Events and Modification in Nominals

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It is a familiar lesson from physical theory that interactions yield an important probe into structure. In the experiments of Rutherford almost 90 years ago, bits of matter were projected together; the physical properties of their interactions yielded evidence for a nucleus, hidden in the heart of atom. In semantics, the results of Donald Davidson in a famous 1967 paper might be viewed in a similar (although perhaps less dramatic) light. Davidson proposed that when we combine verbs and adverbs together, the logical properties of that interaction yield evidence for a semantic nucleus in the heart of the clause - an event argument.

In recent years, the consequences of Davidson's "discovery" have been elaborated by a number of different researchers across a variety of linguistic domains. In this paper I want suggest to suggest a further area of elaboration. Specifically, I will propose that the interactions between nouns and adjectives yield evidence for an event argument inside the nominal as well. Furthermore, this position seems to exist in both of the nominal projections countenanced by current linguistic theory: DP and NP. Postulating this element sheds light, I believe, on some well-known facts of adjectival modification. But as we will see, it also raises a large number of interesting new problems concerning event modification inside the nominal and its relation to event quantification outside in the clause. I'll begin by sketching the basic data that motivate the account.

1.0. The Intersective/Non-Intersective Ambiguity

The adjective in (1a) is well-known to be ambiguous between what's usually called an "intersective" and a "nonintersective" reading; these readings are paraphrased informally in (1b,c), respectively:

(1) a. Olga is a beautiful dancer.
b. 'Olga is a dancer and Olga is beautiful'
c. 'Olga is beautiful as a dancer'/'Olga dances beautifully'

On the first reading, *beautiful* applies to Olga; she herself is beautiful, even if her dancing is awkward. On the second reading, *beautiful* applies to Olga qua dancer; Olga's dancing is beautiful even if she herself is unattractive.

The sort of ambiguity found in (1) arises with many other adjectives in English, as shown by 2(a-e):

Devon Strolovitch and Aaron Lawson (eds), *SALT VIII*, 145-168, Ithaca, NY: Cornell University.

(2) a. Kathrin is an intelligent student.
b. George is a skillful manager.
c. Yo-yo is a good cellist.
d. Bill is a diligent president.
e. Peter is an old friend.

Thus, (2a) can mean that Kathrin is a student and an intelligent person - the intersective reading; alternatively it can mean that she is intelligent as a student or that she studies intelligently - the nonintersective reading. Likewise (2e) can mean that Peter is a friend who is old or aged; or it can mean that Peter is a friend of longstanding. And so on.

Logically speaking, one could give at least two different kinds of diagnoses of the ambiguity found in (1) and (2). On the one hand, one might blame the ambiguity on the adjective. Perhaps the adjective contains some hidden semantic complexity that reveals itself in combination with a simple noun. Call this an "A-analysis" of the phenomenon. Alternatively, one might ascribe the source of ambiguity to the noun, so that the adjective is simple and it's the noun's properties that ultimately yield the ambiguous result. Call this an "N-analysis".

2.0. An A-Analysis (Siegel 1976a,b)

All analyses of the intersective/non-intersective ambiguity that I am aware of are A-analyses: they assume nouns to be simple predicates of things, but assign adjectives some hidden semantic and/or grammatical complexity.

The best known of the A-theories is the "Double-Category" theory articulated by Muffy Siegel in her 1976 thesis, *Capturing the Adjective*.[1] Siegel proposes, in essence, that the ambiguity in (1) and (2) reflects a fundamental dichotomy holding among adjectives in English. She suggests that there are actually two syntactically and semantically distinct classes of items conflated by the traditional category AP.

The first class is that of predicatives (my terminology). These occur underlyingly as predicates, although surface syntax may disguise this. Semantically, they are functions from entities to truth-values and are extensional. When they combine with a noun, the semantic result is predicate conjunction, which can be expressed through λ-abstraction. This is the source of the intersective reading. An example of the predicative class is *aged*:

CLASS I Predicative Adjectives (t//e) (*sick, infinite, portable, nude, tall, aged,...*)

Example: *aged* ⇒ **aged'**
aged friend ⇒ λx[**aged'**(x) & **friend'**(x)] "Intersective Modification"

The second class is that of attributives. These occur underlyingly as nominal modifiers, although again surface syntax may disguise this to some extent.

Semantically they express functions from CN denotations to CN denotations. They combine with their nominal as function to argument and so, in the usual Montagovian way, they invoke intensions. This is the source of the non-intersective reading. An example of the attributive class is *former*:

CLASS II Attributive Adjectives (CN/CN) (*veteran, former, rightful, chief,...*)

Example: *former* ⇒ **former'**
former friend ⇒ **former'(^friend')** "Non-intersective Modification"

Although some adjectives are assigned exclusively to the predicative category (*aged*) and others exclusively to the attributive category (*former*), a large number of forms are assumed to belong to both. This for Siegel is the source of the intersective/non-intersective ambiguity: it's a simple case of homophony between semantically distinct elements. Thus a single phonetic form like *old* actually corresponds to a "doublet" old_1/old_2; this yields ambiguity for an example like *old friend*:

"DOUBLETS" (*beautiful, old, good, intelligent, difficult, diligent, firm, true,...*)

Example: old_1 *friend* ⇒ $\lambda x[\mathbf{old_1'}(x) \& \mathbf{friend'}(x)]$
old_2 *friend* ⇒ $\mathbf{old_2'}$ **(^friend')**

2.1. Some Features of the Analysis

As Siegel explicitly discusses, her analysis undermines the traditional category of adjective: for her there simply is no unified class of elements belonging to a category A.[2] Furthermore, Siegel's analysis entails considerable duplication in the lexicon of English. As you can see by the list of doublet examples, many forms appear in both classes. In Siegel's analysis, we have no choice but to view this as a form of lexical accident. We must say that there are two syntactically and semantically distinct items that happen to sound the same and (by and large) happen to occur in the same positions. This kind of duplication is endemic to the analysis, and must be assumed not only for English, but for all other languages as well. It seems fair to regard this as a potential weakness of the theory.

On the other hand, the analysis has three important apparent strengths. First, it captures the potential non-intersectivity of adjectives like *beautiful* - the fact that a beautiful dancer need not be beautiful and a dancer. This follows directly from the logical representation in which *beautiful* is not predicated of the subject. Second, it accounts for substitution failure with nonintersectives As. This is illustrated in the familiar pattern in (3). Suppose *dancer* and *singer* are coextensive, so that if one applies to Olga the other does too. Then, even so, the inference fails from *Olga is a beautiful dancer* to *Olga is a beautiful singer* and vice versa. This is captured by appeal to the intensional operator in function-argument combination (3).

(3) Suppose: {x: x is a dancer} = {x: x is a singer}
Then: *Olga is a dancer.* ↔ *Olga is a singer.*
But: *Olga is a beautiful dancer.* ←/→ *Olga is a beautiful singer.*
Analysis: **beautiful'(^dancer')**(o) ←/→ **beautiful'(^singer')**(o)

Finally, the analysis captures the fact that nonintersectivity and substitution failure are correlated phenomena with adjectives. For it's exactly when [$_N$ A N] is read nonintersectively (i.e., as meaning "dances beautifully") that substitution of equivalents fails. If dancers and singers are the same, and *beautiful dancer* is read intersectively, then being a beautiful dancer implies being a beautiful singer (and vice versa). But, if *beautiful dancer* is read nonintersectively, then substitution fails. So the behaviors are linked in an appropriate way.

2.2. Whence Substitution Failures? (McConnell-Ginet 1982)

Siegel's account of substitution failure with nonintersective adjective modification closely parallels that usually given for substitution failure with adverbial modification. Consider the paradigm in (4). Here, just as above, appeal is made to functional application and intensions:

(4) Suppose: {x: x dances} = {x: x sings}
Then: *Olga dances.* ↔ *Olga sings.*
But: *Olga dances beautifully.* ←/→ *Olga sings beautifully.*
Analysis: **beautifully'(^dance')**(o) ←/→ **beautifully'(^sing')**(o)

And the parallelism seems fitting. For after all, it surely is clear that substitution fails from *Olga is a beautiful dancer* to *Olga is a beautiful singer* (on the non-intersective reading) for the same reason that it fails from *Olga dances beautifully* to *Olga sings beautifully*.

Interestingly, McConnell-Ginet (1982) has provided two simple but compelling reasons for thinking that the analysis given in (4) is NOT the right account of substitution failure with adverbs. I will rephrase these points below, putting them a little differently than she did, but the ideas are hers.

2.1.1 *Substitution Failure Does Not Entail Intensionality*

Consider the argument and analysis given in (5), which is parallel to (3) and (4). Suppose the set of individuals who eat is identical to the set of individuals who cook. So Olga eats iff Olga cooks. Under this assumption, it still doesn't follow that Olga eats fish iff Olga cooks fish. Reasoning as before our diagnosis would be that the object combines with the verb as function to argument, invoking intensions:

(5) Suppose: {x: x eats} = {x: x cooks}
Then: *Olga eats.* ↔ *Olga cooks.*
But: *Olga eats fish.* ←/→ *Olga cooks fish.*
Analysis: **fish'(^eat')(o)** ←/→ **fish'(^cook')(o)**

In fact, however, we do <u>not</u> give this analysis. Rather, we attribute substitution failure to the relationality of *eat* and *cook* (6a,b), which is concealed in the simple intransitive absolute forms. If *eat* and *cook* are reanalyzed as transitive, then the inference pattern in (5) is predicted on simple 1st-order grounds. (7a) doesn't entail (7b), but intensions have nothing to do with it:

(6) a. eat(x,y)
b. cook(x,y)

(7) a. ∀x [∃y[eat(x,y)] ↔ ∃y[cook(x,y)]] "Whoever eats cooks "
b. ∀x [eat(x,fish) ↔ cook(x,fish)] "Whoever eats fish cooks fish"

The first point is therefore this: substitution failure is <u>not</u> a mechanical diagnostic for intensionality. Logic allows for different sources of entailment failure in such cases. Hidden relationality, in particular, is an alternative source.[3]

2.1.2 *Intensionality Does <u>Not</u> Track Our Intuitions about the Cases*

McConnell-Ginet's second point can be seen by comparing the two cases of substitution failure given in (8) and (9), the analyses suggested for them, and the intuitive correctness of these analyses given how we actually reason with the cases.

(8) Suppose: {x: x dances} = {x: x sings}
Then: *Olga dances.* ↔ *Olga sings.*
But: *Max thinks Olga dances.* ←/→ *Max thinks Olga sings.*
Analysis: **think'(m, ^dance'(o))** ←/→ **think'(m, ^sing'(o))**

(9) Suppose: {x: x eats} = {x: x cooks}
Then: *Olga eats.* ↔ *Olga cooks.*
But: *Olga eats fish.* ←/→ *Olga cooks fish.*
Analysis: **eat'(o,f)** ←/→ **cook'(o,f)**

Accounting for the lack of entailment in (8) informally, we might explain things this way: "Well, even if the actors and singers happen to coincide in this world, in the world of Max's thoughts the two sets might well diverge. So, thinking that the one predicate is true of Olga might very well be different than thinking that the other is true of her." Here we are using the idea of worlds compatible with the beliefs of the subject (Max). The appeal to alternative worlds offers a plausible model of why speakers judge the inference to fail.

By contrast, the substitution failure in (9) arises from an intuitively different source. The issue is not a matter of what *eats* and *cooks* might have meant in alternative circumstances. Rather it's a matter of pointing to a hidden dimension in the predicates. "Look," we might say, "whenever there is eating, there is eating of something. Likewise whenever there is cooking, there is cooking of something. But even if all the same people eat and cook, it still needn't be true that any of them eats and cooks the same thing. Hence the conclusion doesn't follow." Here our explanation doesn't proceed by appealing to potential extensions in alternative worlds; rather it analyzes the predicate more finely in this world.

Now consider again the adverbial entailment paradigm in (3), and its intensional analysis. What is our intuition of why substitution fails? Interestingly, as McConnell-Ginet observes, it does not seem to involve thinking about who *dance* and *sing* might have applied to in alternative circumstances. It's not a matter of what might have held in other worlds. How do we reason in this case? "Look," we might say, "whenever there is dancing and singing there is a performance. And even if the same people dance and sing, the performances are still different. And one might be beautiful, and the other not. Hence the conclusion doesn't follow." Reasoning this way, we are following the model of (9), and not the model of (8).

So the second point is simply this: at least in the cases at hand, an intensional analysis of substitution failure in adjectival modification (unlike an intensional analysis of substitution failure in clausal complements) does not correctly track our intuition about why inference fails. So not only does logic provide us with alternative means of understanding why substitution fails, these alternatives seem to offer a better model of how we actually reason in these cases.[4]

2.3. Enter Davidson (Davidson 1967, Davies 1991)

Nearly ten years after McConnell-Ginet, Davies (1991) rediscovered her points about substitution failure with adverbial modifiers, but put the issue in a stronger form. Davies noted that the lack of entailment from *sang beautifully* to *danced beautifully* holds not only if singers and dancers happen to be the same, but even if they are necessarily are the same. Even if singers and dancers coincided in all possible worlds, it still wouldn't follow intuitively that singing beautifully would entail dancing beautifully, or vice versa.

Davies (1991) went on to make an interesting proposal based on Davidson's 1967 theory of adverbial modification. On Davidson's view, action verbs likes *sing* and *dance* are not simple one-place, intransitive predicates. Rather they are relational, containing an extra argument place for an event e (10a,b). Adverbs relate to verbs by being predicated of the events that verbs introduce. *Olga danced beautifully* and *Olga sang beautifully* are rendered approximately as in (10c,d):[5]

(10) a. dancing(e, x)
b. singing(e, x)
c. ∃e[dancing(olga,e) & beautiful(e)]
d. ∃e[singing(olga,e) & beautiful(e)]

Davies observed that by articulating these predicates more finely to include an event

parameter, Davidson correctly predicts substitution failure when adverbs are attached, even if the singers and dancers happen to be the same - indeed, even if singers and dancers are necessarily the same. Thus (11a) does not entail (11b):

(11) a. $\forall x\,[\exists e[\text{dancing}(e,x)] \leftrightarrow \exists e[\text{singing}(e, x)]]$
b. $\forall x\,[\exists e[\text{dancing}(e,x) \,\&\, \text{beautiful}(e)] \leftrightarrow \exists e[\text{singing}(e, x) \,\&\, \text{beautiful}(e)]$

Since the respective events are different, that one is beautiful will not entail that the other is so. This prediction follows on simple first order grounds, without appeal to intensions, or reference to alternative worlds.

In essence, then, Davidson's analysis explains failures of inference by moving in just the way that McConnell-Ginet suggests: by detecting an additional dimension in the semantic structure of the predicate. Furthermore, this dimension seems to be just the one we intuitively appeal to in explaining substitution failures like those in (4). The event parameter allows us to separate the dancer from the dance.[6]

3.0. An N-analysis (Larson 1983, 1995, Larson and Segal 1995)

The implications of these points for adjectival modification appear straightforward. We said that substitution surely fails between *beautiful dancer* and *beautiful singer*, on the non-intersective reading, for the same reason that it fails between *dance beautifully* and *sing beautifully*. Since the intensional analysis does not look right for the latter, we conclude that it is not right for the former either. A Davidsonian event analysis seems to deliver the right entailment results for the right reasons in the case of adverbs. This suggests that a parallel account should be given for adjectives. That is, we should import Davidson's analysis of adverbial modification to adjectival modification, reproducing the basic technical moves.

There are in fact four crucial technical moves to make:

- Relativize the semantics of CNs to events.
- Analyze As as predicates
- Allow AP to be predicated either of x or e in its associated CN
- Introduce an event quantifier

Candidate proposals for the first three items appear in (12a-c), which employ the relational evaluation predicate from Larson and Segal (1995).[7] (12a) takes the nominal *dancer* to apply to pairs of individuals <x,e> such that x is the agent of e, where e is a dancing. (12b) takes adjectives like *beautiful* to be predicates of things. More exactly, *beautiful* is true of an individual x just in case x is beautiful relative to some comparison class *C*, which I'll assume here to be given by context, but which may also be given by an explicit *for*-PP. Finally, (12c) gives candidate rules for combining an AP with the nominal it modifies. According to these rough schemata, when an adjective combines with a noun denoting an event-individual

pair, the adjective can be predicated of either the x parameter or the e parameter.

(12) a. Val(<x,e>, *dancer*) iff dancing(e,x)
b. Val(x, *beautiful*) iff beautiful(x, *C*) ("x is beautiful for a *C*")
c. Val(<x,e>, [$_{NP}$ AP NP]) iff Val(<x,e>, NP) ... Val(x, AP)
Val(<x,e>, [$_{NP}$ AP NP]) iff Val(<x,e>, NP) ... Val(e, AP)

It is the possibility of being predicated of either x or e that I take to underlie the intersective/nonintersective ambiguity. When AP is predicated of the x variable it is the subject Olga, the dancer, that is ultimately asserted to be beautiful (13a). By contrast when AP is predicated of the e variable it is the event, the dancing, that is asserted to be beautiful (13b). A similar analysis can be given *for old friend* as indicated in (14). In both (13) and (14), I have suppressed the quantifier and its associated connective since I am focusing here on the predication relations.

(13) Olga is a beautiful dancer.
a. Qe[dancing(e, olga) ... beautiful(olga,C)] ("Olga is beautiful")
b. Qe[dancing(e, olga) ... beautiful(e,C)] ("Dancing is beautiful")

(14) Peter is an old friend.
a. Qe[friendship(e, p) ... old(pete,C)] ("Peter is old")
b. Qe[friendship(e, p) ... old(e,C)] ("The friendship is old")

This approach offers some grasp on the CLASS I/CLASS II division noted earlier. A natural idea is that adjectives behaving as exclusive CLASS I members, what Siegel categorized as t///e's, are ones that cannot be predicated of events. Thus it seems very plausible to think events cannot be aged in view of the fact that they do not age. Neither can they be nude, portable, or tall. If this is granted, then we correctly predict an example like (15), *Jerry is an aged president*, to be unambiguous. This is so because one of the two possible interpretations, "aged(e)", is independently excluded on pragmatic grounds.

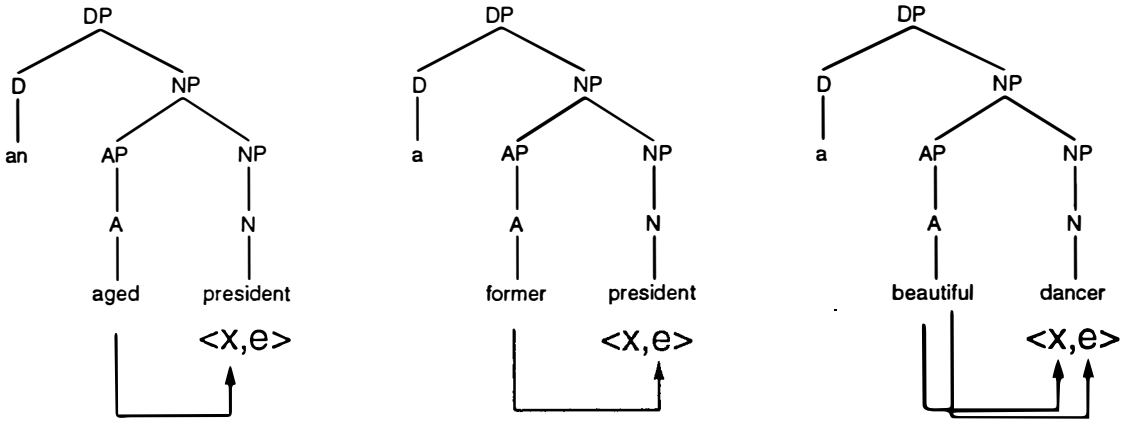
(15) Jerry is an aged president. #Qe[presidency(e, j) ... **aged(e,C)]**
Qe[presidency(e, j) ... aged(j,C)]

Correlatively, suppose that an exclusive CLASS II adjective like *former* applies strictly to events and not to other kinds of things. Then we correctly predict *Jerry is a former president* to be unambiguous, since we can have "former(e)" but not "former(jerry)" (16):

(16) Jerry is a former president. Qe[presidency(e, j) ... former(e,C)]
#Qe[presidency(e, j) ... **former(jerry,C)]**

The general situation would thus be as shown below, with some adjectives applying

strictly to non-events (*aged*), others applying strictly to events (*former*), and still others applying naturally to both, yielding ambiguity (*beautiful*):



Such a view would allow us to capture neatly an observation due to Vendler (1967) that coordination cannot join a strictly intersective A (*blonde*) with a strictly nonintersective A (*fast*) (17a). Correlatively, when an adjective that can be read either way (*beautiful*) is coordinated with a strictly intersective adjective, it must be read intersectively (17b), and when it is coordinated with a strictly nonintersective adjective, it must be read nonintersectively (17c).

(17) a. *She is a blonde and fast dancer. (Vendler (1967))
b. She is a blonde and beautiful dancer.
c. She is a fast and beautiful dancer.

These results follow under a simple coordination rule like (18), according to which an object x is a value of conjoined APs just in case it is a value of both conjuncts:

(18) Val(x, [$_{AP}$ AP1 *and* AP2]) iff Val(x, AP1) & Val(x, AP2)

On our approach, this rule will entail that both adjectives must be predicated of an event, or of a non-event, but that the predications cannot be "mixed".

As pretty as this picture is, I think it oversimplifies in some important ways. Specifically, it seems to me that the full analysis of exclusive CLASS II forms will inevitably be more complex than indicated. Unlike *former*, items like *mere, utter, complete*, etc. do <u>not</u> seem to be analyzable as simple, univocal predicates of events. Rather they appear to be forms whose relation to N parallels the relation of a degree modifier to an associated A. Thus *utter incompetence* seems semantically parallel to *utterly incompetent*, *complete fool* is parallel to *completely foolish*, *mere mortal* is parallel to *merely be mortal*, etc. Here (as in the case of *former president*) the adjectives are behaving "adverbially", but the semantics is degree modification, not event modification. I leave open the question of how precisely to accommodate these forms, simply speculating that, just as we must posit a hidden event parameter in *dancer* to accommodate *beautiful dancer*, we may ultimately be forced to posit a

hidden degree parameter in *fool* to accommodate *utter fool*.

3.1. Some Consequence and Further Questions

The Davidsonian analysis of nonintersective adjectival modification proposed here has a number of broad and straightforward consequences that I will simply list. On this account:

- The intersective/nonintersective ambiguity arises from the semantic structure of N, not that of A.
- There are in fact no truly "non-intersective" readings. It simply a matter of intersecting the A denotation with different sets (dancers versus dancings)
- A non-intensional account of substitution failure is provided similar to that given by Davidson/McConnell-Ginet/Davies for adverbs.
- The link is captured between *beautiful dancer* and *dance beautifully.*
- We "recapture" the adjective. No semantic division of the category AP arises: they're all predicates, but they are predicated of different things.

At the same time, however, a number of equally broad and straightforward questions arise. Specifically:

- What is the nature & position of the event quantifier in the nominal?
- How are its restriction and scope determined?
- How pervasive is event modification in nominals?
- What is the relation of event modification inside the nominal to event modification outside the nominal?

Due to space limitations, in what follows I will do no more than sketch approaches to these questions. Details are provided in Larson (in prep).

4.0. The Nature & Position of the Event Quantifier

A natural candidate for the event quantifier in nominals is suggested by the close semantic relation between sentences containing a predicate nominal (19a/20a), and generic sentences with an adverb (19b/20b). Following Krifka, Chierchia (1995) suggests that generic verbs and predicate nominals are bound by a generic quantifier (19c/20c); we read (19c) as: "in general, for eventualities of the contextually relevant kind (Con) containing Olga, those eventualities are dancings by Olga".[8] Thus the generic quantifier Γ is a natural candidate for our event quantifier.

(19) a. Olga is a dancer.
b. Olga dances.
c. $\Gamma e[$ Con(e, olga)] [dancing(e, olga)]

(20) a. Olga is a beautiful dancer
b. Olga dances beautifully.
c. Γe[Con(e, olga) & dancing(e, olga)] [beautiful(e,C)]

Chierchia assumes a single generic quantifier Γ located outside the predicate nominal and having scope over it. But two sets of facts suggest this picture is too simple.

4.1. Individual-Level/Stage-Level Contrasts in the Nominal (Bolinger 1967)

In his 1967 examination of adjectival constructions, Bolinger notes that pre- and postnominal adjectives show an interesting difference in interpretation. The prenominal As show what he calls a "characterizing" reading; they attributes a stable property to the noun; by contrast, postnominal adjectives attribute transitory properties. So, for example, *visible stars* in (21a.i) is most naturally read as referring to those stars whose intrinsic brightness makes them visible to the unaided eye - stars of magnitude 5 or brighter on the standard astronomical scale. By contrast, *stars visible* in (21a.ii) is understood to refer to those stars that happen to be visible at present, observing conditions being what they are:

(21) a. i. the visible stars (include Capella, Betelguese, and Sirius)
ii. the stars visible (include Capella, Betelguese, and Sirius)
b. i. the navigable rivers (include the Nile, the Amazon and the Ganges)
ii. the rivers navigable (include the Nile, the Amazon and the Ganges)
c. i. the responsible individuals (include Mary, John and Alice)
ii. the individuals responsible (include Mary, John and Alice)
d. i. the stolen jewels (were on the table).
ii. the jewels stolen (were on the table).

The difference is truth conditional. On a night where clouds obscure some portion of the sky, (21a.i) might well be true and (21a.ii) false at the very same time. Similarly for the other pairs in (21). In Larson (in prep) this distinction is analyzed as one of individual-level (i-level) versus stage-level (s-level) predication (Carlson 1972, Kratzer 1995). *Visible* in (21a.i) is read as an i-level predicate; whereas *visible* in (21a.ii) is read as a s-level predicate.

Although Bolinger speaks in terms of pre- and postnominal position, in fact the relevant contrast is not one of linear order, but rather of relative closeness to N. Note that it is possible to get more than one occurrence of A in conjunction with N:

(22) a. The visible stars visible include Capella.
b. The visible visible stars include Capella.

We understand (22a) as: 'The inherently visible stars that happen to be visible at the moment include Capella'. The same in true for (22b), with the added intuition that the occurrence of *visible* closest to N is what predicates inherent, i-level visibility. This intuition is confirmed by the contrast in (23), a minimal pair due to B. Citko:

(22b) The visible visible stars include Capella.
s-level **i-level**

(23) a. The invisible visible stars include Capella.
b. #The visible invisible stars include Capella.

The first is coherent; it asserts something like: "the intrinsically visible stars that happen to be invisible at the moment include Capella." The second is incoherent; it claims, in effect, "the intrinsically invisible stars that happen to be visible at the moment include Capella."

In Chierchia (1995) it is proposed that i-level predicates are in fact inherent generics - predicates carrying an eventuality variable bound by a generic quantifier Γ. By contrast, stage-level predicates are not bound by Γs. Taking this proposal together with the Bolinger facts discussed above, a natural idea is that the generic quantifier Γ is located quite close to N and hence only APs sufficiently close to N can be bound by Γ:

(24) [AP [Γe [AP N]] AP]
s-level **i-level** **s-level**

4.1. Temporal Modification in DP (Larson and Cho 1998)

Larson and Cho (1998) discuss the fact that possessive nominals show an apparent ambiguity with respect to temporal modifiers. In (25) *former* simply modifies N; *former restaurant* refers to objects that were once restaurants but are restaurants no longer. But imagine (26) as spoken by a real estate broker talking about properties. *Former* can modify the nominal (26a), but it can also modify the possession relation (26b). Because of this dual possibility,(27) appears coherent, with *current* modifying the possession relation and *former* modifying the noun.

(25) A **former restaurant** ('formerly was a restaurant')
(26) My **former restaurants** include ...
a. 'formerly were restaurants, currently mine'
b. 'formerly mine, are/were restaurants'

(27) My **current former restaurants** include ...

Larson and Cho (1998) propose that this ambiguity is reflected in structure; specifically, possessive DPs are suggested to contain a predicate (*Poss*) that is counterpart to *have* in VP. The ambiguity in (26) and similar DPs arises from the fact that *former* can modify either NP, or the phrase headed by *Poss*:

(28) a. [$_{DP}$ My [Poss [$_{NP}$ former [$_{NP}$ restaurants]]]]] ('formerly restaurants')
b. [$_{DP}$ My [$_{DP}$ former [Poss [$_{NP}$ restaurants]]]]] ('formerly mine')

The kind of possession involved in cases like (26) is not inherent (so-called "inalienable") possession; rather, as discussed in Cho (1998), it constitutes temporary, s-level possession. If correct, this suggests the presence of a second, non-generic event quantifier (∃) above NP, which binds an event position in *Poss*, and which interacts with *former* on its "formerly-possessed" reading. This quantifier may also be the binder of stage-level postnominal adjuncts. If so, the picture that we derive for event quantifiers in DP would appear to be approximately as follows (29):

(29) $[_{DP}\ \exists e\ [\ AP\ [\ \Gamma e\ [\ AP\ N\ ]\ ]\ AP\ ]]$
s-level **i-level** **s-level**

4.2. Determining Restriction and Scope

A rather surprising feature of the "logical form" in (20c) is that AP corresponds to the nuclear scope of event quantification; in other words, it is the "adjunct" that supplies the main predication. This result converges in an interesting way with proposals by Condoravdi (1989) on the analysis of middles. Condoravdi addresses the familiar fact that, in general, middle predications prefer a postverbal predicate (an adverb or adjunct PP) and are typically perceived as incomplete without it (30a-c). What is the source of this preference and the perceived incompleteness?[9]

(30) a. These flowers grow ?(quickly/in sandy soil)
b. Ballerinas dance ?(beautifully)
c. Bread cuts ?(easily).

Condoravdi advances the following remarkable proposal: the postverbal predicate is required in middles because it constitutes the nuclear scope of sentential event quantification. It is the "adjunct" that supplies the main predication (31a-c):

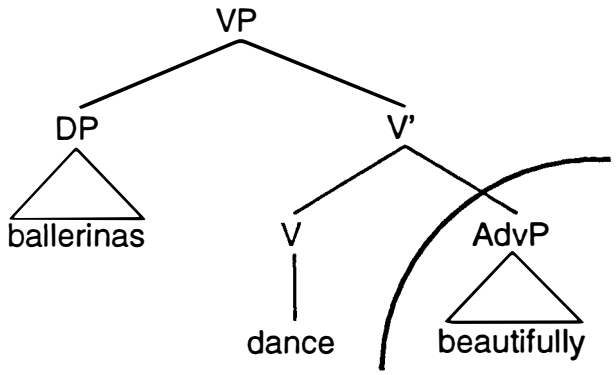
(31) a. Γe [Con(e, f) & growing(e, f)] [quick(e, C)]
b. Γe [Con(e, b) & dancing(e, b)] [beautiful(e,C)]
c. Γe [Con(e, br) & cutting(e, br)] [easy(e,C)]

Condoravdi's proposal raises immediate questions regarding how to map from syntactic representation of a middle to its logical factoring of restriction and scope. The challenge is a genuine one. In general, following proposals by Diesing (1992), the restriction on a quantifier is assumed to be mapped from higher tree material (IP), whereas the scope is obtained from lower material. But in the often-assumed analysis of adjuncts wherein adverbs and PPs are right-adjoined to VP, the relevant relations are reversed. The adjunct material, which constitutes the scope, originates higher in the tree than the VP material, which constitutes the restriction.

In fact, Condoravdi's analysis of middles can be squared with general mapping principles if we adopt the "low" position for adverbs and adjuncts advocated in Larson (1988), Kayne (1993), Chomsky (1995), and Pesetsky (1995).

Consider the "VP shell" structure in (32).

(32)



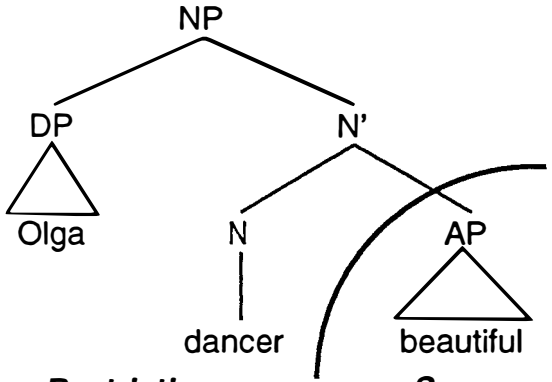
Quant	*Restriction*	*Scope*
Γe	[Con(e, b) & dancing(e, b)]	[beautiiful(e,C)]

Suppose now, in general conformity with the proposals of Diesing, that the lowest phrase (here AdvP) is mapped to the scope and the remainder is mapped to the restriction. Then we achieve just the result we want; pieces of syntax and logical form match up in the desired way.

4.2.1. *Extension to Adjectives*

I propose to extend these results with middle verbs and adjuncts to nouns and adjectives. Assume (following old proposals in the generative literature) that attributive adjectives arise in postnominal position, counterpart to that observed with the adverb in (32). Assume further that the subject of a predicate nominal arises within it, following Chomsky (1995). Then we obtain the nominal structure in (33) for *Olga is a beautiful dancer*. This structure allows us to map our adjectival modifications to their interpretation just as with middles :

(33)



Quant	*Restriction*	*Scope*
Γe	[Con(e, olga) & dancing(e, olga)]	[beautiful(e,C)]

Once again we get the result we want: pieces of syntax and logical form match up

appropriately.

The analysis in (33) entails that postnominal position is basic for manner adjectives, and that prenominal position is derived (34) (see Larson (in prep) for a full development of this idea):

(34) Olga is a [beautiful$_i$ [dancer t_i]]

There is suggestive evidence for this view from Italian, where adjectives can occur both pre- and postnominally. Cinque (1993) and Crisma (1993,1996) among others note that whereas a manner adjective like *brutale* can both precede and follow an event noun like *aggressione*, postnominal position entails, and is in fact required for a manner reading (34a). When the adjective occurs before the noun (34b), it gets instead a subject-oriented interpretation (roughly, "it was AP of so-and-so to do X"; e.g.,"it was brutal of them to invade Albania"):

(34) a. La loro **aggressione brutale** all'Albania
Det their aggression brutal against Albania
'their brutal aggression against Albania' (*brutale* manner adv.)

b. La loro **brutale aggressione** all'Albania
Det their brutal aggression against Albania
'their brutal aggression against Albania' (*brutale* subj-oriented)

Cinque (1993) proposes that postnominal position for A is the result of N raising around a prenominal adjective. However an attractive alternative given our semantic results is that the underlying postnominal position shown in (34a) is in fact the basic one, and that Italian(as an option) allows adjectives to remain in their original site.

4.3. How Pervasive is Event Modification in Nominals?

The nouns so far used to motivate event structure in nominals are all ones with either a clear verbal counterpart (*dancer-dance, manager-manage*), or a counterpart referring to a state or action (*friend-friendship, cellist-cello-playing*). These are nouns of roughly verb-like character. However, consider the following pairs, discussed by Vendler (1967):

(35) a. i. Arthur is a **just ruler**.
ii. Arthur **rules justly**.

b. i. Arthur is a **just king**.
ii. *Arthur **kings justly**.

An adverbial analysis of A-N seems reasonable for (35a.i) given the corresponding V-AdvP example (35a.ii) But what about (35b.i)? There is of course no verbal form **king*, and yet the semantic relation of A to N seems highly parallel in *just ruler* and *just king*. Vendler saw the point plainly and did not shrink from its implications; he suggested that we should in fact analyze *king* as (or as containing) a hidden V, which is adverbially modified by *just* in such examples. The lack of an overt verbal form *king* is viewed more or less as a lexical accident.

Whether or not this is the correct analysis of *just king*, there are numerous

other A-N examples exhibiting an intuitively adverbial semantics with no clear deverbal item present. Consider the following additional items from Bolinger (1967):

(36) a. The New York Times is a **daily newspaper.** ('appears daily')
b. That was a **stray bullet.** ('went astray')
c. Dancer's Delight is a **fast horse** ('runs fast')

In (36a-c) there is a clearly understood verbal element ('appear', 'go', 'run'), but notice that, unlike the case of *cellist/play-cello*, there is no reliable association between the noun meaning and the implied verb. It is by no means clear that *newspaper* should be associated closely with *appear*, or *bullet* with *go*, or *horse* with *run*. Compare, for example, the interpretations of *daily bread*,('eaten daily'), *stray mark* ('placed wrongly') and *fast plane* ('flies fast'), where in each case a different verbal component appears to be understood.

Consider also the examples in (37) where the adjective is understood as an adverb that is associated with the main clause predicate. Thus to have a quick cup of coffee is to have (or drink) a cup of coffee quickly; to make a beautiful birdfeeder to constitute something that will serve beautifully as a birdfeeder.

(37) a. Max had a **quick cup of coffee.**
b. That will make a **beautiful birdfeeder.**

Given the vagueness in their link to verb-like predication, incorporating cases like (36) and (37) within the present analysis is not straightforward. An account of *fast horse* will plainly not appeal to a state of horsiness (38a) of which we predicate the property of being fast (39a). Likewise a quick cup of coffee is not a state of being coffee ('coffeeosity') (38b) that is somehow quick (39b):

(38) a. Val(<x,e>, horse) iff horsiness(e,x) ??
b. Val(<x,e>, coffee) iff coffeeosity(e,x) ??
c. Val(<x,e>, birdfeeder) iff feeding(e,x,b) ??

(39) a. Qe[horsiness(e, DD) & fast(e)] ??
b. ...Qe[coffeeosity(e,x) & quick(e)]... ??
c. Qe[feeding(e,x,b) & beautiful(e)] ??

On closer examination it appears that the examples just surveyed divide into a number of different classes that must be analyzed in different ways. For instance, notice that with our original cases of adverbial adjectives such as *beautiful dancer* and *old friend* the nonintersective reading is not preserved with the A in predicate position (40a,b).[10] By contrast, *fast* ('runs fast') and *quick* ('drunk quickly') retain their apparent adverbial sense in predicate position.

(40) a. That dancer is beautiful. (only intersective)
b. That friend is old. (only intersective)
c. Dancer's Delight is fast. (preserves "adverbial reading"!)
d. That cup of coffee was quick. (preserves "adverbial reading"!)

Furthermore, notice that the adverbial sense of *quick* in *quick cup of coffee* and *beautiful* in *beautiful birdfeeder* seem to be in some sense dependent on the main verb. My own judgment is that when have in (37a) is replaced by *see*, or some other non-ingestive verb, the adverbial reading is much less accessible (41a). Similarly, when *make* is replaced by *buy* in (37b), the sense of *beautiful* for me is only the intersective one of 'physically beautiful':

(41) a. ?Max saw a quick cup of coffee.
b. Max bought a beautiful birdfeeder. (only intersective)

These results clearly suggest that adverbial readings of adjectives may not be a unitary phenomenon and that certain cases will not be analyzable by relativizing nominals to events, in the way suggested above. This entire area evidently merits a thoroughgoing review, with very careful scrutiny of individual cases.

4.4. Event Modification Internal & External to the Nominal

Event quantification was first introduced by Davidson in connection with adverbial modification at the verb-phrase level. A natural question arises as to the interaction between verb-phrasal and nominal event quantification. This question can be put in a very sharp form in connection with certain examples, yet again noted in Bolinger (1967). Bolinger observes (42)-(43), where an adjective occurring inside a nominal appears to be understood as if it were a matrix adverbial.

(39) a. [An **occasional** customer] strolled by.
(cf. *Occasionally a customer strolled by*.)
b. Max saw [the **occasional** customer].
(cf. *Occasionally Max saw a customer*.)

(40) a. [a **sporadic** shot] was heard.
(cf. *Sporadically a shot was heard*.)
b. Sandy heard [a **sporadic** shot].
(cf. *Sporadically Sandy heard a shot*.)

(41) [an **infrequent/rare** visitor] was seen.
(cf. *A visitor was seen infrequently/rarely*.)

The difference between these cases and that of *beautiful dancer* is seen clearly in an example like (42), which shows both a *beautiful dance*-type of interpretation, in which *occasional* adverbially modifies its sister nominal (call this the "internal Adv

reading"), and an interpretation in which it appears to modify the matrix VP (call this the "external Adv reading").

(42) Barbara saw an occasional sailor
'Barbara saw a person who occasionally sailed' (internal Adv reading)
'Occasionally, Barbara saw a sailor (external Adv reading)

The existence of an external adverbial reading presents a significant puzzle for compositional semantics. Consider the obvious idea of deriving the external reading by raising the adjective out of DP at logical form, allowing it to attach and express modification in the containing clause:[11]

(43) $[_{IP}$ **occasional** $[_{DP}$ an __ customer] strolled by]

A potential virtue of this idea is that it might help to explain certain constraints on the availability of the external reading. For example, note that an article (definite or indefinite) is required for the external reading; the presence of other determiners blocks it (44). Furthermore, the relevant adjective must be outermost for an external reading; in an interior position only an internal reading is possible (cf (45a,b)):

(44) a. Two occasional sailors strolled by. (internal reading only)
(≠ Occasionally two sailors strolled by.)
b. Every occasional sailor strolled by. (internal reading only)
(≠ Occasionally every sailor strolled by.)

(45) a. A well-dressed occasional sailor strolled by. (internal reading only)
b. An occasional well-dressed sailor strolled by. (external reading only)

Under the movement analysis, an natural idea is that the adjective requires an article as an escape-hatch out of DP, and cannot move over an intervening adjective.

Despite these virtues, however, the LF raising analysis appears dubious on the whole. For one thing, the proposal offers no account of why an element interpreted outside DP is projected within it initially. On the account being offerred, the adjective does not participate at all in the semantic composition of DP. The movement conjectured in (43) must efface the original presence of AP within DP, leaving no semantically active trace. But if the adjective does not participate in the semantic composition of DP, then what was it doing in DP in the first place?

There are empirical complications as well. Observe that an adjective inside a definite nominal corresponds to an Adv outside an indefinite nominal, and not to an Adv outside a definite nominal (47a,b). If the adjective were simply raising out of DP, past the article, we wouldn't expect an alternation in definiteness:

(46) a. The occasional customer strolled by.
= Occasionally, a customer strolled by.
≠ Occasionally, the customer strolled by.

b. Max saw the occasional customer.
= Occasionally, Max saw a customer.
≠ Occasionally, Max saw the customer.

Furthermore, consider adjectives like *odd*, which intuitively have an external reading, but which seem to lack any adverbial counterpart:[12]

(48) The odd Samoan showed up.
≠ Oddly, a Samoan showed up.

Finally, notice the curious fact that the adjectives showing the behavior in (39)-(41) are confined to adjectives of infrequency. Counterparts expressing frequency or regularity do not support an external Adv reading (44). If A were simply raising out of DP, we wouldn't expect a difference in frequency versus infrequency:

(49) a. [a frequent customer] strolled by.
(≠ Frequently a customer strolled by.)
b. Barbara saw [a regular customer].
(≠ Regularly Barbara saw a customer.)
c. [a common visitor] was seen.
(≠ A visitor was seen commonly.)

These facts suggest that more than simple LF raising, converting a nominal modifier to a verbal modifier, is at work here.

4.4.1. *A's as D's*

I believe that the phenomenon of external adverbial readings in (39)-(41) may be linked to certain definiteness phenomena observed with adjectival agreement in Scandinavian languages. Svenonius (1993) notes that Norwegian definite DPs with a prenominal adjective generally require an overt determiner (50a). The nominal inside DP occurs with a definite suffix, and D licenses this definite suffix. Interestingly, certain adjectives including *samme* 'same' and *første* 'first' are an exception to the rule just stated. These adjectives can apparently license a definite suffix on N even without the presence of an overt definite D (50b,c).

(50) a. *(det) viktige møtet
(the) important meeting.DEF 'the important first meeting'
b. samme trøtte maten
same boring food.DEF 'the same boring food'
c. første viktige møtet
first important meeting.DEF 'the first important meeting'

Interestingly, these adjectives obey a constraint similar to that observed in (45), namely: they must be outermost; if they occur inside another adjective, the definite article is required (51a); furthermore, when one of the relevant adjective occurs

without an article, it does not behave like a normal adjective insofar as it does not accept a degree modifier (51b):

(51) a. *(det) viktige første møtet
(the) important first meeting.DEF 'the important first meeting'
b. *(det) aller første møtet
(the) very first meeting.DEF 'the very first meeting'

Svenonius proposes that *samme* and *første* are "determining adjectives": adjectives that behave as determiners. I suggest this is also plausible for the adjectives in (39)-(41) on their external Adv readings. Suppose that the adjectives in question do raise, but raise to the article (52a). Suppose further that A/D complex denotes a pair quantifier over events and individuals, with a logical form roughly as in (52b), which may be read as follows: for few pairs <e,x> such that e is a part of some larger contextually given event e* and x is a customer, e is a strolling-by by x:

(52) a. [$_{DP}$ an occasional customer] strolled by.

b. INFREQ<e,x> [Π(e,e*) & customer(x)] [strolling-by(e,x)]

This appear to derive approximately the right reading, but retains our grasp on why the adjective is projected in DP: A/D quantifies over both events and nonevents.[13]

5.0. Conclusion

In this paper I have argued that a number of adjectival ambiguities typically described as intersective/nonintersective can be illuminated by importing the event analysis of Davidson (1967), originally developed for adverbs, into the semantics of NP/DP. On this account the intersective/nonintersective ambiguity arises from complexity in the semantic structure of the nominal, and not from the adjective. I have argued for the superiority of this account to the Montagovian analysis of Siegel (1976a,b), which is based on possible world semantics. But I have also shown that the event-based analysis raises many new questions, the bulk of which remain to be answered in detail. These results, though preliminary are I think sufficient to indicate the extraordinary richness of the topic area, and the powerful tool that adjectival modification offers as a probe into the semantic structure ofnominals and nominal phrases.

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NOTES

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1. Siegel's analysis has been endorsed in print as recently as Partee (1995). Another "A analysis" is the one given by DeGraff and Mandelbaum (1993), extending Higginbotham (1985), who proposes that certain adjectives represent simple intransitive predicates (e.g., red(x)), whereas others represent binary relations, which take a subject and an attribute argument provided by the noun they modify. Higginbotham suggests the latter as account of comparison class relativity in cases like *big butterfly*, represented big(x, [x: butterfly(x)]) - "big for a butterfly". DeGraff and Mandelbaum (1993) extend this analysis to an account of nonintersectivity, proposing that *beautiful dancer*, on its nonintersective reading, is to be represented beautiful(x, [x: dancer(x)]). In my opinion, DeGraff and Mandelbaum (1993) rests on a basic confusion of nonintersectivity and comparison-class-relativity. The need to separate the two is plain from the fact that *beautiful dancer* shows both parameters

of interpretation. When *beautiful dancer* is understood nonintersectively ("dances beautifully"), *beautiful* must still be understood relative to a comparison class. My daughter dances beautifully for a 6 yar old, and so is a beautiful dancer relative to that class. We thus need to distinguish beautiful-as-X (nonintersectivity) from beautiful-for-a-X (comparison-class-relativity). Attributes are employed by Higginbotham (1985) to handle the latter, and so are not available for the former. For fuller discussion, see Larson (in prep.).

2. From this perspective, the title of Siegel's dissertation is somewhat ironic.

3. Intensionality may be looked at as hidden relationality if object-language predicates are relativized to possible worlds (e.g., dancer(x,w) "dancer in world w). In this case the point would be that hidden dimension made available by possible worlds semantics is not the correct one for accounting for substitution failure with adjectival modification.

4. McConnell-Ginet (1982) puts the general point this way (where I have amended her text slightly to fit the current discussion):

> "The semantics of intensional logics is based on the construction of possible worlds. It recognizes that, although there may be identity of [dancers] and [singers] in some situations, alternative situation exists in which some [dancers] do not [sing], and vice versa. It is this possibility of alternative situations (other possible worlds), in which [dancing] and [singing] are differently distributed as properties of individuals, that is used [in a Montague-style theory] to distinguish [*dance beautifully*] from [*sing beautifully*]. But the intensional machinery does not provide a good model of how we think about WHY those [dancing beautifully] might be different from those [singing beautifully], even though [dancers] and [singers] happen to be the same. The explanation lies not in the existence of an alternative situation (where individuals have different properties), but simply in the possibility of a different sorting of the individuals, given a refinement of the sorting principles. What matters is assessing an added dimension in the given situation..." (pp.162-163).

5. These formulae are simplified, ignoring tense and the comparison class parameter in the adjective (see below).

6. Although the point is perhaps obvious, it's worth noting here that these conclusions don't bind us to the view that substitution failure with adverbs never results from intensionality. Adverbs like *possibly, necessarily* and *allegedly* are plausible candidates for such an account. The point here simply is that intensionality is not always the source of substitution failure on this view.

7. A relational valuation predicate departs from the usual valuation function "[[ ]]" of model theory. Relational valuation is adopted in Situation Semantics (see Barwise and Perry (1983), Larson (1983)).

8. For ease of reading, these representations simplify on those given in Cheirchia (1995) in leaving out the larger contextual event and the overlp relation that Chierchia discusses. See Cheirchia (1995) for details.

9. The need for middles to take a postverbal predicate is known to involve many subtleties. As noted to me by J. Gueron, negation and yes-no question formation

license middles without a postverbal predicate:

(i) a. Bread doesn't cut
b. Does bread cut (or not)?

E. Keenan points out that the need for a postverbal predicate seems to decline to the extent that the main predicate is not conventionally associated with the subject. Thus (iia) is perceived as incomplete, presumably because growth is standardly associated with living things like flowers, but (iib) seems little less odd, presumably due to the lack of such an association; consider also the pair in (iii) due to C. Schutze:

(ii) a. ?Flowers grow.
b. Crystals grow.

(iii) a. ?Bread cuts.
b. Styrafoam cuts.

I have no particular insight into these subtleties. They do not, however, appear to me to affect Condoravdi's basic point that in middles with a postverbal proedicate, the latter functions as the main assertion of an event quantification.

10. This claim may appear to be counterexemplified by cases like *This cellist is good* or *That manager is skillful*, where *good* and *skillful* seem to retain their adverbial sense ('plays well,' 'manages skillfully'). I think this is an illusion induced by an independent factor. Adjectives like *good* and *skillful* diverge from *beautiful* and *old* in allowing an *at*-complement specifying an activity:

(i) a. skill/good at playing/dancing/being a friend
b. *beautiful at dancing
c. *old at being a friend

A natural proposal is that cases like *That cellist is good* are understood with an implicit at-PP parallel to *That cellist is good at playing.* It is the implicit PP that gives the illusion of an adverbial reading in such cases. This matter is discussed further in Larson (in prep).

11. See Kitagawa (1986) for a proposal along these lines for a class of cases from Japanese that appear to raise similar problems.

12. Jeff Pelletier and Ed Keenan independentlypointed out to me the case of *odd.* I'm am grateful to Ed Keenan for the example in (48).

13. Kitagawa (1986) notes Japanese examples that may not analyzable this way. Rendaku voicing shows the As in (50) to be inside the nominal (indicated by brackets). But is seems to modify the verb (behave adverbially):

(i) a. [ko gosi]-o kagameru
little waist -ACC bend
'to bend a little/slightly at the waist'

b. [oo guti]-o akeru
wide mouth -ACC open
'to open one's mouth wide'

Kitagawa analyzes these by raising A out of N, attaching it to VP. As we've noted, this is an unattractive solution, since it only postpones the core question of why an adjective interpreted as an adverb should have been projected inside the nominal in the first place. At this point, however, it is simply unclear what to say.