

5.1 *Speech act adverbials*

In many respects, it's possible to analyze language without taking into consideration that it's actually used by humans. This is one of the central principles and surprising discoveries of generative grammar. There are, however, certain phenomena that go out of their way to preclude this possibility. Surely SPEECH-ACT ADVERBIALS such as *frankly*, *confidentially*, and *seriously* merit a spot near the top of that list. There is no getting around the fact that they seem to be characterizing the speaking event itself. They are also known as PRAGMATIC, DISCOURSE-ORIENTED, or UTTERANCE-MODIFYING adverbials.

To the semanticist, this isn't terribly alarming. The semantics deals in questions of discourse context routinely, and dynamic semantics (Stalnaker 1979, Kamp 1981, Heim 1982, Groenendijk & Stokhof 1991) is founded on the idea that meaning is about turning one discourse state into another via speech acts. Yet there's something to be said for setting one's open-mindedness aside and allowing oneself to be momentarily scandalized by it. This is partly an exercise in historical imagination. The analysis of this class of adverbs played an important role in the vicious infighting of the early years of generative syntax (see Newmeyer 1980; or, for a history intended for a general readership, Harris 1993). At issue was whether the deep structure of a sentence could, if only it could be pushed back deep enough by undoing enough syntactic operations, turn out to be its semantic representation too. The school of thought that held that it could was called Generative Semantics.

Speech-act adverbs were important in this debate because they seemed to reveal that the syntactic structure of a sentence directly reflects information about the speech act performed in saying it. This may support an especially expansive view of what how much semantic information can be encoded in a syntactic representation. The key fact is that speech act adverbs support paraphrases involving manner modification of a verb of speaking:¹⁹

- (76) a. $\left. \begin{array}{l} \text{Frankly,} \\ \text{Confidentially,} \\ \text{Seriously,} \end{array} \right\}$ you really shouldn't talk to Floyd.
- b. I hereby say to you $\left. \begin{array}{l} \text{frankly} \\ \text{confidentially} \\ \text{seriously} \end{array} \right\}$ that you really shouldn't talk to Floyd.

¹⁹Not all manner modifiers of verbs of speaking have speech act adverb counterparts, however. *Hesitantly*, *eagerly*, and *insincerely*, for example, all lack speech act uses.

A more natural paraphrase would be of the form ‘frankly speaking’ (Bellert 1977). Either way, the correspondence might suggest that all sentences involve an underlying verb of speaking that expresses their illocutionary force (saying, asking, ordering, etc.), which seemed strong evidence in favor of the Generative Semantics position. This sense of getting a glimpse into the structure of speech acts is also part of what makes these adverbs especially interesting.

The view that there is an underlying speech-act verb in all sentences is called the PERFORMATIVE HYPOTHESIS (Ross 1970, Lakoff 1972, Sadock 1974), because it renders every utterance a PERFORMATIVE one (Austin 1961)—that is, one that accomplishes something by the very act of its being said. Here are some other examples:

- (77) a. I (hereby) christen this ship The Robot Monkey.
 b. I (hereby) declare you legally divorced.
 c. I (hereby) claim this island for Spain.

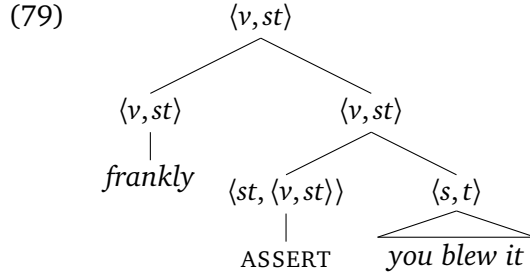
From our contemporary perspective, we may have more tools to address the problem, but the facts remain and similar issues arise.

The natural modern rendering of the idea would be to make use of an assertion operator (Ginzburg & Sag 2001, Krifka 2001, Hacquard 2007, Cohen & Krifka 2011). I’ll provide rough a sketch of how this might work, which won’t be too different from the original proposal and therefore inherits some of its shortcomings (see Boër & Lycan 1980 and Levinson 1983).

Perhaps the most elegant option would be to use the same denotation for speech-act adverbs as for manner adverbs: a property of events. If these adverbs are to combine with an assertion operator, the node above it must also denote a property of events. This suggests that the assertion operator should apply to a proposition to be asserted, and return a property of an event of having asserted it:

$$(78) \quad \llbracket \text{ASSERT} \rrbracket = \lambda p_{\langle s,t \rangle} \lambda e \lambda w . \text{assert}(p)(e)$$

There’s a slight twist here: ASSERT collects up a world argument, but doesn’t actually use it. There’s no need to use it because ASSERT is always interpreted with respect to the actual world. The argument needs to be there only to ensure that it yields the right type to combine with *frankly*. With that in place, it can combine intersectively with a manner adverb (via an intensional variant of a rule of intersective interpretation):



- (80)
- $\llbracket \textit{frankly} \rrbracket = \lambda e \lambda w . \mathbf{frank}_w(e)$
 - $\llbracket \textit{you blew it} \rrbracket = \lambda w . \exists e [\mathbf{blow-it}_w(\mathbf{you})(e)]$
 - $\llbracket \textit{ASSERT} \rrbracket (\llbracket \textit{you blew it} \rrbracket)$
 $= \lambda e' \lambda w' . \mathbf{assert}(\lambda w . \exists e [\mathbf{blow-it}_w(\mathbf{you})(e)])(e')$
 - $\llbracket \textit{Frankly, ASSERT you blew it} \rrbracket$
 $= \lambda e' \lambda w' . \llbracket \textit{frankly} \rrbracket (e')(w') \wedge$
 $\llbracket \textit{ASSERT you blew it} \rrbracket (e')(w')$
 $= \lambda e' \lambda w' . \mathbf{frank}_{w'}(e') \wedge$
 $\mathbf{assert}(\lambda w . \exists e [\mathbf{blow-it}_w(\mathbf{you})(e)])(e')$

This asks for an event and a world, and is true if the event was a frank one, and it was an event of asserting the proposition that you blew it. For this to function in discourse, a principle like (81) needs to be adopted:

- (81) If a linguistic expression of type $\langle v, st \rangle$ is uttered unembedded, interpret it with respect the utterance event and the actual world.

This means that (80) will be judged true iff the utterance event is a frank one in the actual world, and if it's an event of asserting that you blew it.

This suffers from a classic problem with the Performative Hypothesis: this would always come out true by the very act of it being uttered so long as the utterance is, in fact, frank. This could be corrected by simply adding a conjunct predicating the asserted content of the evaluation world:

- (82)
- $\llbracket \textit{ASSERT} \rrbracket = \lambda p_{\langle s, t \rangle} \lambda e \lambda w . \mathbf{assert}(p)(e) \wedge p(w)$
 - $\llbracket \textit{Frankly, ASSERT you blew it} \rrbracket$
 $= \lambda e' \lambda w' . \llbracket \textit{frankly} \rrbracket (e')(w') \wedge$
 $\llbracket \textit{ASSERT you blew it} \rrbracket (e')(w')$
 $= \lambda e' \lambda w' . \mathbf{frank}_{w'}(e') \wedge$
 $\mathbf{assert}(\lambda w . \exists e [\mathbf{blow-it}_w(\mathbf{you})(e)])(e') \wedge$
 $\exists e [\mathbf{blow-it}_{w'}(\mathbf{you})(e)]$

Now, in addition to the previous requirements, the sentence will be judged

true only if you did, in fact, blow it. There's another problem here, though, which this doesn't address. It's not clear that we would actually judge this sentence merely false if we found its utterance something other than frank. To express disagreement with this sentence, one couldn't felicitously say 'No, that's not true. I blew it, but you weren't being frank.' We'll have to set this problem aside here. One natural approach to it, though, would involve treating the contribution of *frankly* as a distinct kind of meaning: a conventional implicature (Potts 2003; more on this in the following section).

To improve on this rough sketch, one could introduce a more sophisticated ontology. Krifka (2001), for example, introduces speech acts into the model. His assertion operator applies to propositions and yields speech acts. This makes it possible to state rules of how discourse should be structured, but it would not allow speech-act adverbs to be interpreted intersectively because the node above the speech-act operator doesn't denote a property. There may be a way to bring the ideas a bit closer together, though. One might modify Krifka's proposal by treating speech acts as a sort of event, so that the domain of speech acts is a proper subset of the domain of events. This would mean the assertion operator could be as it is above, but Krifka's rules governing how discourse is structured would have to change in a single consistent way. The change wouldn't need to be profound. It might suffice to stipulate that when a property of events is uttered unembedded, a contextually-restricted definite description operator is added that maps it to the unique speech act that satisfies the description and is currently being performed.

Potts (2003) proposes an articulated and formally explicit semantics for speech-act adverbs. His analysis also involves enriching the model, in his case with utterances themselves.²⁰ This makes it possible to place speech-act adverbials on a separate dimension of meaning from ordinary content. They wind up modifying instead the relation that holds between a speaker and an utterance. This helps capture the sense that speech acts and ordinary semantic content live in different tiers of the semantics. What it doesn't do in his formulation is provide an interpretation for speech-act adverbs that is intersective, or indeed one on which their meaning is identical to their manner counterparts. So there is a trade-off here: one theoretical desideratum for another.

Potts also provides an account of how speech act adverbs behave in questions:

- (83) a. Honestly, are you drunk?
b. Confidentially, which student do you find the most irritating?

²⁰This isn't quite true. In Potts (2003), these objects appear to be sentences more than utterances: they have a syntax and a semantics, but no phonology. Utterances in a stricter sense are introduced in Potts (2007).

In these cases, the adverb seems to be directed at the addressee rather than the speaker. It's not the asking in (83a) that's honest—it's the desired answer. Potts encodes this by treating all speech-act modifiers as systematically ambiguous between related homophonous question- and declarative-modifying meanings.

One important property of speech act adverbials that this theory, like an assertion-operator theory, captures is their resistance to embedding:

- (84) a. ??Clyde suspects that seriously, you blew it.
 b. ??Great wondered whether, confidentially, you blew it.
 c. ??Floyd doubts that frankly, you blew it.

To varying extents, these can be interpreted as though the adverb were parenthetical and interpreted as though it were high (although there is another problem with (84c), as we'll see in section 5.4). It is of course also possible to embed these adverbs on the manner reading.

Given how neat the puzzle is, and how old, it's a bit surprising that all this hasn't been further explored from a formal-semantic perspective. The ingredients for a more satisfactory account may be floating about. At the moment, they await someone to assemble them in a satisfying and enlightening way.

5.2 Evaluative adverbs

Another class of speaker-oriented adverbs express the speaker's evaluation of the proposition expressed by the modified sentence:

- (85) $\left\{ \begin{array}{l} \text{Remarkably,} \\ \text{Fortunately,} \\ \text{Oddly,} \end{array} \right\}$ Floyd can recite the *Iliad* in Basque.

These are EVALUATIVE ADVERBS. They differ fundamentally from speech-act adverbs in that they don't seem to be analogous to manner adverbs. Normally, they support paraphrases in which their adjective counterpart is predicated of a proposition:

- (86) It is $\left\{ \begin{array}{l} \text{remarkable} \\ \text{fortunate} \\ \text{odd} \end{array} \right\}$ that Floyd can recite the *Iliad* in Basque.

These adverbs are impossible before questions (Bonami et al. 2004, Bonami & Godard 2007):

(87) *Fortunately, who rescued you?

In English, they don't easily occur inside questions either, or in the antecedents of conditionals (Ernst 2009):

- (88) a. ??Who fortunately rescued you?
b. ?If, remarkably, Floyd can recite all of the *Iliad*, he probably can't do it in Basque.
c. ??If, unfortunately, Floyd went to Flint, he no doubt regretted it.

Bonami & Godard (2007) report that in French, these are both well-formed, but the adverb is interpreted independently of its immediate surroundings:

- (89) a. Si Paul va, malheureusement, voir Marie, elle sera
if Paul goes unfortunately to-see Marie she will-be
furieuse.
furious
'If, unfortunately, Paul goes and sees Marie, she will be furious.'
not: 'If it is unfortunate that Paul met Marie, she will be furious.'
b. Qui Marie a-t-elle malheureusement invitée?
who Marie has-she unfortunately invited
asks: 'Who did Mary invite?'
commits speaker to: 'Whoever Marie invited, it's unfortunate that she did.'

In (89a), the meaning of the adverb doesn't contribute to the semantics antecedent, and in (89) it doesn't form part of the question.

Along with Potts (2003), they argue that this demonstrates that these expressions should be interpreted on a separate semantic dimension distinct from ordinary truth-conditional content. They articulate this claim in the spirit of Potts' theory of CONVENTIONAL IMPLICATURES (see also section ??). These are elements of meaning that Grice (1975) first recognized, but didn't characterize in a way that made them linguistically useful. Potts changed that. In part, the important insight is that conventional implicatures aren't at all like conversational implicatures. Conversational implicatures arise pragmatically as interlocutors work out each other's communicative intentions, and they can be denied without contradiction. Conventional implicatures have neither of these properties, and one makes more progress by focusing on the differences between the two than on their similarities. The 'conventional' thing about conventional implicatures is that they are part of the

conventionalized—that is, lexical—semantics of particular morphemes.²¹ What makes them different from ordinary meaning is that they don't contribute directly to the at-issue truth-conditional meaning of a sentence, they resist semantic embedding, and they tend to involve the perspective of the speaker in some way (the latter two claims may need significant qualification; Amaral et al. 2007, Schlenker 2007, Harris & Potts 2009). Potts analyzes nominal appositives, such as *a cyclist* in (90), in this way:

- (90) a. Lance, a cyclist, wound up disappointing everyone.
 b. It's not true that Lance, a cyclist, wound up disappointing everyone.

The resistance to embedding is reflected in (90b), which denies that Lance wound up disappointing everyone, but not that he was a cyclist.

Potts builds conventional implicatures into the semantics by compartmentalizing them. As the semantics gets built up compositionally, conventionally-implicated content is set aside in a kind of holding area—a different 'dimension' of meaning—in which it is no longer accessible to elements higher in the tree. Formally, this is implemented by distinguishing expressions that contribute conventional implicatures by assigning them a distinct type. This type triggers the compartmentalization. The type of $\llbracket \textit{unfortunately} \rrbracket$, for example, would be type $\langle st, t^c \rangle$, where t^c is the conventional-implicature analogue of the ordinary truth value type t . The denotation, then, might be as in (91) (the type must be indicated explicitly because it isn't recoverable from the lambda expression alone):

$$(91) \quad \llbracket \textit{unfortunately} \rrbracket = \lambda p_{\langle s, t \rangle} . \textit{unfortunate}(p) \quad \text{type: } \langle st, t^c \rangle$$

This applies to an ordinary proposition, and places in the conventional-implicature dimension the information that it is unfortunate.

Interestingly, many adverbs of this class have counterparts that occur as degree modifiers of APs (see section 7) For discussion of the scope and opacity properties of these adverbs, see Bonami & Godard (2008). For discussion of how such adverbs work in German, see Liu (2009).

5.3 Modal adverbs

We've already encountered the MODAL ADVERBS *necessarily* and *possibly* in section 3.1. It's conventional to group them with a number of other modal adverbs with a similar syntactic distribution under the label EPISTEMIC

²¹Sometimes, these morphemes are spelled out by prosody alone, like the COMMA morpheme of Potts (2003) (see section ??), which licenses nominal appositives.

ADVERBS. The term isn't optimal because at least a few of them can get other kinds of readings:

- (92) In view of the regulations, Floyd will $\left\{ \begin{array}{l} \text{obligatorily} \\ \text{necessarily} \\ \text{inevitably} \end{array} \right\}$ be shot.

If *hopefully* and *ideally* are placed in this class, this is even clearer. Other members of the class include *probably*, *certainly*, *definitely*, *surely*, and *clearly*.

The standard analysis of modal adverbs is of course to treat them as, well, modal: as quantifiers over possible worlds. We saw that in action for *necessarily*, and it could be extended to other members of the class. In the lexical semantics of modal auxiliaries, fine-grained variation among modals can be achieved by varying the accessibility relation that determines what worlds the modal quantifies over (Kratzer 1981, 1991). The same tools can be put to work in the analysis of these adverbs (Anand & Brasaveanu 2010). Such an analysis gives rise to some analytical challenges too. Some modal adverbs are gradable (*very probably*, *quite possibly*). Providing an analysis of this that does justice to the fact that they are both gradable and modal is not trivial, and is another aspect of the problem gradable modal adjectives raise (see section ??).

5.4 Polarity

It's a surprising characteristic of speaker-oriented adverbs that they are ill-formed in structures like (93b):

- (93) a. Floyd $\left\{ \begin{array}{l} \text{(un)fortunately} \\ \text{amazingly} \\ \text{probably} \\ \text{certainly} \end{array} \right\}$ hasn't died.
 b. *Floyd hasn't $\left\{ \begin{array}{l} \text{(un)fortunately} \\ \text{amazingly} \\ \text{probably} \\ \text{certainly} \end{array} \right\}$ died.

This reflects that speaker-oriented adverbs can't occur in the scope of negation. Speech-act adverbs aren't included in (93) only because they resist embedding in general. Nilsen (2004, 2003) (building on observations in Bellert 1977) observes that the natural way to make sense of this is to suppose that speaker-oriented adverbs are POSITIVE POLARITY ITEMS—expressions that occur in environments in which negative polarity items (NPIs) like *ever* and *any*

aren't licensed. These observations aren't limited to English. Nilsen (2004) observes similar effects in Norwegian, Dutch, and Greek, Cinque (1999) in Italian, and Ernst (2009) in French and Mandarin.

This is slightly surprising. Non-adverbial paraphrases of (93b) don't have this property:

- (94) It isn't $\left. \begin{array}{l} \text{(un)fortunate} \\ \text{amazing} \\ \text{probable} \\ \text{certain} \end{array} \right\}$ that Floyd has died.

One of the most prominent way of accounting for polarity sensitivity involves ideas that were first articulated in Kadmon & Landman (1993). In a nutshell, NPIs are treated as broadening contextually-supplied restrictions on the domains of quantifiers. In many sentences, this would have the effect of weakening the truth-conditional claim they make—saying that someone in the world wears glasses is weaker than saying that someone in the room does. The other part of the meaning of NPIs, on this view, is that they require that they have a strengthening, not a weakening effect. The only way this can come about is if domain-widening happens in certain environments, and only these license NPIs. Such environments include the scope of negation: saying that no one in the world wears glasses is stronger than saying no one in the room does. This is the framework Nilsen (2004) adopts. He derives the difference between speaker-oriented adverbs and their non-PPI adjectival counterparts by assigning the adverbs subtly different denotations, ones that have a domain-shrinking effect. Ernst (2009) considers some of the same facts, but provides an analysis built around an alternative theory of polarity sensitivity (associated with Giannakidou 1999).

6 Locative adverbials

6.1 *Types and positions of locative adverbials*

Maienborn (2001) provides a helpful typology of locative adverbials. There are, in her system, three, distinguished both by their syntactic position and their interpretation. These positions are especially clear in German, the language she focuses on, but the principles apply more broadly. The first is the easiest case, EXTERNAL MODIFIERS (her examples):

- (95) a. Eva signed the contract in Argentina.
 b. Paul sang the Marseillaise in front of the Capitol.

These can be analyzed in a straightforward Davidsonian style. For (95a), for example, the denotation might be as in (96):

$$(96) \quad \exists e[\mathbf{sign}(\mathbf{the-contract})(\mathbf{Eva})(e) \wedge \mathbf{in}(\mathbf{Argentina})(e)]$$

If one wanted to spell things out a little further, one could add to the model a domain of spatial REGIONS (Link 1998, Bierwisch 1988, 1996, Wunderlich 1991). A rough representation of how this might be used is in (97), where **region** maps individuals or events to the regions they occupy (a spatial trace function in the sense of Link 1998) and \sqsubseteq is the part-of relation for regions:

$$(97) \quad \exists e \left[\begin{array}{l} \mathbf{sign}(\mathbf{the-contract})(\mathbf{Eva})(e) \wedge \\ \mathbf{region}(e) \sqsubseteq \mathbf{region}(\mathbf{Argentina}) \end{array} \right]$$

Thus the signing event occupies a region that is part of the region Argentina occupies. The other classes of locatives are not so neatly handled, however.

The second type is INTERNAL MODIFIERS:

- (98) a. Eva signed the contract on the last page.
 b. Paul sang the Marseillaise on his head.

In (98a), it's not really true that Eva's contract-signing took place on the last page of the contract. Likewise for (98b) and Paul's singing. Both are internal in the sense that they don't provide information about the location of an event as a whole, but rather information about the location of a part of the event or spatial information relevant to the manner in which it was carried out. In English, internal modifiers (naturally enough) occur closer to the verb than external ones.

The third type is one we have already encountered, FRAME-SETTING ADVERBIALS:

- (99) a. In Argentina, Eva still is very popular.
 b. In Bolivia, Britta was blond.

One striking difference between these locative and the others, she notes, is that they're not droppable. One can't conclude from (99a) that Eva is still very popular, or from (99b) that Britta was blond. Maienborn ultimately analyzes these adverbials as topic-like.

6.2 Vector Space Semantics

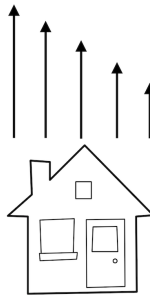
There is an alternative to thinking about locatives simply in terms of regions, and it's especially natural for spatial prepositions. This view, articulated

and refined by Zwarts (1997), Zwarts & Winter (2000) and Winter (2005), involves conceptualizing preposition meaning in terms of VECTORS in a VECTOR SPACE. Vectors are simply directed line segments, a contiguous linear set of points. They are introduced directly into the model.

On this view, a PP such as *above the house* is true of vectors that start at the house and point upward (i.e., that end at some point above it), like those in (101):

$$(100) \quad \llbracket \textit{above the house} \rrbracket \\ = \lambda v . \mathbf{start}(\mathbf{the-house})(v) \wedge \mathbf{upward}(v)$$

(101) ABOVE THE HOUSE



A sentence meaning, then, would be as in (102):

$$(102) \quad \llbracket \textit{The bird is above the house} \rrbracket \\ = \exists v \left[\mathbf{start}(\mathbf{the-house})(v) \wedge \mathbf{upward}(v) \right. \\ \left. \mathbf{end}(\mathbf{the-bird})(v) \right]$$

This requires that there be a vector that starts at the house and ends at the bird. In order to get here compositionally, the property of vectors the PP denotes needs to be turned into a property of individuals located at the end of those vectors. This could be accomplished by a type shift (Partee 1987), or by supposing that there is an unpronounced morpheme that does this work. Up to this point, this is relatively intuitive, but nothing special has happened. One place this framework shines, though, is in the interpretation of modifiers of the PPs, which in turn sheds light on the PPs themselves.

Measure phrases, for example, are compatible with *above the house* but not *near the house*:

$$(103) \quad \textit{six feet} \left\{ \begin{array}{l} \textit{above} \\ \# \textit{near} \end{array} \right\} \textit{the house}$$

To make sense of this, a first step is to suppose that measure phrases denote properties of vectors too—specifically, of vectors with a certain length:

(104) $\llbracket \textit{six feet} \rrbracket = \lambda v . \mathbf{length}(v) \geq \mathbf{6-feet}$

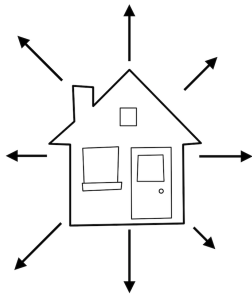
This can be interpreted intersectively with *above the house*:

(105) $\llbracket \textit{six feet above the house} \rrbracket = \lambda v . \mathbf{start}(\mathbf{the-house})(v) \wedge \mathbf{upward}(v) \wedge \mathbf{length}(v) \geq \mathbf{6-feet}$

Near the house, on the other hand, imposes a restriction not on the direction of vectors, but on their length:

(106) $\llbracket \textit{near the house} \rrbracket = \lambda v . \mathbf{start}(\mathbf{the-house})(v) \wedge \mathbf{short}(v)$

(107) NEAR THE HOUSE



Given all this, *six feet* should be able to combine with *near the house*. As Zwartz & Winter (2000) and Winter (2005), show, though, measure phrases are only possible with properties of vectors that are upward monotonic in the sense that if the property holds of a vector, it also holds of all longer vectors.²² That's true of $\llbracket \textit{above the house} \rrbracket$, but not $\llbracket \textit{near the house} \rrbracket$.

An bonus feature of this framework is that it makes it possible to provide natural intersective denotations for ill-understood PP modifiers like *diagonally* in *diagonally across the quad*.

7 Adverbs as modifiers of adjectives

A common thing to say about adverbs is that they are modifiers of verbs, sentences, or adjectives. Sometimes prepositions are thrown in, too. It's rarely remarked that this is actually slightly mysterious: sentences are verbal projections, and so of course are VPs, but if adjectives and prepositions are to be included as well, it behooves us to ask why. Given how freely the term 'adverb' is thrown about, one might suspect that this is simply the result of an age-old analytical error. At some point, words like 'degree morpheme' and

²²In fact, they actually require monotonicity in both directions.

certainly ‘degree head’ and ‘Deg’ were unavailable, and perhaps someone mistakenly applied the principle that everything is an adverb until proven otherwise. It would be satisfyingly iconoclastic to dismiss all that. But we can’t.

One slight indication that we might be dealing with adverbs after all is that some degree words seem to have an *-ly* ending (*really, truly*). But these can—and probably should—be set aside as inconsequential remnants of the history of these expressions. The phenomenon runs deeper, though, as these examples from [Castroviejo Miró \(2008\)](#) reflect:

- (108) extremely tall, endlessly frustrating, colossally stupid, deeply talented, widely successful, ridiculously expensive

The crucial thing is not just that there is a regular pattern in the distribution of *-ly* here. That too we might be able to handle, at worst by positing two homophonous *-ly* morphemes. It’s that many of these expressions remain closely related to their VP-modifying counterparts, and are probably more than just phonologically identical to them.

That becomes even clearer when one focuses on particular subclasses of these adverbs. There is, for example, a proper subset of evaluative adverbs that systematically have AP-modifying degree uses ([Katz 2005](#), [Nouwen 2005, 2011](#), [Morzycki 2008](#)):

- (109) a. *evaluative adverbs*

$$\left. \begin{array}{l} \text{Amazingly,} \\ \text{Remarkably,} \\ \text{Surprisingly,} \\ \text{Alarmingly,} \\ \text{Disappointingly,} \end{array} \right\} \text{Floyd is tall.}$$

- b. *evaluative degree adverbs*

$$\text{Floyd is } \left. \begin{array}{l} \text{amazingly} \\ \text{remarkably} \\ \text{surprisingly} \\ \text{alarmingly} \\ \text{disappointingly} \end{array} \right\} \text{tall.}$$

Part of what’s entertaining about this effect is that the degree readings in (109b) are systematically related to the ordinary adverbial ones in (109a). But the connection is not direct. *Floyd is remarkably tall* can’t merely be paraphrased as *Remarkably, Floyd is tall*. One might dismiss this lack of synonymy on the grounds that only the latter involves a POS morpheme.

Degree *remarkably* and POS, it's reasonable to assume, compete for the same syntactic position and are thus in complementary distribution.²³

That alone won't suffice, though. The details need to be spelled out, and there are two natural ways of doing so. The meaning of (110a) might be something like (110b), in which **remarkable** is predicated of a degree; or something like (110c), in which it's predicated of a proposition:

- (110) a. Floyd is remarkably tall.
 b. $\exists d[\mathbf{tall}(d)(\mathbf{Floyd}) \wedge \mathbf{remarkable}(d)]$
 c. $\exists d[\mathbf{tall}_{w'}(d)(\mathbf{Floyd}) \wedge \mathbf{remarkable}(\lambda w'. \mathbf{tall}_{w'}(d)(\mathbf{Floyd}))]$

One difficulty with both of these is that neither reflects that if (110a) is true, it must be the case that Floyd is tall—that is, neither reflects that (110a) doesn't neutralize the adjective. But this isn't the deepest problem. It could be addressed by shoehorning in a conjunct about exceeding a contextually-provided standard. The deeper problem in (110b) is that, on the usual understanding of degrees, one can't really predicate remarkableness of them. They're just not rich enough. A degree of height is something like '6 feet', but '6 feet' can't be said to be remarkable on their own. The alternative in (110c) avoids this problem by predicating remarkableness of the proposition that Floyd is *d* tall. But this won't suffice either. Suppose there has been an eery coincidence, and Floyd was born at 5:09 in 1959, lives at 59 Fifty-ninth Street, and his precise height is 5'9". In this scenario, it's certainly remarkable that his height is 5'9", but we still can't truthfully say of him that he's *remarkably tall*. In [Morzycki \(2008\)](#), I try to account for this by pursuing an analogy to the paraphrase 'It's amazing how tall Floyd is'. But [Nouwen \(2011\)](#) proposes a more elegant solution that combines insights in [Katz \(2005\)](#) to get the result that one is only remarkably tall to a degree if it would be the case that being tall to any higher degree is also remarkable (see also discussion in [Castroviejo Miró & Schwager 2008](#) and [Schwager 2009](#)). Interestingly, [Nouwen](#) shows this can be related to the observation, due to [Zwicky \(1970\)](#), that when evaluative adverbs occur in antonymous pairs, only one member can occur as an AP modifier (*#usually/#unremarkably tall*).

[Castroviejo Miró \(2008\)](#) broadens the picture to include a wider range of adverbial AP modifiers. She shows that at least some of them—members of a class that includes *extremely*—behave as though they contribute secondary, conventionally-implicated content in the [Potts \(2003\)](#) style.

Finally, the last nail in the coffin of the idea that AP-modifying adverbs

²³Actually, a more subtle way of implementing this is available. POS and *remarkably* can be framed in a way that would ensure that either can combine with the type of a gradable predicate, but neither can combine with the result of combining the other with a gradable predicate.

aren't true adverbs: in some cases, it looks like APs host manner adverbs. There is some debate about whether apparent examples of this are misleadingly exceptional (Katz 2003, 2008, Geuder 2005, Mittwoch 2005, Maienborn 2007), but there's certainly no shortage of them (as Ernst 2011 demonstrates in an especially systematic way):

- (111) a. Floyd is $\left\{ \begin{array}{l} \text{visibly happy} \\ \text{strangely beautiful} \end{array} \right\}$.
b. The talk was $\left\{ \begin{array}{l} \text{oddly unnerving} \\ \text{fatally flawed} \end{array} \right\}$.
c. These examples might be misleadingly exceptional.

Some of these also have degree readings, but they all have another reading which would at least seem to be a manner one.

The principal conclusion to draw from all this, I think, is just that much remains yet to be understood about how adverbial modification of AP works.

8 Phenomena we will mostly set aside

8.1 Temporal adverbials

Temporal adverbials aren't so much a semantic phenomenon as they are a semantic industry. They are one of the principal topics in temporal semantics, itself a vast enterprise. For that reason, I will set them aside here. Their semantics is directly connected to relatively few ideas that are a focus of this book, and depends on too many that aren't.

Nevertheless, at least one point should be made. The best-known fact about temporal adverbials is that they are sensitive to TELICITY—very roughly, whether a predicate characterizes an event as bounded. One common way of understanding the idea is that a VP is ATELIC iff it describes an event in a way that would also describe any part of the event. Otherwise, it is TELIC. Thus *push the cart* is atelic, because every part of an event of pushing the cart is also an event of pushing the cart. On the other hand, *push the cart off a cliff* is telic, because not every part of an event of pushing the cart off the cliff is also an event of pushing the cart off a cliff.

It's sometimes hard to avoid lapsing into talk of events themselves being telic or atelic. As the characterization above reflects, though, strictly speaking it's event **descriptions**—VPs, essentially—that are telic or atelic, not the events themselves. Indeed, the same event of pushing the cart off a cliff can be described with both the atelic VP *push the cart* and the telic VP *push the cart off the cliff*. This may seem a pedantic point, but something important depends on it—and it's something immediately relevant here.

First, the fact. Setting aside various complications, English temporal *for* PPs are generally compatible only with atelic VPs, and temporal *in* PPs with telic ones (Vendler 1967, Dowty 1979, many others):

- (112) a. Floyd pushed the cart $\left\{ \begin{array}{c} \text{for} \\ \# \text{in} \end{array} \right\}$ an hour.
 b. Floyd pushed the cart off the cliff $\left\{ \begin{array}{c} \# \text{for} \\ \text{in} \end{array} \right\}$ an hour.

So, compositionally, how would one capture this? There are two obvious possibilities: *for an hour* could denote a property of events or a predicate modifier. If we can get away with a property denotation, we should. Using a needlessly high type is always undesirable, like lighting a cigarette with a blowtorch. But as it turns out, we're not lighting a cigarette. Although it's perfectly reasonable to think of lasting an hour as a property of an event, these adverbs also need to impose the telicity requirement. As we just established, being telic or atelic is **not** a property of an event but rather of an event description. The PP therefore needs to know not just about an event, but also about the whole VP—which means it has to denote a predicate modifier. One way to represent the atelicity requirement, in the spirit of Dowty (1979), is in (113) (τ is a function mapping events to their running times and \sqsubseteq is the subevent relation; Link 1998):

$$(113) \quad \llbracket \text{for an hour} \rrbracket \\
= \lambda P_{\langle v, t \rangle} \lambda e : \forall e' [e' \sqsubseteq e \rightarrow P(e')] . P(e) \wedge \llbracket \text{an hour} \rrbracket (\tau(e))$$

This encodes the atelicity requirement as a presupposition that the event description P also holds of all subevents of e , and treats *an hour* as a property of times. Imposing this requirement requires access to the VP denotation. A property denotation wouldn't provide that access, so it would preclude imposing such a requirement. If, however, events had inherent telicity on their own, a property denotation might have sufficed.

Importantly, the problem here is linguistic, not conceptual. The idea that events might be telic or atelic on their own isn't incoherent. Boundedness in scales works in precisely that way. Open and closed scales can be represented as open and closed intervals. Like degrees, times also involve linearly ordered points, and their analogous notion of boundedness might have been consistent with an account in terms open and closed intervals as well (indeed, Dowty 1979 considers the possibility). As it turns out, it doesn't seem to be.

The importance of this here, then, is threefold. First, it shows that at least some temporal adverbials seem to need to a predicate modifier type. Second, it highlights an asymmetry between the notion of boundedness in the degree

and temporal domains. Third, it's useful reminder that abstractions like this aren't somehow inevitable consequences of certain formal assumptions, but reflections of particular empirical facts about language that could well have been otherwise.

A good starting point in the literature on temporal semantics is Dowty (1979), and classic references include Vendler (1957, 1967), Partee (1973), Bach (1986), Krifka (1989), Kratzer (1998), and Krifka (1998).

8.2 Adverbs of quantification

The other major issue we will set aside is adverbs of quantification such as *frequently*, *often*, *always*, and *rarely*, and we will do so for similar reasons. Adverbs of quantification are among the major issues addressed under the rubric of quantification generally. Classic references in the area include Lewis (1975), Kamp (1981), Heim (1982), and de Swart (1993).

Again, though, there is one small point that bears making. The analysis of these adverbs has taken various forms over the years, but a relatively consistent current is treating them as basically quantifiers. The essential contribution of *always*, for example, is universal quantification, and of *sometimes*, existential. One leading idea has been that they are UNSELECTIVE QUANTIFIERS, ones that bind all free variables in their scope. Such an analysis, like most typical ones, makes them profoundly different from other classes of adverbs—certainly, quite different from all the predicational adverbs we've examined here.

And yet, there's something that such a sharp demarcation leaves unexplained—that some adverbs of quantification are gradable:

- (114) a. Floyd $\left\{ \begin{array}{l} \text{very} \\ \text{quite} \end{array} \right\} \left\{ \begin{array}{l} \text{frequently} \\ \text{often} \\ \text{rarely} \end{array} \right\} \text{explodes.}$
- b. Floyd explodes more $\left\{ \begin{array}{l} \text{often} \\ \text{frequently} \\ \text{rarely} \end{array} \right\}.$

This suggests that these adverbs have a degree argument, or in any case a type that is compatible with degree modification. It's not trivial to reconcile such a gradable predicate type that with a semantics that introduces a quantifier with scope extending outside the adverbial itself. A similar issue comes up in the semantics of *many* and *few* (see section ??), but in those cases the standard move is to assume that the quantifier is actually introduced independently.

9 Adverb order revisited

We've already encountered several ways in which the position of an adverb can influence its interpretation. Being very high in the clause can cause a manner adverb to be interpreted as a speech-act adverb, perhaps due to the proximity of a speech-act operator. (Or perhaps there is simply an ambiguity between manner and speech-act adverbs, but independent principles ensure that the latter occur high. See section 5.1.) Subject-oriented adverbs may need to be above a Voice head to get interpreted in the right way, thereby explaining why they tend to occur higher than manner adverbs. Evaluative adverbs apply to propositions, so they need to be high enough in the clause to find a proposition-denoting expression as their sister.

One can be more or less persuaded by these kinds of explanations, but one definitely shouldn't conclude that they constitute a full account of how adverb position and interpretation correlate. There is an extensive array of interesting generalizations and puzzles in this domain, explored most comprehensively in Cinque (1999) and Ernst (2002). Some of these are purely about the relative order of adverbs, and some involve restrictions on the order of adverbs relative to various other non-adverb syntactic constituents, including most prominently verbal heads.

I'll briefly mention two such puzzles, just to provide a sense of the problems. One is that evaluative adverbs can occur above epistemic ones, but not vice versa:

- (115) a. $\left\{ \begin{array}{l} \text{Unfortunately,} \\ \text{Unsurprisingly} \end{array} \right\}$ the students will $\left\{ \begin{array}{l} \text{certainly} \\ \text{probably} \end{array} \right\}$ object.
b. ?? $\left\{ \begin{array}{l} \text{Certainly,} \\ \text{Probably,} \end{array} \right\}$ the students will $\left\{ \begin{array}{l} \text{unfortunately} \\ \text{unsurprisingly} \end{array} \right\}$ object.

Another is that speaker-oriented adverbs must scope over subject-oriented ones (example from Ernst 2009):

- (116) a. They obviously have cleverly been siphoning off little bits of cash.
b. *They cleverly have obviously been siphoning off little bits of cash.

One striking aspect of this is that *obviously* is perfectly capable of occupying the lower position in (116b), provided a speaker-oriented adverb doesn't occur above it:

- (117) They have obviously been siphoning off little bits of cash.

As for restrictions on the relative order of heads and adverbs, here is another example from Ernst (2009):

- (118) a. They will ideally be leaving.
b. *They will be ideally leaving.
c. *They will have been ideally leaving.

Ernst (2002) and Ernst (2009) provide accounts of these sets of facts.

There is a bigger picture here, though. There are two classes of approaches to such problems, and they mesh with the semantics differently. One is a widely-held view in syntax that restrictions on adjuncts—on their relative order and on what can adjoin to what—need not be specified in the syntax because they will follow from the semantics. This idea is longstanding, dating back to at least the early 1980s, but it was always a curious one: it's a promissory note issued by syntacticians and payable by semanticists. In the intervening decades, the semantics has been able to provide some explanations of the necessary sort, but certainly not enough to fully deliver on it.

The guiding principle of Ernst (2002) is to pursue semantic explanations that begin to do this. The concrete semantic proposals he makes aren't in a fully compositional framework, and more generally they are intended more as a demonstration of the general proposition that syntactic position can follow from semantics than as a complete and compositional theory of particular constructions. Nevertheless, it provides a firm foundation of observations and analytical insights upon which one might develop more detailed semantic analyses. This makes it an excellent starting point for semantic inquiry in this area.

The alternative option is the one championed by Cinque (1999): to reclaim such facts for syntax, and take responsibility for explaining them syntactically. Cinque does so with an extensive array of functional heads corresponding to the adverb hierarchy in (3) in section 2, whose specifier positions adverbs occupy. This would relieve semantics of the responsibility to account for puzzles it has, to a large extent, neglected in any case.

It's an interesting state of affairs. Adverbs are difficult semantic territory, certainly, but syntactic work in this area highlights how much there remains to be explained of their semantics. Adjectives are fascinating, and there is no shortage of semanticists who have fallen under their spell. Adverbs, by contrast, haven't been able to attract quite the same following. The difference is as understandable as it is unfortunate.

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morzycki@msu.edu
<http://msu.edu/~morzycki>