COMPLEMENT COERCION AND THE SEMANTICS OF ASPECTUAL VERBS

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ABSTRACT

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This thesis investigates the semantics of complement coercion (CC). The most prominent account of this phenomenon is due to Pustejovsky (1991, 1993), who essentially argues that it can be explained via a type-shift in nominal complements. However, this analysis suffers from two major empirical drawbacks. For one, it incorrectly predicts the ungrammaticality of certain sorts of coordinate constructions. It also overgeneralizes, predicting that the full range of aspectual verbs (AVs) in English should allow CC. It turns out, however, that only a subset of these verbs do. This thesis develops a theory of complement coercion which can account for the coordinate structure data and for the pattern of CC availability in AVs.

This thesis advances a type-based analysis of CC in AVs. Specifically, it is proposed that AVs which allow CC differ in their type from those that do not. This analysis also captures the insight that the coercing verb, rather than the complement, is responsible for CC via an operator which shifts intransitive verbs that modify properties of times (such as AVs) into transitive verbs. Due to the proposed type difference between the two AV subclasses, it turns out that only certain AVs will allow CC. What emerges is a theory of CC which can account for data that eluded previous analyses and also makes novel predictions about the relationship between CC and other facets of tense and aspect in English.

ACKNOWLEDGEMENTS

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INTRODUCTION

English aspectual verbs (AVs), like *begin* and *finish*, have been discussed intermittently in both the semantic and syntactic literature (Perlmutter, 1970; Newmeyer, 1975; Portner, 1992; Fukuda, 2008). Even less frequently discussed is a peculiar alternation which some of these verbs allow:

(1) a. John began reading the book.

   b. John began the book.

(2) a. The author started writing the book.

   b. John started the book.

(3) a. Phil finished mowing the lawn.

   b. Phil finished the lawn.

While aspectual verbs typically take some sort of participle or infinitival[1] verb as their complement (1-3 a), they may also take a nominal complement. These latter cases are remarkable for two reasons. First, the AV can take complements of different semantic types, even though the AV seems to be performing an identical semantic function in both cases. Secondly, the grammar can apparently reconstruct a fully specified interpretation from the combination of the aspectual verb and the

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[1]These infinitival complements will not be discussed here, but see Portner (1992, chapters 4 and 5) for an extensive discussion.

amputated complement. This process is typically called complement coercion.[2] It will henceforth be abbreviated CC.[3]

The goal of the present work is to develop a new analysis of complement coercion in AVs. First, in 2, we will review previous analyses of CC, focusing on the NP type-shifting analysis (2.2-2.3) and an underspecification analysis (2.4) of CC. We will discover that these analyses run into various problems with certain coordinate structures, and also fail to account for why CC is possible with certain AVs but not with others. In 3 we will clarify the data that the new analysis will account for. In particular, it will also be observed that the availability of CC in AVs correlates with the availability of imperfective morphology in these AVs. We will also lay out the syntactic and semantic assumptions underlying this analysis. In 4, the analysis will be developed. To prefigure this section a little bit, this analysis will construct a semantics for AVs such that certain AVs have the appropriate type to take an operator which executes CC. This analysis will also make novel predictions about the imperfective morphology data introduced in 3. Finally, 5 will lay out some directions that future research may take.

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[2]Many researchers, e.g. Pustejovsky (1993), also claim that such verbs as *enjoy* allow complement coercion. This class of verbs will not be discussed in the main body of this thesis, but see 5.2 for some discussion on how the analysis developed here may be extended to these verbs.

[3]Complement Coercion has also recently been the subject of a great deal of experimental work, which this thesis will not have room to explore. But See Pylkkänen and McElree (2006, 2007) and Husband et al. (2010) for some discussion.

Chapter 2

SOME PREVIOUS THEORIES OF COMPLEMENT COERCION

2.1 A Simple Syntactic Analysis

The simplest explanation for CC would be to posit a null syntactic head, some sort of abstract verb, as the complement to the coercing aspectual verbs in (1-3):

(4)   John began [**VERB** the book]

This would allow a semantically uniform treatment of the coercing and non-coercing aspectual verbs (aside from the detail of filling in the interpretation for the former). This analysis was suggested by Newmeyer (1975), and briefly considered by Pylkkänen and McElree (2006), who reject it on the following grounds. They point out that, were this analysis correct, the null verb should be able to take adverbial and prepositional modifiers, as the overt verbal complement does in cases like (5) and (6):

(5)   a. Mary [finished [eating the meal slowly]]

      b. Mary [finished [eating the meal] slowly]

(6)   a. Mary [finished [baking the bread in the oven]]

      b. Mary [finished [baking the bread] in the oven]

In (5a), *slowly* modifies the lower VP *eating the meal*, indicating that Mary finished an event of eating a meal slowly (and perhaps continued on, now eating the meal

quickly). In the second reading (5b), it modifies *finish*, where it means that the event of finishing eating the entire meal was slow. Similarly in (6a) the preposition *in the oven* modifies the lower VP, where it means that Mary completed the event of baking the bread in the oven (and then perhaps continued baking the bread, now in some other contraption). In (6b), on the other hand, *in the oven* modifies *finish*, where it means that the event of finishing baking the bread occurred in the oven. Now consider (7) and (8):

(7)   a. Mary [finished the meal slowly]

      b. *Mary [finished [**VERB** the meal slowly]]

(8)   a. Mary [finished the bread in the oven]

      b. Mary [finished [**VERB** the bread in the oven]]

In these coerced constructions, only the readings (7a and 8a) where the adjunct modifies *finish* is available. If these sentences actually had a structure like (4), then readings based on structures like (7b) and (8b), where *slowly* and *in the oven* respectively modify the abstract predicate, should be possible. Their impossibility suggests that a null verb along the lines of the structure in (4) is not present in coerced sentences.

    Pylkkänen and McElree (2006) also note that, while passivization of the nominal is impossible with a full verbal complement (9a), it is licit in cases of CC (9b):

(9)   a. *The book was finished reading by John

      b. The book was finished by John.

Were these two constructions syntactically identical (as (4) predicts), then such an asymmetry would likely not show up.

Next, we shall consider an NP type-shifting analysis proposed by Pustejovsky (1991, 1993, 1995) which offers a fully compositional semantic solution to the problem of CC.

2.2   The NP Type-Shifting Analysis

Pustejovsky (1993)[1] argues that complement coercion can be executed through a type-shifting operation within the nominal complement. Specifically, he argues that there exists a set of type-shifting functions which enable functional application (FA) in certain instances where FA would otherwise be predicted to fail. Suppose we have an expression α, which is of type $\langle b,a \rangle$ and another expression β. α may apply to β if either if β is of type $\langle b \rangle$; or if among the set Σ_β of type shifting operations which apply to β, there is an operation σ that, when applied to β, yields an expression of type $\langle b \rangle$. If such an operation σ exists α will correctly yield an expression of type $\langle a \rangle$ when applied to the output of $\sigma(\beta)$. This can be formalized as in (10) (from Pustejovsky (1993, 83-84)):

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[1]I shall focus on Pustejovsky (1993) since it contains the most explicit presentation of his theory of CC.

(10)   **Functional Application With Coercion (FA$_C$):**

If α is of type $\langle$b,a$\rangle$ and β is of type $\langle$c$\rangle$, then:

i   if c $=$ b, then $\alpha(\beta)$ is of type a.

ii   if there is a $\sigma \in \Sigma_\beta$ such that $\sigma(\beta)$ yields an expression of type $\langle$b$\rangle$, then $\alpha(\sigma(\beta))$ is of type $\langle$a$\rangle$

iii   otherwise, type clash.

In other words, certain expressions β have a set of type-shifting operations Σ_β associated with them. Coercion can be executed only if the appropriate type-shifting operation exists for a given expression.

Lets assume that AVs, such as *start*, have a type of $\langle VP, \langle NP, S \rangle \rangle$[2]. In other words, it takes a VP complement, and return an intransitive verbal predicate. Now, for coercion to be possible with a nominal in the complement position of the AV, there must exist an operation ρ in Σ_{NP} (the set of type-shifting operations which apply to nominals) which allows the nominal to shift to a type $\langle VP \rangle$.

These type-shifting functions have to be limited; otherwise type-shifts could be posited that would allow anything to take anything as an argument. The set of type-shifting operations available to the NP complement is restricted by the nominals qualia structure (Pustejovsky, 1991, 1993, 1995), which consists of complex structured representations inside a lexical item. These representations then link that item to various other lexical items. In short, this is a way to partially decompose a nominal's meaning into various sub-constituents.

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[2]In using these non-standard type, I am simply following Pustejovsky (1993). In the analysis presented in 3 and 4, I shall revert to a more standard type-system.

This type-shifting operation ρ may only apply to an expression P if there exists some appropriate qualia role Q such that Q is a two place-predicate with P as its internal argument. This can be formalized as in (11):

(11) $\forall P[\rho(P) \rightarrow \exists Q[Q(P)(x)]]$

Among the qualia roles Pustejovsky proposes are the agentive role Q_A (how an object came into existence) and telic role Q_T (the function or use of an object). The type-shifting operator ρ forces the nominal to be interpreted as either its telic or agentive roles:

(12) $\rho = [Q_T(NP), Q_A(NP)]$

These two operations Q_T and Q_A essentially shift the interpretation of the nominal from its basic interpretation (e.g. x is a book) to a more complex function associated with how the nominal comes into existence (Q_A), or how it is used (Q_T); following the meaning postulate in (11), the nominal then becomes the internal argument for this more complex function (Pustejovsky, 1993, pg. 87):

(13) a. $Q_T(book) = \lambda x \lambda y[read(x)(y)](book)$

b. $Q_T(book) = \lambda x \lambda y[read(x)(y)](book)$

It should be easy, at this point, to see how this all adds up to allow complement coercion. Consider a verb, such as *begin*, that takes a type $\langle VP \rangle$ complement. When it actually takes a verbal complement as its argument, the function applies as usual. But when it finds a nominal there instead, it must employ the type-shifting operation ρ, as (10) dictates. So long as the appropriate qualia role is associated with the

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nominal, then the type-shifting operation will apply, and the AV will be able to apply to its complement. A derivation along these lines for *Mary began the book* may be seen in (14), (Pustejovsky, 1993, pg. 88):

(14)   a. Mary began a book.

       b. **begin'**$(Q_T$(a book)(x)){Mary} $\rightarrow$

       c. **begin'**$(Q_T$(a book)(Mary))(Mary)

What is more, the type-shifting operation, when combined with Pustejovsky's theory of qualia structure, correctly predicts the preferred interpretation for constructions like (14 a); viz. Mary began either reading or writing a novel. It should be noted, however, that the two are in principle dissociable. One who finds Pustejovsky's arguments for the notion of qualia structure unpersuasive may still adhere to a theory of complement coercion that relies on some sort of nominal type-shifting, or vice versa. However, as we shall see, there are reasons to be skeptical of the type-shifting argument.

2.3   Problems With The NP Type-Shifting Analysis

Pustejovsky's theory of qualia structure has been criticized on both conceptual[3] and empirical grounds. On the empirical side, we find that contextual factors can override default interpretations. Consider a scenario like the one in (15a) below. Then consider a sentence like (15b):

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[3]We won't go into these here, but see Fodor and Lepore (1998) for a very strong critique of Pustejovsky's general theory of qualia structure.

(15)   a. The goat was happily eating a tattered old paperback book.

       b. Because it was so hungry, the goat finished the book quite quickly.

(15b) most likely means that the goat finished eating the book, not reading or writing it, although its very unlikely that such a non-standard activity as eating would be stored in the lexical entry for *book*. Were coercion operations strictly linked to the nominal's qualia structure, then it's hard to see how such contextual sensitivity would be possible. Lascarides and Copestake (1998) propose an analysis (to be discussed in 5.1) that allows one to combine the qualia theory of nominal structure with contextual reinterpretation. However, the type-shifting component of Pustejovskys analysis runs into other, more severe problems.

For one thing, various writers (Copestake and Briscoe, 1992; Godard and Jayez, 1993; Lascarides and Copestake, 1998) have noted a certain type of construction which the NP type-shifting analysis predicts to be ungrammatical:

(16)   John picked up and started the book.

The first verb in this construction, *pick up*, takes a nominal argument, and the second, *start*, a verbal argument. If we assume that the nominal complement shifts its type to that of a verb in order to combine with an aspectual verb like *start*, as the NP type-shifting analysis predicts, then it's difficult to see how it would also be able to combine with a verb like *pick up*, which must take a NP complement. Therefore the construction should be ungrammatical. Its well-formedness strongly suggests that the nominal complement does not undergo a type-shift.

What's more, this analysis seems to make the wrong prediction about other kinds of coordinate structure. The NP type-shifting theory would predict that, because

the nominal complement has shifted to the same type as a VP complement, a coerced nominal complement and a VP complement should both be able to appear as arguments of an aspectual verb in a coordinated construction. However, this is not the case:

(17)   a. #John began the DVD and eating popcorn.

        b. #John finished the book and taking notes.

Again, this suggests that the nominal complement is not responsible for complement coercion. Rather, it seems that the type contrast is not in the nominal, but in the aspectual verb itself.

It should be noted that a syntactic explanation for the data in (17) is conceivable, depending upon the syntax we assume for AV complements. Suppose, for the sake of argument, that these gerundive complements are control clauses.[4] This would mean that coercing AVs can either c-select for a nominal complement, in which case they assign [ACC], or for a control complement. In this latter case lets follow Munn (1993, 76) and assume that the verb assigns some sort of +control feature. Now, a sentence like (17a) would have a structure something like (18)[5]:

(18)   begin [$_{NP}$ [$_N$ the DVD] [$_{BP}$[$_B$ and] [$_{TP}$ PRO eating popcorn]]]

Assume, again following Munn (1993), that [ACC] and +control are privative features in complementary distribution, so that the AV may assign either [ACC] or [control],

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[4]Perlmutter (1970) actually argued that AV syntax is ambiguous between being a control and a raising structure (the syntax of AVs will be discussed at somewhat greater length in 3.2 and 5.2).

[5]The phrase structure in (18) assumes the existence of a B(oolean)P (Munn, 1993).

but not both. Now, in order to license the first conjunct of the coordinate structures in (18), the AV will have to assign [ACC]. This will mean, however, that no [control] will be available to license the second conjunct. So the derivation will crash due to the presence of an unlicensed control clause in the second conjunct.

While such a syntactic explanation for the unacceptability of these sentences is actually quite plausible, the syntax of AVs is rather unclear, as we shall see in 5.2 below. In any case, sentences of the (16) variety remain a problem for the NP type-shifting analysis. Moreover, this analysis also runs into a problem of over-generalization, as we shall presently see.

The NP type-shifting analysis also predicts that this type-shifting operation will be quite general. The type requirements of the verb motivate a type-shift in the nominal, whose type-shifting possibilities are lexically constrained. Consider, though, the following data:

(19)　a.　John kept reading the book.

　　　b.　*John kept the book.

(20)　a.　John stopped reading the book.

　　　b.　*John stopped the book.

(21)　a.　John ceased reading the book.

　　　b.　*John ceased the book.

Each of the verbs in (19-21a) requires a type $\langle VP \rangle$ argument, and thus should license coercion in the nominal. Whats more, its clear from sentences like (1b) that the NP complement *book* in (19-21b) is capable of undergoing coercion. So, there are no

important differences between (19-21) and (1-3) which should render CC impossible. The unavailability of CC in these sentences (19-21) is a puzzle, for which an NP type-shifting analysis offers no solution.[6]

In addition to those in (1-3), but unlike (19-21), other aspectual verbs seem to allow coercion:

(22)   a. John resumed reading the book.

         b. John resumed the book.

(23)   a. John continued reading the book.

         b. John continued the book.

We can thus divide our set of AVs into those that allow CC ((1-3), (22-23)), which we shall call *finish*-type verbs, and those that do not (19-21), which we shall call *stop*-type verbs. This contrast will be discussed at greater length in 3.1.

2.4   Other Possibilities: Underspecification Of The AV

The first of our objections to the NP Type-shifting analysis, that it incorrectly predicts the ungrammaticality of sentences like (16) (repeated as (24) below), has already been raised by authors such as (Copestake and Briscoe, 1992, 1995; Godard and Jayez, 1993; Lascarides and Copestake, 1998):

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[6]One might be able to attribute (18a) to a blocking effect, but this solution has difficulty explaining (19b), where the context doesn't encourage blocking, and doesn't explain (20) at all.

(24) John picked up and started the book.

To address this problem, Copestake and Briscoe (1995) and
Lascarides and Copestake (1998) claim that coercing verbs are underspecified for the
type of their complement. Working in an HPSG-derived framework, these authors
argue that verbs which allow complement coercion, such as the AVs[7], may subcate-
gorize for both nominal complements, which they assume to have a type $\langle NP \rangle$, and
gerundive complements of some sort, which they assume to take a type of $\langle VP \rangle$.[8]
Thanks to a highly structured lexical semantics, the denotations of these verbs may
alter depending upon which complement the verb takes.

Consider a verb like *start*. These authors are not explicit about the semantics
of the verb itself, but assume that it relates an event e involving some individual
x to a event e which is the starting event of e. Let's consider the denotation when
start subcategorizes for a $\langle VP \rangle$ complement. Here, the verb *start* takes in some
relation from individuals to properties of events and relates the event to the starting
sub-event. Its denotation may look something like (25). Note that, for the sake of
consistency with the denotations to be employed in chapters 3 and 4, we will construct
the denotation using the lambda-calculus, even though these authors employ a rather
different framework:

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[7]These authors assume that AVs pattern with attitude verbs of the *enjoy*-type in al-
lowing for complement coercion. As was mentioned in fn. 2 of chapter 1, this thesis will
ignore verbs of that class. However, the possibility of extending the analysis in 4 to these
verbs will be discussed in 5.2.

[8]Again, we are employing these non-standard types simply because the authors under
discussion do. A more standard type system will be used in chapters 3 and 4.

(25) ⟦ start$_{VP}$ ⟧ = λp$_{VP}$λxλe ∃e'. start(e, x, e') & p(e', x)

When it selects for a ⟨VP⟩ complement, *start* and other AVs then take in the VP complement and return a relation from individuals to the starting event. A predicate like *start reading the book* might be constructed in the following way. Since the verb takes a ⟨VP⟩ complement, it selects the denotation seen in (25). Let's assume that *reading the book* simply has a denotation like (26):

(26) ⟦ reading the book ⟧ = λxλe'∃y. reading(e', x, y) & book(y)

Then *start reading the book* would have a denotation as in (27):

(27) ⟦ start$_{VP}$ reading the book ⟧ = λxλe∃e'. start(e, x, e') & ∃y[reading(e', x, y)] & book(y)]

In words, *start reading a book* takes an individual argument x where is the agent, and an event argument e, where e is the starting event associated with the event e' of x reading some y and where y is a book.

Coercion, in this system, works in a fashion similar to Pustejovsky's, in that the interpretation is provided by a qualia role associated with the nominal complement. However, instead of nominal type-shift being responsible for coercion, the operation is carried out by the verb itself, when it subcategorizes for a ⟨NP⟩complement. In these cases, *start* will apply to a ⟨NP⟩ complement. The event e that is being started will be specified by deriving a predicate from one of the NP's qualia roles. A constant *act-on-pred* is include in the denotation to delimit the set of predicates which may occupy the relevant slot.[9] So a denotation for *start*$_{NP}$ may look something like (28):

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[9] Lascarides and Copestake (1998) note that the range of possible predicates in coercion cases is subject to numerous restrictions. For instance, telic predicates are acceptable, but

(28) $[\![\text{start}_{NP}]\!] = \lambda p_{NP} \lambda x \lambda e \exists y \exists e'.\ \text{start}(e, x, e)\ \&\ Q_{T/A}\, \textit{act-on-pred}(e', x, y)\ \&$

$p(y)$

A predicate like *start the book* might be constructed in the following way. Assume that *book* has a denotation something like the following:

(29) $[\![\text{book}]\!] = \lambda x.\ \text{book}(x)\ \&\ [Q_T(\text{book}) = \lambda y \lambda x \lambda e.\ \text{read}(e)(y)(x)(\text{book})]$

So *start the book* will have a denotation like[10]:

(30) $[\![\text{start}_{NP}\ \text{the book}]\!] = \lambda x \lambda e \exists y \exists e'.\ \text{start}(e, x, e)\ \&$

$Q_{T/A}\, \textit{act-on-pred}(e', x, y)\ \&\ \text{book}(y)\ \&\ \rightarrow$

$= \text{start}(e, x, e)\ \&\ \text{read}(e, x, y)\ \&\ \text{book}(y)$

Thanks on the one hand to the underspecification of the coercing verb, and on the other to the qualia structure of the nominal, both coercing and non-coercing AV structures will yield the same meanings.

So, sentences like (23) are not a problem for such an underspecification theory, since *start* can select for complements of the same type as *pick up*, ⟨NP⟩. In these cases, the coercion in the AV is predicted to come from the internal lexical semantics of the verb, as we see in (28).

However, it is not so clear that this system can account for the data in (17), repeated here as (31):

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not inherently atelic ones. Also illicit are predicates referring to covering some distance (e.g. *John began *(crossing) the desert*). I take it that *act-on-pred* is supposed to filter out such unacceptable predicates. This will be discussed further in sections 4.3 and 5.1.

[10]The derivation for these coercing sentences is more easily explained when the HPSG-style syntax the authors under discussion assume is used. Thus, the denotation in (30) may appear somewhat unclear.

(31)   a. #John began the DVD and eating popcorn.

          b. #John finished the book and taking notes.

Typically, theories that allow for underspecification of a verb predict that coordination of unlike categories should be grammatical, as long as the selecting verb accepts complements of both categories (see Sag et al. (1985) and Munn (1993, 2.5.2) for discussion). A verb like *become*, for instance, takes both nominal and adjectival complements, and so both are acceptable in a coordinate structure[11]:

(32)   John became a lawyer and good at golf.

Consequently, it does not appear that the sort of syntactic explanation which may account for the unacceptability of the data in (31) is possible in the sort of framework assumed by the underspecification analysis, barring some *ad hoc* stipulation. In other words, an underspecification theory should predict, incorrectly it turns out, that the sentences in (31) are grammatical. It is possible that such structures lead to some problem with semantic interpretation, but it is not clear what that problem would be.

Another potential problem with the underspecification theory is that it must attribute the availability of coercion to lexical-level idiosyncrasy. In some sense, this marks another advantage over the NP-type shift analysis, since the underspecification

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[11]To account for exceptions to this, underspecification theories must stipulate certain restrictions on coordinate structures. Consider a verb like *remember*, which can accept nominal and sentential complements. To explain the ungrammaticality of (1), Sag et al. must stipulate that nominal complements must precede sentential ones (example from Munn (1993, 80)):

    i *John remembered that Mary was arriving and the meeting that they had scheduled.

theory provides some level of explanation for why only certain AVs allow CC. Its explanation is, essentially, that the availability of CC comes down to variation in the sort of lexical entry that an AV has. Verbs which happen to categorize for both nominal and VP complements, like *begin* or *finish*, allow coercion. Verbs which only take VP complements, like *stop* or *keep*, do not. If no other explanation could be found for such a difference, then such idiosyncrasy would be acceptable. If, however, other generalizations could be found, which pointed to a deeper explanation for this difference, then attributing the difference to mere lexical variation would appear to be inadequate. Although such a theory might capture the right data, it would remain unsatisfactory from an explanatory viewpoint. As we shall see in 3.1, *finish*-type verbs also seem to allow imperfective morphology which *stop*-type verbs do not. These facts do not follow from the underspecification theory, meaning that it has less explanatory power.

We have, then, a set of desiderata for a theory of complement coercion. First, it should predict what sort of interpretation a coerced predicate will receive. The analysis to be developed in this thesis will *not* fulfill this requirement (but see 5.1 for some thoughts on how this might be done). It should also correctly predict the coordination data in (16) and (17/31). We have seen that the NP type-shifting analysis incorrectly predicts the ungrammaticality of (16), and its semantics also incorrectly predict the grammaticality of (17/31), although its possible that the ungrammaticality of these sentences stems from independent syntactic considerations. Conversely, while the underspecification theory makes the correct predictions about the data in (16), its syntax and semantics do not seem to rule out those in (17/31).

Finally, a theory of complement coercion must explain why CC is available in some aspectual verbs but not in others. The NP type-shifting analysis over-generalizes, and predicts that all AVs should allow CC. While the underspecification theory allows for coercion to be available in some AVs but not others, it must explain this at the level of idiosyncratic lexical variation. It is to this last problem of finding some principled account for the selective availability of CC among the set of aspectual verbs to which we shall now turn.

Chapter 3

PRELIMINARIES FOR A NEW ANALYSIS

3.1 What Is To Be Discussed

In 2.3, we divided the AVs into two classes: the *finish*-type verbs, listed in (33) below, and the *stop*-type verbs, listed in (34):

(33) *Finish*-Type Verbs: Begin, Start, Finish, Resume, Continue.

(34) *Stop*-Type Verbs: Stop, Keep, Cease.

The *finish*-type verbs allow complement coercion, the *stop*-type verbs do not. How else might the two verb classes vary? It turns out that the verbs in (33) and (34) also differ in their ability to take imperfective morphology. Those in (33) can, as we see in (35a-d), those in (34) cannot, as seen in (35e-g):

(35) a. John was beginning to read the book (when the phone rang).

     b. John was starting to read the book (when the phone rang).

     c. John was finishing reading the book (when the phone rang).

     d. John was resuming reading the book (when the phone rang).

     e. *John was stopping reading the book (when the phone rang).

     f. *John was keeping reading the book (when the phone rang).

     g. *John was ceasing reading the book (when the phone rang).

There are a few potentially troubling observations to be made about the data presented in (35). Most obviously, one might suspect that the pattern of data in (35) falls out from the doubl-ing filter (Ross, 1972; Milsark, 1988; Pullum and Zwicky, 1999). While the exact formulation of this filter varies, it is supposed to block the appearance of adjacent *–ing* affixed verbs at PF or s-structure. For instance, Milsark (1988), whose theory of doubl-ing we shall focus on, formulates the filter in the following way:

(36)   **Doubl-ing Filter:** At PF, mark as ill-formed any sentence containing contiguous *–ing* affixed verbs.

Why might we suspect that the pattern in (35) stems from doubl-ing? Aspectual verbs like *stop* and *continue*, it turns out, are precisely the sorts of verbs discussed by the authors who have looked at doubl-ing. Consequently, one might argue that the unacceptability of *–ing* in *stop*-type verbs (37) simply stems from a filter like (36):

(37)   a. *John was stopping reading the book (when the phone rang).

b. *John was keeping reading the book (when the phone rang).

c. *John was ceasing reading the book (when the phone rang).

One might also observe that even some finish-type verbs seem to carry apparent doubl-ing restrictions:

(38)   a. *John is continuing reading the book.[1]

        b. *John was keeping reading the book (when the phone rang).

        c. *John was ceasing reading the book (when the phone rang).

This leaves only a handful of AVs as genuine exceptions to doubl-ing, *finish* and *resume*:

(39)   a. John was finishing reading the book.

        b. John was resuming reading the book.

Moreover, exceptions to doubl-ing have already been noticed in the literature. Milsark (1988), following earlier observations by Milsark (1972) and Emonds (1973), discusses cases of apparently adjacent gerundive constructions where the doubl-ing filter does not apply. These include sentences like those in (40) below:

(40)   a. John was enjoying reading the salacious novel.

        b. John was regretting reading the salacious novel.

Their conclusion was that verbs which take nominalizing gerunds may violate the doubl-ing filter. Tests for the presence of a nominalizing gerund include the ability to take possessive nominals (41a), known as POSS-ing, or nominals licensed by accusative case (41b), known as ACC-ing:

(41)   a. John enjoyed Fred's reading the salacious novel aloud.

        b. Mary regretted Fred drinking the entire bottle of wine.

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[1]Curiously, as Ross (1972) originally noted, some AVs yield strong doubl-ing effects only in the present tense. Thus, *John was continuing reading the book* sounds only marginally unacceptable, while (38a) sounds ungrammatical.

Nominalizing gerunds also allow passivization (42a, c) and the formation of *that*-cleft constructions (42b, d):

(42)   a. Reading the book was enjoyed by John.

          b. It was reading the book that John enjoyed the most.

          c. Drinking a bottle of wine was regretted by John.

          d. It was drinking a bottle of wine that John really regretted.

Conversely, the verbs to which the doubl-ing filter applies, such as start and stop, do not behave like nominalizing gerunds. For instance, they do not allow ACC-ing (43b, d) or POSS-ing (43a, c) constructions:

(43)   a. *John started Fred's reading the book.

          b. *John started Mary reading the book.

          c. *John stopped Bill's reading the book.

          d. *John stopped Mary reading the book.

Moreover, they do not allow passivization (44) or *that*-cleft constructions (45):

(44)   a. *Reading the book was started by John.

          b. *Reading the book was stopped by John.

(45)   a. *It was reading the book that John started.

          b. *It was reading the book that John stopped.

So, the these verbs do not seem to take nominalizing gerundive complements. Rather, Milsark (1988) proposes that they are control verbs, and so take non-tensed TP complements.

How does Milsark (1988) account for the ability of nominalizing gerunds to block his formulation of the doubl-ing filter (36)? He proposes that such nominalizations always allow a cased element to intrude between the two *–ing* affixed verbs. This is most obvious in the case of ACC-ing or POSS-ing sentences (41), where an overt nominal appears. In cases like (40), Milsark (1988) proposes that a case licensed PRO appears in these positions, taking either genitive or accusative case depending on the particular construction.

Jaeggli (1980), in a study of restrictions on English *to*-contraction, had independently proposed that cased PRO is visible to PF filters. If we carry over this assumption that cased PRO is visible to PF filters, but not PRO of the uncased variety, then we have an explanation for the exceptions to the doubl-ing filter. With verbs that take nominalizing gerunds as complements, a cased PRO will appear in the Spec-NP position, and so the two gerundive verbs are rendered non-contiguous at PF. Such a phrase structure might look something like (46):

(46)   enjoying [$_{NP}$ PRO$_{+GEN}$ [$_N$ reading the book]]

Since verbs like *stop* or *start*, to which the doubl-ing filter may apply, are assumed to take tenseless TPs as complements, PRO will not be case licensed, and so will be invisible at PF. In these cases then, the two *ing* affixed verbs will appear to be contiguous at PF, and the doubl-ing filter (36) will cause them to be marked as ill-formed. A phrase structure for these sorts of verbs might look like (47):

(47)   *stopping [$_{TP}$ PRO [$_{VP}$ reading the book]]

If *resume* and *finish* were found to pattern with *enjoy* and *regret*, then a ready explanation would be found for the data in (35), repeated below as (48):

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(48)   a. John was beginning to read the book (when the phone rang).

        b. John was starting to read the book (when the phone rang).

        c. John was finishing reading the book (when the phone rang).

        d. John was resuming reading the book (when the phone rang).

        e. *John was stopping reading the book (when the phone rang).

        f. *John was keeping reading the book (when the phone rang).

        g. *John was ceasing reading the book (when the phone rang).

(48a-b) would be grammatical because the verbs take infinitival complements, so the doubl-ing filter doesnt apply. (48c-d) would bypass the filter due to an unusual syntactic structure, much as *enjoy* does. And (48e-g) would be straightforward doubl-ing violations.

However, there are at least two reasons to think that a Milsark-style doubl-ing filter cannot account for the data in (48). First off, it turns out that *resume* and *finish* have a different syntactic structure from *enjoy* and *regret*. They do not allow ACC-ing or POSS-ing constructions (49):

(49)   a. *John finished Fred's reading the book.

        b. *John finished Mary reading the book.

        c. *John resumed Bill's reading the book.

        d. *John resumed Mary reading the book.

Moreover, they do not allow passivization (50) or that-cleft constructions (51):

(50)   a. *Reading the book was finished by John.

        b. *Reading the book was resumed by John.

(51)   a. *It was reading the book that John finished.

        b. *It was reading the book that John resumed.

In short, they fail to pattern with the class of verbs which take nominalizing gerunds as complements. Thus, an explanation of doubl-ing filter exceptions of the sort that Milsark (1988) employed is unavailable for *resume* or *finish*. Indeed, since these two verbs seem to pattern with the other AVs on syntactic tests (see 3.2 and 5.3 for a fuller discussion of AV syntax), it seems unlikely that a syntactic explanation along could account for their unusual behavior relative to *stop* and *keep*. In short, verbs like *resume* and *finish* remain a genuine puzzle for Milsark (1988) and other theories of doubl-ing.

Secondly, while *stop*-type verbs like *stop* and *keep* only take gerundive complements, *cease* can also take an infinitival complement. So, if a doubl-ing filter like (36) could account for the data in (35), then a sentence like (52) should be grammatical:

(52)   *John was ceasing to read the book (when Mary came in).[2]

Since this sentence is clearly unacceptable, an independent reason for its ungrammaticality will have to be found.

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[2]In certain contexts *cease* seems to be acceptable in a progressive construction:

i   John was ceasing to read many novels (as his graduate studies progressed).

It is interesting that (i) refers to a habitual activity of John's (reading novels), and not to a single event, such as (52) refers to. The unusual behavior of *cease* in such habitual readings will not be explained by the analysis in 4, and must remain a topic for future research.

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How, then, to explain the data we've been discussing? I'd like to propose that a semantic explanation can be found for the data in (35/48). That is, an imperfectivity operator, morphologically realized by *–ing*, may apply to *finish*-type verbs but not to *stop*-type verbs.[3] So, imperfective morphology will be available on *finish*-type verbs, but not on *stop*-type verbs. This will account both for the pattern of data in (35/48) and for the apparent unacceptability of imperfective morphology even when doubl-ing isn't a factor (52). Moreover, as we shall see in 4, this same semantic explanation can account for the appearance of CC in the finish-type but not the stop-type AVs.

This leaves a few questions, neither of which the present work can address in detail. Assuming that the ungrammaticality of (35e-g) arises from a semantic source, then why do certain *finish*-type AVs (as seen in (38)) yield apparent doubl-ing effects, even though they are not subject to the same semantic restrictions as the *stop*-type verbs? And, more generally, just what is the doubl-ing filter, if it is anything at all? Pullum & Zwicky may be on to something with their suggestion that doubl-ing could be nothing more than a partially grammaticalized "phonesthetic dispreference for jingling sequences of similar sounding endings" (Pullum and Zwicky, 1999, 255-256). It is notable that only those *finish*-type verbs which also take infinitival complements

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[3]One puzzling bit of data comes from Ross (1972, 70):

 i *You can go on watching this if you want, but I'm stopping watching it.

 ii You can go on watching this if you want, but I'm stopping ~~watching it~~.

Assuming that elided structure is invisible at PF, then a doubl-ing filter would be able to account for these data, but not a semantic explanation along the lines to be proposed. This is a problem which will have to be addressed in later work.

seem to display doubl-ing effects. This is consistent with the view that there is merely a sort of stylistic dispreference for doubl-ing, such that when an infinitival complement is available, as with *continue* or *start*, the speaker strongly disprefers the *–ing* complement. When no infinitive is available, as with *finish* or *resume*, then the speaker will be forced to make do with the doubl-ing construction.[4] Unfortunately, this thesis doesn't have room to discuss these possibilities more carefully or extensively.

The question now is, can we find a similar explanation for both the ability to allow complement coercion and the ability to take imperfective aspect? These questions shall form the basis of the following discussion. First, though, the syntactic and semantic framework the analysis in 4 will employ should be addressed at greater length.

3.2   The Syntax And Semantics Of AVs

We have already seen that AVs do not seem to have gerundive complements of the nominalizing sort. What sort of syntax do they have then? The syntax of English AVs turns out to be rather complicated in ways that dont seem to be immediately relevant to our concerns (but see 5.3 for some discussion). For this thesis, we shall assume that AVs are verbs which take as their complements imperfective predicates. We shall follow Kratzer (1998) and assume that imperfectivity is encoded by an aspect

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[4]This observation seems to hold more generally. Thus, for verbs like *try* or *attempt*, which take both infinitival and gerundive complements, the doubl-ing filter applies (**John is trying reading the book*, **John is attempting reading the book*). Verbs which only take gerundive complements, and not infinitival complements, like *enjoy* or *consider*, can violate the doubl-ing filter (*John is enjoying reading the book*, *John is considering reading the book*).

operator on the head of Asp(ectual)P. We shall also assume that AspP embeds a vP, where the external argument of the lower verbal predicate is introduced (Kratzer, 1996). For the analysis in 4, we will simply assume that the complement of the AV is a kind of modified control clause. Where most control clauses are assumed to be TPs, we shall assume that AV clauses are genuinely tenseless, and so lack a TP. Instead we will assume that the complement consists of an AspP embedding a vP. At the moment, we shall assume that the external argument for the embedded predicate is introduced by PRO, which is co-indexed with the external argument of the AV. The syntax we are assuming will thus look like (53) below:

(53) $[_{v\text{P}}$ John$_i$ $[_{\text{VP}}$ begin $[_{\text{AspP}}$ $[_{\text{Asp}}$ -ing] $[_{v\text{P}}$ PRO$_i$ eat the apple]]]]

From the perspective of the analysis to be developed in 4, the crucial assumption encoded in (53) is that AVs apply to the output of an imperfectivity operator (*–ing*). This is a semantic, rather than a syntactic assumption. So, while the particular syntactic structure sketched out in (53) may be subject to modifications,[5] it is important for the analyses in 4 to assume that the AV applies to the output of an imperfectivity operator. Let us now see how a structure like (53) might be interpreted.

We shall assume the theory of tense and aspect developed in Reichenbach (1947), Klein (1994), and Kratzer (1998, 2002) inter alia. In this framework, the job of an aspect operator, such as the imperfectivity operator, is to relate the running time associated with an event- or the event time (ET)- to the reference time (RT), which might roughly be described as the time from which one views the event in question. As we saw in (53), we are assuming that aspect operators are introduced by the

[5]Indeed, some modifications will be explored in 5.3 below.

functional category AspP, which appears above vP. A plausible denotation for our imperfectivity operator (realized by the morpheme *–ing*) might be borrowed from Kratzer (1998):

(54) $[\![\text{–ing}]\!] = \lambda P_{\langle s,t \rangle} \lambda t \exists e. \; P(e) \; \& \; t \subset \tau(e)$

According to (54), *–ing* takes a property of events and returns a property of times. It asserts that the property of events is true and that t, the RT, is a proper subinterval of the running time associated with the relevant event (i.e. the ET). The running time of the event is introduced as the output of the trace function τ, where the event itself is the input (Link, 1987). Thus *–ing* relates the ET to the RT, where the latter is a part of the former.[6]

To see how the imperfectivity operator in (54) works, lets see how we might go about constructing a derivation for a predicate like *John is eating the cookie*. First, the denotation for the vP, *John eat the cookie*, might appear as follows:

(55) $[\![\text{John eat the cookie}]\!] = \lambda e. \; \text{eat(the cookie, e)} \; \& \; \text{Agent(e)} = \text{John}$

(55) simply states that e is an event of eating the cookie, of which John is the agent. After application of the imperfectivity operator, we will have a structure like the following:

(56) $[\![\text{John eating the cookie}]\!] = \lambda t \exists e. \; \text{John.eat.the.cookie(e)} \; \& \; t \subset \tau(e)$

John eating the cookie returns a property of the RT, and asserts that the RT comprises a proper subinterval of the running time of some event e, and that e is the

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[6]The reader might note that (54) fails to solve the imperfective paradox, discussed below in section 3.3. However it shall be adequate for our purposes.

event where John eats a cookie. It is such an imperfective property of times that the AVs will apply to. In 3.3, we shall see some evidence that the framework we have proposed is on the right track.

3.3   Some Evidence For This Framework

Now, do we have any evidence that such an imperfectivity operator resides in the gerundive complement of the AVs? Data supporting this hypothesis comes from two sources: what Dowty (1979) labeled the imperfective paradox, and the distribution of stative predicates in the complement position of AVs. An imperfectivity operator with the same *–ing* morphology and (we will assume) identical semantics makes an appearance in English progressive constructions. Such constructions are formed by the application of a copular verb carrying tense information to the output of the imperfectivity operator. An example of this is seen in (57) below:

(57)   John was eating the cookie.

Assuming that was simply denotes a past tense operator, and assuming the imperfectivity operator in (54), then (57) might somewhat informally be translated as (58):

(58)   there is some moment t such that t precedes t_{now} and t forms the proper part of an interval where John eats the cookie.

Different entailments arise from a progressive construction depending upon whether the event encoded within the sentence is telic or atelic. For instance, an atelic

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progressive sentence (59a) entails that the perfective form of the sentence is also true (59b):

(59)   a. John was eating.

       b. John ate.

However, this entailment does not arise for telic predicates. In other words, a telic progressive (60a) does not entail that its corresponding perfective form is true (60b):

(60)   a. John was eating the cookie.

       b. John ate the cookie.

Various solutions to this problem have been proposed.[7] Most of these solutions have been inspired by Dowty's original discussion of the paradox, which attributed the failure of the entailment in telic predicates to the semantics of the imperfectivity operator itself. According to Dowty, an imperfectivity operator may take in a telic predicate P, but does not assert that P is true at t in w_0. Rather, it asserts that P is true at some t' in some w' such that t is a proper subinterval of t' and w' is an *inertial world* of w_0 at t. An inertial world is one which is identical to the present world assuming, to state things somewhat vaguely, that things continue going in the same direction. So, a statement like (60a) says something like:

(61)   There exists some moment t such that t precedes t_{now}, and t is the proper subpart of some interval t' in w_0 where for all w' such that w' is an inertial world of t at w_0, John eats the cookie in the interval t' in w'.

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[7]See Portner (1992, chapter 5), Zucchi (1999) for discussions of some of the most prominent of these.

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The details of what constitutes an inertial world turn out to be quite vexing, but what's important for our purposes is that the imperfective paradox arises from the semantics of the imperfectivity operator realized as *–ing*. Now, if this same imperfectivity operator appeared in the gerundive complements of AVs, then we would predict the imperfective paradox to arise in AV constructions. This indeed seems to be the case. As with the progressive construction in (59), both *stop*-type and *finish*-type aspectual verbs entail the perfective form of the complement when the predicate is atelic:

(62) a. John stopped eating.

   b. John ate.

   c. John began pushing the wheelbarrow.

   d. John pushed the wheel barrow.

However, we see in (63) that AVs do not entail the perfective form of their complement when the predicate is telic. So (63a) does *not* entail (63b), and (63c) does not entail (63d):

(63) a. John stopped eating the cookie.

   b. John ate the cookie.

   c. John began building the wheelbarrow.

   d. John built the wheel barrow.

These facts would follow if we assumed that an imperfectivity operator, identical to that appearing in progressive constructions, showed up in the complement position of AVs. Note that the imperfective paradox is most easily explained if we assume that

the imperfectivity operator is intensional. Since such intensionality will not prove important for the rest of our discussion, we shall ignore it henceforth, and revert to the non-intensional imperfectivity operator offered (54).

Next, consider the behavior of stative predicates in the complement position of AVs. Returning to our comparison of progressive constructions and AV constructions, we might note that, in general, stative predicates sound infelicitous when embedded within progressive constructions:

(64) a. #John was liking fish.

      b. #Bill was loving Patricia.

      c. #François was being afraid.

Such stative predicates do not have troubling combining with AVs, however:

(65) a. John started liking fish.

      b. Bill kept loving Patricia.

      c. François stopped being afraid.

Dowty (1979), following work by Taylor (1977), suggests the following explanation for the infelicity of the sentences in (64). A stative asserts that some property (e.g. *loving Mary*) holds for all (contextually relevant) moments of time. A progressive picks out a moment of time inside of the interval during which some property holds. Now, since stative properties already hold of all contextually relevant moments of time, it is simply redundant to pick out a moment of time associated with a stative and state that the stative holds at that moment.

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However, Comrie (1976) and Dowty (1979) note that certain stative predicates allow a progressive reading under the right circumstances. The most common perhaps involve the verb *live*. This can appear, for instance, in both the simple present (66a) and progressive (66b) variety, with subtle differences in meaning:

(66)   a. John lives in Chicago.

          b. John is living in Chicago.

(66a) seems to indicate that Johns living in Chicago is a more or less permanent state of affairs. (66b), on the other hand, indicates either a certain degree of uncertainty about John's place of residence or that John is only temporarily a resident of Chicago. In other words, the progressive is acceptable with certain stative predicates as long as the truth of the proposition in question is highly uncertain or the state a temporary one. Something similar happens with a stative verb like *stand*. In certain situations, the progressive form seems infelicitous:

(67)   a. An old oak tree stands in my backyard.

          b. #An old oak tree is standing in my backyard.

While (67a) simply indicates that for all contextually relevant times there is an old oak tree standing in my back yard, the progressive form in (67b) again lends the state an air of temporariness or uncertainty. (67b) would only be felicitous if the old oak tree had the capacity to move, which makes it sound odd out of the blue. In a slightly different context, however, predicates involving *stand* sound alright in the progressive form:

(68) a. An old bird bath stands in my backyard.

b. An old bird bath is standing in my backyard.

Again, while (68a) indicates a situation where the old bird bath is a permanent fixture of my backyard, (68b) indicates a situation where the bird bath's presence in my backyard is quite possibly temporary.

To explain this sort of behavior, Dowty invokes Carlson (1977) and the distinction between stage-level and individual-level predicates. Stage-level predicates, to put things informally, are properties that hold of an individual during a particular interval. Individual-level predicates hold of an individual generally. Carlson's own system is rather complicated, and requires ontological assumptions which differ markedly from our own analysis. However, Kratzer (1995) provides a semantics for individual-level and stage-level predicates more in line with the analysis in 4. Kratzer claims that the two predicate classes differ in their argument structure: viz. stage-level predicates have an extra argument for eventualities that individual-level predicates lack.

Let's see how this might work for a stage-level/individual-level ambiguous stative predicate like *live in Chicago*. For its individual-level interpretation, it would simply be a property of individuals, which we might represent in a somewhat simplified denotation like (69):

(69) $[\![\text{live.in.Chicago}_1]\!] = \lambda x.\ \text{live.in.Chicago}(x)$

(69) simply says that an individual x possesses the property of living in Chicago. For the stage-level reading, *live in Chicago* would be a relation between individuals and eventualities, and so might have a denotation like (70):

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(70) $\llbracket$live.in.Chicago$_2\rrbracket$ = λxλe. live.in.Chicago(x)(e)

(70) says that e is the eventuality of x living in Chicago. Crucially, once the external argument of (70) has been saturated, it will be a property of eventualities, and so will be able to interact with our imperfectivity operator. So, a statement like *John is living in Chicago*, would have a denotation like (71), ignoring tense:

(71) $\llbracket$John.living.in.Chicago$\rrbracket$ = λt$\exists$e. live.in.Chicago(e) & t $\subset$ τ(e)

(71) now states that t, the RT, is a proper subinterval of the running time of some event e, where is the event of John living in Chicago. Notably, the individual-level version of *live in Chicago*, lacking an event argument, will never have the proper type to interact with an imperfectivity operator, so a progressive construction like (66b) necessarily has a stage-level reading.

Interestingly, it appears that a stage-level reading is possible for many other stative predicates, so long as the right context is provided. Take, for instance, a stative predicate such as *like fish*. Out of the blue, this predicate accepts simple present tense (72a), but the corresponding progressive (72b) appears infelicitous:

(72)   a. John likes fish.

b. #John is liking fish.

A statement like (72b) probably feels infelicitous because, under normal circumstances, one's taste in fish remain constant throughout life, and so an individual-level reading is more appropriate than a stage-level reading. But imagine speaking to the parent of a young child. This parent might complain that his daughter is a very picky eater, which makes planning dinner very difficult. The daughter is particularly

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difficult when it comes to fish. The parent serves fish for dinner every Friday. One week, the daughter will claim she loves fish and demand she be served it more often. The next, she will claim it is disgusting and that she never wants to eat it again. Then the parent utters (73):

(73)   Last week, luckily, my daughter was liking fish (But who knows about this week).

In such a context, a stage-level reading for *like fish* sounds perfectly reasonable. Again, however, this is a context which requires the state to be a possibly temporary one, necessitating a stage-level reading.

A similar example, noted by Deo (2011), concerns *Mary was weighing 110 lbs.* Out of the blue, this sounds infelicitous, since predicates like *weigh X lbs* are most naturally employed as individual-level properties. But in circumstances where Mary's weight is fluctuating a great deal, such as after a pregnancy, and where her present weight might be temporary, then a stage-level reading might be appropriate, and so a statement like *Mary was weighing 110 lbs* at that point sounds perfectly reasonable.

The imperfectivity operator, then, may accept stative predicates, but only in contexts where a stage-level reading is appropriate. This accords with our intuitions about that stative complements of AVs that we saw in (65) above, repeated as (74) below:

(74)   a. John started liking fish.

       b. Bill resumed loving Patricia

       c. François stopped being afraid of snakes.

Intuitively, an AV describes a change in the status of the property encoded in the complement over time (this will be spelled out more explicitly in 4.2 below). Consequently, only the stage-level variety of stative, which may hold over particular intervals, should be possible in the complement position. This is consistent with the hypothesis that an imperfectivity operator resides in the complement position of AVs.

Interestingly, a subset of stative predicates do not seem to allow stage-level readings. For instance, *know*, as was observed by Comrie (1976) and Dowty (1979), can not appear in a progressive construction, even when it is describing a potentially temporary state. Imagine that François, a native speaker of French, suffers from frequent and temporary lapses into a kind of general aphasia, wherein he displays absolutely no sign of possessing any knowledge of his native language. In these cases, a statement like (75) still sounds infelicitous:

(75)   #Today, François is knowing French.

(75) is infelicitous despite the context, where Franois knowledge of French is a possibly temporary state. Dowty observes that, while the truth of statives that allow the progressive can be ascertained by observing a large of enough number of instances where the state seems to hold, ascertaining that *François knows French* does not work in the same way. Instead, something like *know French* is just a property that holds of François. It thus seems to always be an individual-level property, and never a stage-level property. This holds with certain other statives like, *be American*. Imagine that John managed to renounce and then regain US citizenship repeatedly. At the moment, he happens to have US citizenship, but it appears that he might

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renounce it at any moment. Even in such a context, (76b) still sounds odd, just as (76a) does.

(76) a. #John is knowing French.

   b. #John is being American.

We have reasons to believe that the unacceptability of the sentences in (76) derives from their incompatibility with imperfective aspect. Briefly, the imperfectivity operator picks out a sub-part of an interval over which some property of events holds. But individual-level predicates dont hold over intervals, or over events with an associated interval. They hold only over individuals. Moreover, unlike the potentially stage-level predicates discussed above, one cannot derive from the predicates in (76) a property which does hold over eventualities. Thus an imperfectivity operator will simply be unable to interact with such predicates.

If it is the case, as we have hypothesized in 3.2, that the *–ing* morpheme in the AV complements encodes a similar imperfectivity operator, then these inherently individual-level statives also ought to appear infelicitous when placed in the complements of AVs:

(77) a. #John began knowing French.

   b. #John stopped being American.

As we can see in (77), such stative predicates are indeed infelicitous.

It seems to be the case then that AVs may interact with stative predicates, but only those stative predicates that allow stage-level interpretations and hence may interact with an imperfectivity operator. The data we have seen for statives, then, is

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consistent with the hypothesis that the complements of AVs contain an imperfectivity operator.[8]

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[8]The reader might wonder about a stative like *be afraid*. It can easily combine with AVs (e.g. *John stopped being afraid*). But, as with *know French*, it seems incapable of taking a progressive reading. I'd like to suggest this is because it is an inherently stage-level predicate. Thus, with many statives the progressive allows us to distinguish between the individual-level and stage-level readings. On the other hand, some statives are only individual-level predicates, and so they cannot combine with an imperfectivity operator. *Be afraid* could combine with such an operator in principle, since it is a stage-level predicate, but such an operation is redundant because this predicate only holds of particular intervals anyway. One needn't say *John was being afraid at the haunted house* because *John was afraid at the haunted house* says the same thing more directly. However, *be afraid* and other potentially stage-level predicates can combine with imperfectivity operators in principle, since they hold over events, and so they can appear in AV constructions.

Chapter 4

A TYPE-BASED ANALYSIS OF ASPECTUAL VERBS AND COMPLEMENT COERCION EXPLAINED

4.1 What Is To Be Explained And How

Our current task, as outlined in 3.1, is to explain why a subset of aspectual verbs, those of the *finish*-type, both allow complement coercion and may take imperfective morphology. Let's tackle the second of these observations first.

We have already determined that aspectual verbs take as their complement imperfective predicates. Such imperfectivity we have assumed arises from an imperfective operator like (54), repeated as (78) below:

(78) $[\![-\text{ing}]\!] = \lambda P_{\langle s,t\rangle}\lambda t\exists e.\ P(e)\ \&\ t \subset \tau(e)$

This operator takes properties of events and returns properties of times. We also observed in (35), repeated as (79) below, that *finish*-type AVs may appear in progressive constructions, while *stop*-type verbs may not:

(79)   a.   John was beginning to read the book (when the phone rang).

     b.   John was starting to read the book (when the phone rang).

     c.   John was finishing reading the book (when the phone rang).

     d.   John was resuming reading the book (when the phone rang).

     e.   *John was stopping reading the book (when the phone rang).

     f.   *John was keeping reading the book (when the phone rang).

     g.   *John was ceasing reading the book (when the phone rang).

Following Kratzer (1998), we will assume that such progressive constructions also require an imperfectivity operator that is morphologically realized by *–ing*.

It would appear then that, for a sentence like (80) below, the AV is sandwiched in between two imperfectivity operators:

(80)   John is finishing reading the book.

So, if the imperfectivity operator maps properties of events to properties of times and has the type $\langle\langle s,t\rangle,\langle i,t\rangle\rangle$, *finish*-type verbs simply do the reverse. Taking properties of times, they return properties of events. Consequently, they should have type $\langle\langle i,t\rangle,\langle s,t\rangle\rangle$. This formal somersault, among other things, predicts the possibility of stacking imperfective operators and *finish*-type AVs on top of each other indefinitely:

(81)   John was resuming finishing reading the book.

(81) is rather hard to parse, but does indeed sound acceptable.

We have also observed that, while the complements of *stop*-type verbs appear to be imperfective predicates, the *stop*-type AV itself cannot appear in a progressive construction, as we see in (82) below:

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(82) *John was stopping reading the book.

While one might attribute the ungrammaticality of (82) to a PF-level doubl-ing filter (Ross, 1972; Milsark, 1988), we have seen that the doubl-ing filter has trouble accounting for the full spectrum of data seen in (79). Instead, let's suppose that *stop*-type AVs simply modify properties of times, and so have the type $\langle\langle i,t\rangle,\langle i,t\rangle\rangle$.

If this were the case, then we would have an explanation for the data in (79). Both *finish*-type verbs and *stop*-type verbs take in predicates of type $\langle i,t\rangle$, but while the former return predicates of type $\langle s,t\rangle$ and so can again combine with an imperfectivity operator of type $\langle\langle s,t\rangle,\langle i,t\rangle\rangle$, stop-type verbs return predicates of type $\langle i,t\rangle$, which cannot combine with imperfectivity operators again. Let's see if we can construct denotations for the AVs which might plausibly capture this distinction.

4.2   The Semantics Of Aspectual Verbs

The following treatment of aspectual verbs is largely inspired by Portner (1992, chapter 5), which was itself heavily influenced by ter Meulen (1985). Portner's system resides in the framework of situation semantics. As we have seen in 4.1, though, our observations about *finish–* and *stop*-type verbs, and their relations to imperfectivity operators, can be most easily stated when we assume events and times as primitives. Accordingly, the analysis here will differ somewhat from Portner's own.

Intuitively, AVs pick out a subinterval corresponding to the interval associated with the running time of an event and situate that subinterval in time. So, if I say that *John stopped eating the cookies*, I am saying in effect that there was some moment in the past when John was eating the cookies; at the next moment, he was

no longer eating the cookies. For *John began eating the cookies*, I'm saying that there was no time before the reference time when the event of eating the cookies was being carried out, but from that time onward the event is being carried out. Similarly *John finished eating the cookies* means that the whole interval of times during which the cookie eating occurs must precede some moment. After that moment, the event of eating the cookies will be entirely used up, so to speak.

With these intuitive definitions in mind, let's propose a denotation for the representative *stop*-type verb:

(83) $[\![stop]\!] = \lambda f_{\langle i,t \rangle} \lambda t.\ f(t)\ \&\ \neg \exists t'[t\ \textit{immediately precedes}\ t'\ \&\ f(t')]$

Notice that (83) satisfies our desire from 4.1 for a *stop*-type function to have the type $\langle \langle i,t \rangle, \langle i,t \rangle \rangle$. It says that a property of times is true at an interval t but is not true at an interval t' which it immediately precedes. *Immediate precedence* might be defined as follows:

Immediate Precedence (i.p.): t immediately precedes t' iff t precedes t' and there does not exist any t" that comes between t and t'.

Now let's see how (83) might combine with an imperfective predicate, like *John eating the cookies.* Recall that this had the following semantic denotation:

(84) $[\![John\ eating\ the\ cookie]\!] = \lambda t \exists e.\ John.eat.the.cookie(e)\ \&\ t \subset \tau(e)$

When *stop* applies to (84), it will return a structure like the following:

AVP
$\langle$i,t$\rangle$
λt. John.eating.the.cookie(t)
& ¬∃t′[t i.p. t′ & John.eating.the.cookies(t′)]
John stop eating the cookie

AV
$\langle\langle$i,t$\rangle$,$\langle$i,t$\rangle\rangle$
λfλt. f(t) & ¬∃t′[t i.p. t′ & f(t′)]
stop

AspP
$\langle$i,t$\rangle$
λt∃e. John.eat.the.cookie(t)
& t ⊂ τ(e)
John eating the cookie

Asp
$\langle\langle$s,t$\rangle$,$\langle$i,t$\rangle\rangle$
λpλt∃e. p(e)
& t ⊂ τ(e)
–ing

vP
$\langle$s,t$\rangle$
λe. eat(the cookie, John, e)
John eat the cookie
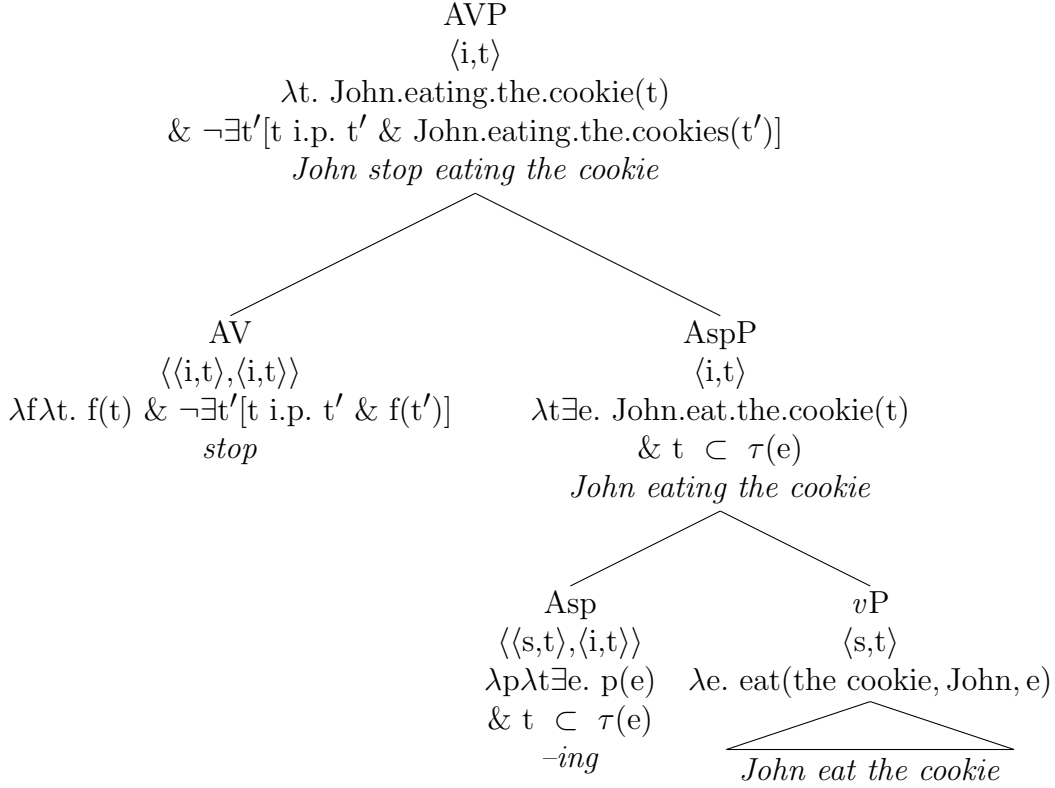
Figure 4.1: **Derivation for *John stopped eating the cookie.***

(85) ⟦John stop eating the cookies⟧ = λt. John.eating.the.cookies(t) & ¬∃t'[t
immediately precedes t' & John.eating.the.cookies(t')]

(85) says that at t, the reference time, John is eating the cookie, but at the very next moment, he is no longer eating the cookie. This can be seen even more clearly in a tree structure, such as figure 4.1 above.

Lets now consider a denotation for *finish*:

(86) ⟦finish⟧ = λf$_{\langle i,t\rangle}$λe. f(τ(e)) & ¬∃t[τ(e) < t & f(t) = 1]

(86) says that the property of times f is true for the interval corresponding to the

running time of an event e and that there are no times following the running time of e for which the property of times f is true. So f does not hold for any time intervals following the running time of e. Notably, verbs like *finish* are now predicted to have a type $\langle\langle i,t \rangle,\langle s,t \rangle\rangle$.

Note that (83) and (86) are identical except in two crucial respects. First, instead of taking a time t as an argument as (83) does, (86) takes an event argument e, whose corresponding interval $\tau(e)$ f can apply to. This allows us to explain the type differences between *stop* and *finish* discussed in 4.1. Furthermore, the semantic differences between these two verbs are explained as the difference between immediate precedence and precedence ($<$), where precedence merely indicates that t precedes t'. This captures our intuition that, when one stops eating the cookies, one may resume at some point in the future, since it is only the moment immediately following t in (83) where f(t) cannot be true. Whereas for *finish*, there cannot be any future intervals t in which one eats the cookies.

Of course, it is actually too strong to say, as (86) does, that there are no possible future intervals with the relevant property. For instance, one might resume eating some cookies at some point in the future, even if one has finished eating the current batch. Therefore, some sort of contextual restriction is necessary, which is represented by C in (87):

(87) $[\![\text{finish}]\!] = \lambda f_{\langle i,t \rangle} \lambda e.\ f(\tau(e))\ \&\ \neg \exists t \text{ in } C[\ \tau(e) < t\ \&\ f(t) = 1]$

(87) says essentially the same thing as (86), except that the set of times is now restricted to those that are contextually relevant. Unlike (86), (87) does not say that one has finished performing the relevant activity for *all time*, but merely that one

has finished the activity for all contextually relevant times.

Interestingly, we can also develop a denotation for begin that is almost identical to *finish*, except for one tweak:

(88) $\llbracket \text{begin} \rrbracket = \lambda f_{\langle i,t \rangle} \lambda e.\ f(\tau(e))\ \&\ \neg \exists t[\ t < \tau(e)\ \&\ f(t) = 1]$

Again, we have a function of type $\langle \langle i,t \rangle, \langle s,t \rangle \rangle$, in accordance with the discussion in 3.1. Unlike (86), $\tau(e)$ in (88) follows, rather than precedes, the time t. This captures the difference between *finish* and *begin*. The former indicates the final moment of doing something, the latter the initial one. Also, as with (86), (88) states that there are no time intervals with the relevant property which precede $\tau(e)$. This is clearly too strong, so again some context restriction is necessary. Thus a reasonable denotation for *begin* might look like (89):

(89) $\llbracket \text{begin} \rrbracket = \lambda f_{\langle i,t \rangle} \lambda e.\ f(\tau(e))\ \&\ \neg \exists t\ \text{in}\ C[\ t < \tau(e)\ \&\ f(t) = 1]$

For the sake of completeness, a denotation for *finish eating the cookies* appears in figure 4.2. A denotation for *begin eating the cookies* would work in much the same way.

These denotations (83-89) illustrate how we might go about constructing semantic representations for the entire class of aspectual verbs. It seems likely that denotations for all of the *stop*-type and *finish*-type AVs could be constructed along these lines. For instance, *keep* might simply be regarded as the inverse of *stop*. Rather than saying that a property holds at t and fails to hold at the following time t', keep asserts that relevant property still holds at the following time t'. Its denotation might then look like (90):
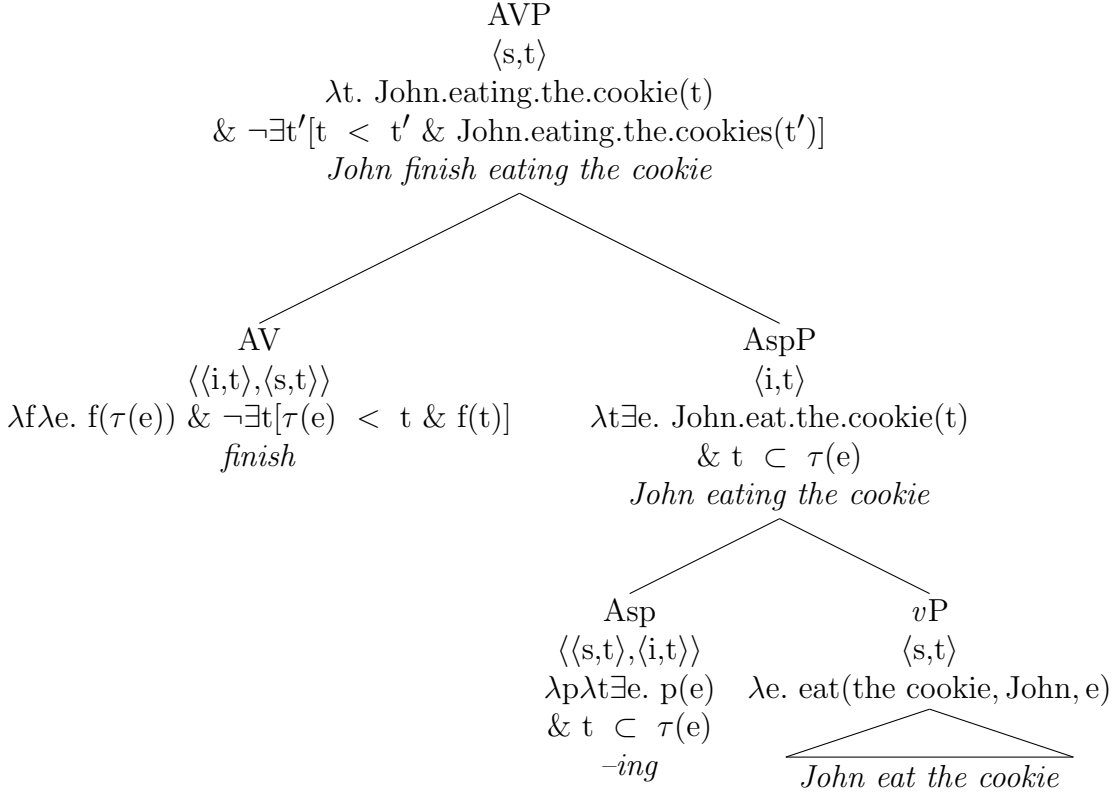
AVP
$\langle$s,t$\rangle$
λt. John.eating.the.cookie(t)
& ¬∃t′[t < t′ & John.eating.the.cookies(t′)]
John finish eating the cookie

AV
$\langle\langle$i,t$\rangle,\langle$s,t$\rangle\rangle$
λfλe. f(τ(e)) & ¬∃t[τ(e) < t & f(t)]
finish

AspP
$\langle$i,t$\rangle$
λt∃e. John.eat.the.cookie(t)
& t ⊂ τ(e)
John eating the cookie

Asp
$\langle\langle$s,t$\rangle,\langle$i,t$\rangle\rangle$
λpλt∃e. p(e)
& t ⊂ τ(e)
–ing

vP
$\langle$s,t$\rangle$
λe. eat(the cookie, John, e)

John eat the cookie

Figure 4.2: **Derivation for *John finished eating the cookie.***

(90) ⟦keep⟧ = λf$_{\langle$i,t$\rangle}$λ. f(t) & ∃t'[t *immediately precedes* t' & f(t')]

A denotation for *resume* and the other AVs might also be constructed along these lines. But such a project wont be pursued here. What's important is that we have developed a system which allows us to capture the apparent type difference between the two verb classes discussed in 4.1, and thereby to account for their behavior with imperfective morphology (this will be discussed at greater length in 4.4). Moreover, it also lays the groundwork for a mechanism that can account for complement coercion.

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4.3 Complement Coercion Explained

We are now, I think, in a position to explain the transitive alternation seen in (1) above (reproduced as 91 below):

(91)   a. John began reading the book.

        b. John began the book.

While the same AV appears in (91a) and (91b), the altered form (91b) has several curious properties. For one, the aspectual verb now appears to be a transitive verb. Whats more, as Pustejovsky (1993) inter alia have observed, (91b) seems to carry some sort of hidden predicate. The sentence is saying that John began doing something with the book in question.

This *doing something* is itself restricted in several unusual ways. In particular, the possible predicates are inherently telic. So, while atelic predicates are acceptable in (92a) and (92c), their alternations in (92b) and (92d) are not:

(92)   a. John resumed pushing the cart.

        b. *John resumed the cart.

        c. John began reading books.

        d. *John began books.

Other odd restrictions seem to exist on the altered form of the aspectual verb. For instance, Lascarides and Copestake (1998), following Godard and Jayez (1993), have observed that complement coercion may not apply to verb phrases referring to distances, for instance:

(93)   a. John began crossing the desert.

        b. *John began the desert.

The extent and nature of these thematic restrictions on complement coercion shall not be pursued in this thesis. Recall from 2.3 that Lascarides and Copestake (1998) had assumed a constant *act-on-pred*, which constrained the range of possible interpretations for coercing sentences. We will assume the existence of a similar abstract predicate, called *Pred*, which likewise restricts the range of possible interpretations. Being a sort of abstract transitive predicate, we will assume that it is a relation between individuals and events.

Lascarides and Copestake (1998) assumed the existence of a nominal qualia structure which allowed a fully specified interpretation to emerge. However, they assumed that such interpretations were defeasible, and subject to reinterpretation depending upon contextual and world knowledge factors. We will depart from Lascarides and Copestake with regard to the existence of qualia structure, and instead assume that the interpretation for *Pred* is filled in entirely by world-knowledge and contextual factors. While a fully worked out theory of CC interpretation will not be on offer, in 5.1 we will discuss how Lascarides and Copestakes work provides an excellent starting off point for building such a theory.

How might *Pred* be inserted into the derivation in a compositional manner? Recall that the AVs require imperfective predicates. It makes sense then to assume that *Pred* must be embedded inside of some sort of imperfectivity operator. I'd like now to propose that the insertion of this imperfectived *Pred*, and hence complement coercion, is carried out by an operator which applies to *finish*-type verbs and re-
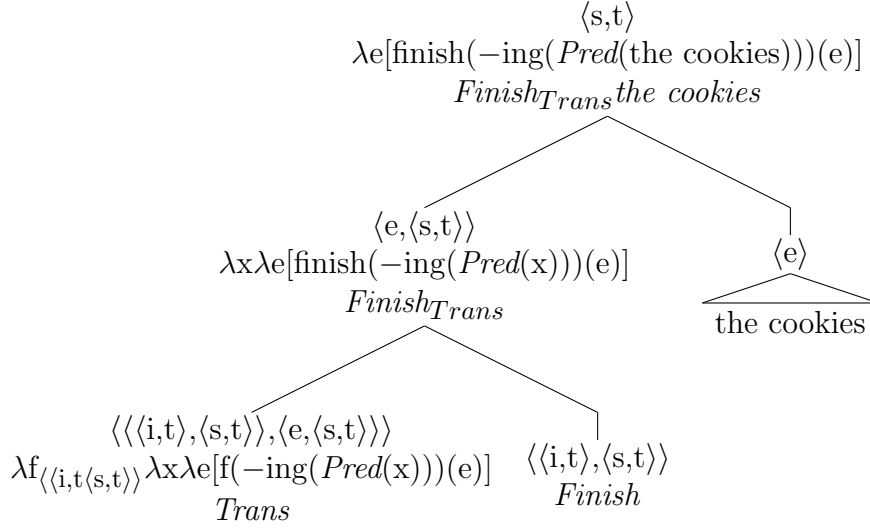
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Figure 4.3: **Derivation for *Finish the cookies*.**

turns transitive verbs. We will call this operator *Trans*. Syntactically, I assume that this operator appears as a phonologically null affix to the aspectual verb. Here is a possible denotation for it:

(94) $[\![\text{Trans}]\!] = \lambda f_{\langle\langle i,t\rangle\langle s,t\rangle\rangle}\lambda x\lambda e\exists.\ f(\text{-ing}(Pred(x)))(e)$

Essentially, *Trans* takes an argument of the type of a *finish*-type aspectual verb and returns a transitive verb, type $\langle e, \langle s, t\rangle\rangle$. It does so by positing an imperfectived verbal predicate *Pred* in the argument position of the aspectual verb, and allowing the individual argument of the aspectual verb to be interpreted as the argument of this predicate. The construction of *finish the cookies* is illustrated by the tree in figure 4.3.

Now, let's see how this proposal allows us to explain the data discussed in chapters 2 and 3.

4.4   Some Consequences Of The Type-Based Analysis

Of the CC analyses discussed in 2, the most cogent were the NP type-shifting analysis presented in Pustejovsky (1991, 1993) and the underspecification analysis of Copestake and Briscoe (1992, 1995), and Lascarides and Copestake (1998). While the NP type-shifting analysis succeeded in explaining how these constructions acquire their default interpretation, it had several drawbacks. For one thing, it made wrong predictions about the coordinate structure facts in (16) and (17). For another, it failed to predict the variable availability of complement coercion in aspectual verbs. While the underspecification theory discussed in 2.4 can account for (16), it still has problems with (17). Lets consider first (16), repeated as (95) below:

(95)   John picked up and started the book.

Pustejovsky's NP type-shifting analysis predicts that this sentence should be ungrammatical, as the nominal will simultaneously have to have the type of a nominal, in order for *pick up* to apply, and a verbal predicate, in order for *start* to apply. A theory which holds that complement coercion stems from underspecification in the coercing verb, such as Copestake and Briscoe (1995) and Lascarides and Copestake (1998), will correctly predict (95) to be grammatical. Likewise, the type-based analysis developed in this work makes the correct prediction about (95). Under this theory, an abstract operator, *Trans*, will be affixed to the AV (as we see in figure 4.3). Since *Trans* returns an AV that takes a nominal complement, just like *pick up* does, no type clash will arise.

(17a), repeated as (96) below, shows that an aspectual verb cannot take NP and VP complements:

(96)   # John began the DVD and eating popcorn.

Recall first that, depending upon one's assumptions, a syntactic explanation for the unacceptability of (96) is conceivable. Leaving that possibility aside, semantically the NP type-shifting analysis incorrectly predicts that (96) should be acceptable, since *the DVD* will be shifted to have the same type as *eating popcorn*, so no type-clash should ensue. For the underspecification theory, I do not think that a syntactic explanation is available. Since AVs like *begin* accept both nominal and verbal predicates as complements, then coordination of both complements should be possible for AVs. Thus, this theory also makes incorrect predictions about (96), absent some stipulations about the possible coordinate structure of AV complements.

However, our type-based analysis of complement coercion provides a semantic explanation of (96), independent of ones syntactic assumptions. In order for *begin* to apply to *the DVD*, *Trans* must apply to the verb, generating an AV that takes a nominal complement. Its semantics would resemble those of figure 4.3. However, for *begin* to apply to a verbal predicate like *eating popcorn*, *Trans* must not have applied to it. Thus, for (96) to be grammatical under our theory, *Trans* must be at once present and absent. Since this is clearly impossible, the type-based analysis correctly predicts that (96) is ungrammatical.

The *Trans* analysis also makes correct predictions about the facts that hindered the simple syntactic analysis discussed in 2.1. Recall that, in (5) and (6), repeated below as (97) and (98), modifiers could modify both the verbal complement and the aspectual verb itself:

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(97) a. Mary [finished [eating the meal slowly]]

  b. Mary [finished [eating the meal] slowly]

(98) a. Mary [finished [baking the bread in the oven]]

  b. Mary [finished [baking the bread] in the oven]

This follows from the structure in figure 4.2, where both an overt verbal complement and aspectual verb are available for modification. In the coercing sentences, like (7) and (8), repeated as (99) and (100) below modification can only occur to the aspectual verb:

(99) a. Mary [finished the meal slowly]

  b. *Mary [finished [**VERB** the meal slowly]]

(100) a. Mary [finished the bread in the oven]

  b. Mary [finished [**VERB** the meal slowly]]

This is because these constructions lack any overt verbal complement, as figure 3 shows. The abstract predicate *Pred* is instead embedded inside of the AV itself. So, if an adverb modifies Pred, it must also modify the AV, and so interpretations like (99b) and (100b) are impossible. The *Trans* analysis also predicts this outcome.

  Now lets turn to the observations made in 3.1: that the *finish*-type verbs allow both CC and take imperfective morphology, while the *stop*-type verbs allow neither. Recall that the NP type-shifting analysis incorrectly predicted all AVs to allow CC. The underspecification theory left CC availability up to idiosyncratic lexical variation, so a correlation such as this one would be highly surprising. However, the analysis developed in 4 accounts for both CC availability and the availability

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of imperfective morphology with the same mechanism: the type difference between the two verb classes. *Finish*-type verbs, we hypothesized, take properties of times into properties of events, and so have a type of $\langle\langle i,t\rangle,\langle s,t\rangle\rangle$. Since imperfectivity operators, we assume, take properties of events into properties of times, our theory correctly predicts that they should be able to apply to finish-type predicates. Notice that a second application of the imperfectivity operator is impossible with stop-type verbs, which have a type of $\langle\langle i,t\rangle,\langle i,t\rangle\rangle$, and therefore block the application of the imperfectivity operator.

In 4.3, it was argued that complement coercion could be explained by a complex operator, *Trans*, which applies to the AV. *Trans* must apply to an argument of a specific type. Since the *finish*-type and *stop*-type verbs differ in type, it cannot apply to both. We assumed that it applies only to verbs of type $\langle\langle i,t\rangle,\langle s,t\rangle\rangle$, that is to *finish*-type verbs. So complement coercion is possible with finish-type verbs, but not with verbs of the *stop*-type. Thus a single type difference accounts for both of these phenomena.

4.5   Summary

When considering the problem of complement coercion, we first observed that previous analyses of the phenomenon fail for one reason or another. In particular, Pustejovsky's NP type-shifting analysis of CC seems to make incorrect predictions about the behavior of AVs in certain coordinate structures. Moreover, it overgeneralizes, and predicts that CC should be available across the set of AVs. An underspecification-based analysis of CC makes correct predictions about the coor-

dinate structures in (16), but not those in (17). Also, while it can account for the selective availability CC in AVs, it must do so at the level of idiosyncratic lexical variation.

To develop a new analysis of CC, we first observed that AVs could be divided into two classes: the *finish*-type verbs, which allow complement coercion; and the *stop*-type verbs, which do not. It was also observed that, while the former also allow imperfective morphology, the latter do not. We next sketched out some syntactic and semantic assumptions about AV structures. We assumed that AVs take as their complement imperfective predicates. We assumed that the imperfectivity of the verbal complement stemmed from the application of an imperfectivity operator, which itself was the head of a AspP. This imperfectivity operator takes in properties of events and returns properties of a time which is a part of the running time associated with that event. We also explored some data consistent with these hypotheses, related to the imperfective paradox and the behavior of stative predicates in the complement position of AVs.

Since this imperfectivity operator can apparently apply to *finish*-type verbs, and since *finish*-type verbs can apply to the imperfectivity operator, it makes sense to assume that finish-type verbs are the inverse of the imperfectivity operator. They take properties of times and return properties of events. The *stop*-type verbs, on the other hand, simply modify properties of times. Consequently, imperfectivity operators cannot apply to them. We then proceeded to develop a semantics for AVs consistent with these type distinctions.

This accounts for the imperfective morphology data, but what about complement

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coercion? For this, we argued for the existence of an abstract predicate *Pred*, which is introduced into the derivation by an operator *Trans*. *Trans*, which can only apply to predicates with the type of the *finish*-type verb, essentially turns that verb into a transitive verb. The argument of the transitivized *finish*-type verb then becomes the logical argument of *Pred*. Now, since *Trans* can apply to a *finish*-type verb, it cannot apply to a *stop*-type verb. Thus, a single factor, the type difference between the two verb classes, explains these two apparently unrelated phenomena.

There are a few puzzling components to this analysis, which will have to be explored more carefully in future work. In 5, I would like to make some suggestions about how such work might proceed. First, we have assumed the existence of an abstract predicate, *Pred*, but offered no hint about how its interpretation might be filled in. Some ideas about this will be sketched out in 5.1 below. Also, many authors (Pustejovsky, 1993; Lascarides and Copestake, 1998) have observed that certain non-AVs, such as *enjoy*, seem to allow an alternation very similar to AV complement coercion. In 5.2, we shall see how these *enjoy*-type verbs resemble *finish*-type AVs, and how our analysis of AVs may be extended to these verbs.

Finally, we assumed that AVs are a sort of modified control verb. The AV, we assumed, embeds an AspP, rather than a full TP. The eternal argument of the embedded predicate is provided by a PRO which is controlled by the external argument of the matrix clause. While this seems to account for several semantic facts about AV complements, it is a somewhat non-standard syntactic analysis. In 5.3 we will explore some other syntactic possibilities for AVs.

Chapter 5

WHAT'S NEXT?

5.1 *Pred* And The Interpretation Of Coerced Predicates

In 4.3, we posited the existence of an abstract predicate, *Pred*. Its most obvious limitation is that it is not at all clear how it works. How, for example, does one infer that in a sentence like *John began the book* John is most likely beginning reading the book, rather than doing something else with it? Perhaps the most interesting theory for such interpretation was proposed by Lascarides and Copestake (1998). Recall from 2.4 that these authors assume a qualia structure similar to Pustejovsky's, along with coercing verbs that are underspecified as to the type of their complement. Lascarides and Copestake also posit an abstract constant within the coercing verb called *act-on-pred*. In order to acquire a default interpretation, a co-indexation mechanism links *act-on-pred* to either the telic or the agentive qualia role within the verbs NP complement. What allows for contextual modification along the lines of (15) above? Lascarides and Copestake argue that qualia information is marked as default within the lexicon. This default information can then be overridden by contextual factors. This latter operation is spelled out with a pragmatic theory called Discourse In Commonsense Entailment, or DICE (Asher and Morreau, 1991; Lascarides and Asher, 1993; Lascarides et al., 1996).

Lascarides and Copestake provide a very elegant solution to the problems of CC interpretation. It would be an interesting task to combine their system with

the one developed in the present work. In particular, there are suggestive parallels between the *act-on-pred* of their analysis and *Pred* posited above. While integrating our analysis with their model may yield very interesting results, Lascarides and Copestake assume a markedly different syntactic-semantic framework from ours, and the task will be a formidable one.

5.2   Complement Coercion And *Enjoy*-Type Verbs

As many authors have observed (Pustejovsky, 1991, 1993; Lascarides and Copestake, 1998), complement coercion appears to extend beyond the set of *finish*-type AVs. Consider, for instance, verbs like *enjoy* and *attempt*:

(101)   a.   John enjoyed (reading) the novel.

        b.   John attempted (reading) the novel.

For convenience, we will call non-AVs that appear to allow complement coercion *enjoy*-type verbs. *Enjoy*-type verbs seem to have many properties in common with *finish*-type AVs. In particular, they seem to display the imperfective paradox. Thus, neither (101a) nor (101b) entail that John actually read the novel. In contrast, consider verbs like *regret* and *celebrate*:

(102)   a.   John regretted reading the novel.

        b.   John celebrated reading the novel.

(102a) and (102b) do entail that John actually completed reading the entire novel. Their complements thus appear to perfective. Intriguingly, these perfective *regret*-type verbs do not seem to allow complement coercion:

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(103)   a. #John regretted the novel.

         b. #John celebrated the novel.

(103a) is clearly unacceptable on a reading where John regrets having read the novel. (103b) is only acceptable on a different reading, where John is celebrating a novels existence (for instance, at an event celebrating the centennial anniversary of the publication of some famous novel). It cannot mean that John is celebrating having finished the novel.

In another parallel to *finish*-type verbs, *enjoy*-type verbs allow imperfective morphology:

(104)   a. John is enjoying reading the novel.

         b. John is attempting reading the novel.

Our analysis predicted that two ingredients were necessary for complement coercion to be possible for a given verb. First, the verb required an imperfective complement. Second, the output of the verb had be able to combine with another imperfectivity operator. It is highly suggestive that the *enjoy*-type verbs, which also appear to allow complement coercion, have both of these properties. Verbs which lack the fist of these properties, like *regret*, on the other hand, seem to resist complement coercion. While a full treatment of *enjoy*-type and *regret*-type verbs is beyond the scope of this thesis, it seems that their behavior with respect to complement coercion is amenable to an analysis similar to that developed for *finish*-type and *stop*-type AVs.

5.3 The Syntax Of AVs Revisited

Starting in 3.2 above, we assumed the syntactic structure in (53), repeated as (105) below:

(105) $[_{v}\text{P John}_i [_{\text{VP}} \text{begin } [_{\text{AspP}} [_{\text{Asp}} \text{-ing}] [_{v}\text{P PRO}_i \text{ eat the apple}]]]]$

(105) is a sort of modified control structure. Unlike canonical control sentences, the matrix AV embeds an AspP rather than a nonfinite TP. It turns out that, though, in some of the earliest discussions of AV syntax, Perlmutter (1968, 1970) actually proposed that AVs may be ambiguous between raising and control verbs.

For a raising verb analysis, he offered the following arguments. It is well known that raising verbs like *seem* allow idioms to maintain their idiomatic meaning (106a), exhibit synonymy between active and passive constructions (107), and allow expletive subjects (109a). Likewise, a *finish*-type verb like *start* also allows idiomatic constructions (106b), exhibits the active and passive synonymy (108), and allows for expletive subjects (109b):

(106) a. The shit seemed to hit the fan.

   b. The shit started hitting the fan.

(107) a. The noise seemed to annoy Joe.

   b. Joes seemed to be annoyed by the noise.

(108) a. The noise started annoying Joe.

   b. Joe started to be annoyed by the noise.

(109)   a. It seemed to rain.

        b. It started to rain.

Stop-type verbs also seem to behave like raising verbs in these respects:

(110)   The shit stopped hitting the fan.

(111)   a. The noise stopped annoying Joe.

        b. Joe stopped being annoyed by the noise.

(112)   It stopped raining.

In other respects, AVs fail to behave like raising verbs. For instance, raising verbs may not appear in imperatives (113), and they may not be embedded under control verbs (114):

(113)   *Seem to eat the pie.

(114)   *John forced Bill to seem to eat the pie.

AVs, on the other hand, allow both imperatives (115) and embedding under control verbs (116):

(115)   Start/Stop eating the pie.

(116)   John forced Bill to start/stop eating the pie.

Moreover, some AVs, like *finish*, fail the tests for raising verbhood (106-109) that other AVs pass:

(117)   *The shit finished hitting the fan.

(118)   a. John finished eating the apple.

        b. #The apple was finished being eaten by John.

(119)   #It finished raining.

These considerations led Perlmutter (1968, 1970) to conclude that most AVs are ambiguous between raising and control verbs, while some- such as *finish*- are just control verbs.

It seems that Perlmutter's observations could be integrated into our analysis without much difficulty. The crucial difference between the two, of course, is that raising verbs lack an external argument, while control verbs do not. While these will cause the denotations between raising and control AVs to differ slightly, it doesn't look like these sorts of distinctions would affect the core proposals of this thesis, particularly with regard to the interactions between AVs and imperfectivity operators.

More recently, Fukuda (2008) has proposed that AVs are actually heads of functional projections within a single clause, rather than biclausal raising or control verbs. Fukuda offers two arguments against a biclausal analysis of AVs. First, he notes that biclausal constructions typically allow for a temporal discontinuity between the matrix and embedded clause, as one might see in (120):

(120)   Today, John hoped to win the race tomorrow.

In (120), today modifies the matrix clause, and tomorrow the embedded control clause. Following observations from Akmajian et al. (1979), Fukuda also notes that biclausal construction often allow the grammatical aspect encoded in the embedded

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clause to differ from that encoded in the matrix clause (examples from Akmajian et al. (1979, 43,(125)):

(121)   a. We'll try to make him [$_{Progressive}$ be singing Coming through the Rye] when...

         b. I will try [$_{Perfect}$ to have finished the work] by the time...

In (121), while the matrix clause has past perfective aspect, the embedded clause has either imperfective (121a) or perfect (121b) aspect. Again, this provides evidence that such constructions are biclausal.

Next, Fukuda (2008) observes that AVs do not allow these sorts of discontinuities. For instance, the event of beginning cannot take place on a different day then the event described in the complement:

(122)   #Today, John began to bake the cake tomorrow.

Moreover, again following Akmajian et al. (1979), Fukuda observes that AVs do not seem to allow complex aspectual structure in the complement (from Akmajian et al. (1979, 40, (112))):

(123)   a. *He began [$_{Progressive}$ being running down the road].

         b. *He began [$_{Perfective}$ to have finished his homework].

This considerations lead Fukuda to conclude that AV constructions are not biclausal. Instead, he proposes that they actually head a functional projection. Specifically, he proposes that they head AspP (Travis 1991; Borer 1994, 1998)[1].

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[1]Fukuda (2008) argues that this AspP may appear either below or above vP. We will ignore this aspect of his proposal since (i) it would seriously complicate the semantics and

There are some problems with Fukuda's arguments for rejecting a biclausal analysis of AVs. For one, although (122) and (123) are indeed unacceptable, its not clear whether the origin of this unacceptability is actually syntactic, as Fukuda claims, or semantic. Indeed, *attempt*, which is commonly analyzed as taking control clauses as its complements, also seems to forbid these sorts of temporal and aspectual discontinuities:

(124)   #Today, John attempted to bake the cake tomorrow.

(125)   a. *He attempted [$_{\text{Progressive}}$ being running down the road].

       b. *He attempted [$_{\text{Perfective}}$ to have finished his homework].

It seems likely that the unacceptability of (124) and (125) stem from semantic, rather than syntactic, peculiarities of *attempt*. It seems quite possible that a semantic explanation could also be found for the unacceptability of the sentences in (122) and (123), particularly given our assumptions that the event encoded by the AV be a sub-event of that encoded by the complement.

However, the argument of Fukuda (2012) for Japanese AVs being functional heads is somewhat more persuasive, and the notion that at least some AVs are non-verbal functional heads is an interesting one. One possibility which might be worth considering is that perhaps *finish*-type AVs are control verbs and *stop*-type verbs are morphemes associated with a functional category, perhaps an A(spectual)V(erb)P.

(ii) his arguments for it involve a rather detailed discussion of infinitival complements, which dont fall under the purview of this thesis. Fukuda (2012) extends this analysis to AVs to Japanese.

The proposal would then be that *finish* has a syntactic structure like (126)[2] and *stop* a structure like (127):

(126) $[_{v\text{P}}$ John$_i$ $[_{\text{VP}}$ finish $[_{\text{AspP}}$ –ing $[_{v\text{P}}$ ~~PRO~~$_i$ eat the cookie]]]]

(127) $[_{\text{AVP}}$ stop $[_{\text{AspP}}$ –ing $[_{v\text{P}}$ John eat the cookie]]]

Structures like (126) and (127) seem to accord with the differences in behavior we have observed. Recall that, under the analysis in 4, *finish*-type AVs take in a property of the RT and return a property of events. Such a type is quite strange within a monoclausal syntax, but would be highly plausible in a structure like (126). The idea would be that *finish*-type AVs take a property of the reference time associated with the embedded clause and convert it into the ET of the event encoded by the matrix clause. *Stop*-type verbs, on the other hand, are simply operators which modify the RT in some fashion.

One consequence of the syntax proposed in (126) and (127) is that *finish*-type verbs are predicted to be genuinely biclausal, while *stop*-type verbs are predicted to be monoclausal. We might then predict different behavior with manner adverbs, which modify a verbal predicate. Consider a sentences like (128):

(128)   John cheerfully ate the cookie.

(128)'s natural interpretation is that Johns manner of eating the cookie was cheerful. It therefore seems to be modifying the VP. A subject-oriented reading where it is cheerful of John to eat the cookie seems somewhat infelicitous. Now consider (129) and (130):

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[2]Or perhaps *finish*-type AVs are ordinary control verbs, selecting for TPs.

(129)   John cheerfully finished eating the cookie.

(130)   #John cheerfully stopped eating the cookie.

While the judgments are rather subtle, it does seem that the manner adverb behaves appropriately in (129), describing a scenario where Johns finishing eating the cookie was a cheerful event. In (130), though, the only available reading seems to be a subject-oriented one, making the sentence sound rather odd. It is difficult to get a reading where Johns stopping eating the cookie was a cheerful event. This seems consistent with the hypothesis that *finish*-type verbs contain a VP which manner adverbs can modify, but *stop*-type AVs lack such a level.

The judgments in (129) and (130) are suggestive that the syntax proposed in (126) and (127) is on the right track, but such data are hardly conclusive. Perhaps a more thorough exploration of the control literature will turn up more evidence either for our against our proposal. In any case, this proposal at least has the virtues of providing markedly different syntactic structures which seem to accord with the semantic analysis presented in 4.

If this proposal holds up for English, then it would be interesting to see how it could be extended cross-linguistically. In English, it seems to be the case that control and raising verbs which select for imperfective predicates- verbs like *finish* and *begin*, or *enjoy* and *attempt* - are also the verbs which allow for complement coercion. Does this same generalization hold for other languages? If so, this would provide exciting evidence that the semantic mechanisms that this thesis has argued to be responsible for complement coercion in English actually hold across natural language.

5.4 Towards A Sortal Analysis Of AVs

Certain predicates have an intuitive quality of punctuality. One might think of the achievement verbs, or of certain accomplishments like *slam the door* or *reach the mountain top.* A diagnostic for this might be found by using the adverbial *at 3:00* which denotes a single time-point, as we see in (131):

(131)   a. John slammed the door at 3:00 pm.

          b. John reached the mountain top at 3:00 pm.

          c. #John built the house at 3:00 pm.

          d. #John climbed Mount Everest at 3:00 pm.

The aspectual verbs have a similar instantaneous feel to them, as we can see in (132):

(132)   John began/finished/stopped building the house at 3:00 pm.

However, there is a difference, I think, between the way in which the two verb classes come about their instantaneousness. To try and make it explicit, we might first note that events have natural start-points and end-points. There is a period when an event is in progress and periods before and after in which it is not in progress. Even atelic events have these boundaries if we assume, following Kratzer (2002) that some possibly covert measure phrase closes off the events of atelic predicates. *Begin* and *finish*, in essence, exploit these natural start-points and end-points of events. Verbs like *resume* do something similar, essentially by imposing a new starting-point (*resume* means something like *re-begin*).

    Stop-type don't have this luxury. To say that *John stopped reading the book* or *John kept reading the book* is not to refer to either the end or beginning of the *read*

the book event. Instead, these sorts of verbs must look inside of an event and identify specific instantaneous sub-events within. Punctuality does not come for free, as it does with verbs of the *finish*-type, but must be imposed.

It also seems to be the case that AVs carry certain presuppositions. This is highlighted by Groucho Marx's famous- and rather misogynistic- joke:

(133)   Have you stopped beating your wife yet?

The joke, of course, is that no matter how you answer (133), it will always presuppose that you have been beating your wife. A less offensive sentence, using a different test, yields a similar result:

(134)   It is not the case that Dave stopped eating the cookie.

In (134), it is still the case that Dave was eating the cookie in the past, indicating presupposition-hood. The reader will also note that these tests yield comparable results when applied to the other AVs.

Examine these tests a little more closely, however, and well notice a subtle but crucial difference holds between the presuppositions supplied by the two verb classes. Consider again the negation test:

(135)   a. It is not the case that Dave stopped eating the cookie.

      b. It is not the case that Dave kept eating the cookie.

      c. It is not the case that Dave began eating the cookie.

      d. It is not the case that Dave finished eating the cookie.

In (135a) and (135b), it is true that, even if Dave did not stop or keep eating the cookie, he had been eating the cookie at the time immediately before the time

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in question. Conversely, (135c) presupposes that Dave had not been eating the cookie at any time before the time in question, and (135d) merely presupposes that converse: that he had been eating the cookie at some point before the time in question. So, while all four constructions presuppose something about the property of Dave's eating the cookie, the *stop*-type verbs appear to restrict the presupposition much more severely than the *finish*-type verbs.

These observations suggest that the difference between the two verb classes may not be between different types, but instead between different sorts of intervals. A verb like *begin*, for instance, asserts that a particular property holds of the reference time, and presupposes that no previous times hold that property. It thus marks the boundary between the reference time, when some property of times starts to be true, and all previous times when it was not true. Similarly, *finish* presupposes that some property of times has been true before the reference time, and asserts that following the reference time it will now longer be true. The *stop*-type verbs, on the other hand, merely relate a property of times to particular time-points. *Stop*, for instance, presupposes that a property of times was true at the time-point immediately preceding the reference time-point, and that it is false immediately after. *Keep* also presupposes that a property of times was true at the time-point immediately preceding the reference time-point, and asserts that it was true immediately after. In short, the *stop*-type verbs return properties of time-points, while the *finish*-type verbs do not.

This, if correct, suggests that the source of the *stop*-type verbs incompatibility with imperfectivity operators may arise because the former return properties of

time-points, which by definition cannot be divided into subintervals. The job of an imperfectivity operator, on the other hand, is to pick out a subinterval from some interval. Thus the two are inherently incompatible. Making this observation more formally explicit, and integrating it into the analysis developed above, will require looking more thoroughly into the literature on tense and aspect and the linguistic encoding of time. However, it seems that such a project would result in a theory of AVs with even greater explanatory power.

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