ON THE EVENT SEMANTICS OF NOMINALS AND ADJECTIVES – THE ONE-ARGUMENT HYPOTHESIS[1]

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1 Events in nominals

As is well known from Bolinger (1967), Vendler (1967) and Larson (1998), among others, sentence (1) is ambiguous.

(1) Olga is a beautiful dancer.

Under one reading Olga herself is beautiful; another reading is that Olga's dancing is beautiful. Larson derives this ambiguity by treating the noun *dancer* in a Davidsonian way, as having not only an argument over individuals but also an argument over events, i.e. **dancing**(*e*,*x*). The adjective *beautiful* is a simple one-place predicate that can either apply to the individual argument, giving the "intersective" reading (with *Olga is a beautiful dancer* entailing *Olga is beautiful*) or it can apply to the event argument, which gives the non-intersective reading (where *Olga is a beautiful dancer* does not entail *Olga is beautiful*). The two analyses are given in (2a) and (2b) respectively.

(2) a. $\exists e$ [**dancing**(*e*,**olga**) $\wedge$ **beautiful**(**olga**)]
b. $\exists e$ [**dancing**(*e*,**olga**) $\wedge$ **beautiful**(*e*)]

Although conceptually attractive, Larson's analysis has two shortcomings. As we show in section 2, the introduction of an additional event argument in the noun creates problems for a compositional treatment of modification and determination. This calls for a more restricted role of events in nominals like *dancer*, closely linked to their verbal base. The second shortcoming of Larson's analysis, discussed in section 3, is that it does not straightforwardly extend to other manner adjectives, in particular *skillful*, as in *skillful surgeon*. Our proposal is that adjectives like *skillful* differ from adjectives like *beautiful* in applying not to individuals or events, but to pairs of events and entities that occupy one of their theta-roles. For instance,

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in the case of *skillful surgeon*, the pairs consist of operation events and their surgeon agents. Adjectives like *skillful* apply to such pairs.

Taken together, these two adjustments of Larson's proposal suggest a more restricted use of events when analyzing nominals like *dancer*, *surgeon*, or *king*. Events are either contributed by a verb that is part of the morphology of the noun, or are part of the pairs denoted by the noun. We will first work out the first possibility and then the second one.

2 Beautiful dancers

2.1 The problem of the event argument

Without further assumptions the introduction of an event argument in nominals leads to overgeneration. The reason is that many cases of modification (e.g. by adjectives or relatives) and all cases of quantification (by determiners) should make a distinction between the two arguments of a noun like *dancer*. Larson's proposal doesn't make such a distinction. For instance, if both the entity argument and the event argument are available for modification by *beautiful*, as in (2), then the question is why they would not be available for relative clauses (3a) or for binding with the determiner (3b).

(3) a. every dancer
  (i) $\lambda X.\forall x$ [**dancing**$(e,x) \rightarrow X(x)$]
  (ii) $\lambda X.\forall e$ [**dancing**$(e,x) \rightarrow X(e)$] (not possible)
  b. dancer that was in the bathroom
  (i) **dancing**$(e,x) \wedge$ **was-in-the-bathroom**(x)
  (ii) **dancing**$(e,x) \wedge$ **was-in-the-bathroom**(e) (not possible)

This suggests that something special happens with the event in (2), which is not possible in (3a) and (3b).

Related to this is an observation by Larson (building on Bolinger 1967) that a non-event modifier like *blonde*, coming between *beautiful* and *dancer* blocks the event reading.

(4) a. Olga is a blonde beautiful dancer.
  b. Olga is a beautiful blonde dancer.

While (4a) is ambiguous, having both the readings in (5) below, (4b) has only the reading represented in (5a).

(5) a. $\exists e$ [**dancing**$(e,$**olga**$)$ & **beautiful**$($**olga**$)$ & **blonde**$($**olga**$)$]
  b. $\exists e$ [**dancing**$(e,$**olga**$)$ & **beautiful**(e) & **blonde**$($**olga**$)$]

This is unexpected if the two arguments of *dancer* are freely accessible for modification. Larson solves this problem by connecting the two ways of applying *beautiful* to two syntactic levels. While *beautiful* can apply both at the non-intersective N-level and the intersective D-level, *blonde* can only apply at the higher level of D, which rules out (5b) for (4a). But this seems a rather brute force syntactic solution for a semantic problem.

2.2 Removing the event argument

There is an insight, going back at least to Higginbotham (1985) that nouns and verbs both have one semantic (or referential) argument. For verbs this is the Davidsonian event argument that is targeted by modifiers and bound by existential closure (see Winter & Zwarts 2011 for a compositional treatment). For nouns it is the argument that is bound by determiners and targeted by ordinary modifiers (intersective adjectives, PPs, restrictive relative clauses). In addition, a verb has one or more syntactic arguments, corresponding to the subject and objects. It is less clear that nouns also have such syntactic arguments (see Grimshaw 1990 for extensive discussion).

If this natural picture holds for nouns, then the noun *dancer* can only be a predicate over dancers, i.e. individuals who dance. There is only one semantic argument and there are no syntactic arguments. This gives us a straightforward account of the restrictions that we saw in the previous section. If there is only an argument over individuals, then what we can derive are the representations in (6) (representing intersection somewhat more economically with $\cap$).

(6) a. beautiful dancer: **beautiful**$\cap$**dancer**
b. every dancer: $\lambda X.\forall x$ [**dancer**$(x) \rightarrow X(x)$]
c. dancer that was in the bathroom: **dancer**$\cap$**that-was-in-the-bathroom**
d. blonde beautiful dancer, beautiful blond dancer: **beautiful**$\cap$**blonde**$\cap$**dancer**

But then the question is how to derive the event reading of *beautiful dancer*.

2.3 Bringing the event argument back in

Some authors have analyzed the ambiguity of *beautiful dancer* as resulting from two different orders of the adjective and the derivational suffix *-er* (Williams 2003:6, Egg 2004).

(7) a. beautiful [-er [dance]]
(the person who dances is beautiful)
b. [-er [beautiful dance]]
(the dancing of the person is beautiful)

In other words, the event is provided by the verb *dance* and it is at that level that the adjective *beautiful* applies (to the event argument of *dance*), giving us the manner reading. Splitting the predicate **dancer** into two parts allows for an ambiguity, while maintaining the restricted view in which nouns and verbs have only one semantic argument for binding and modification.

This way of analyzing *beautiful dancer* also explains why an intervening non-event adjective like *blonde* blocks the event reading, in other words, why *beautiful* needs to be close to the noun. The expression *beautiful blonde dancer* can only have the structure in (8a), in which *blonde* applies after derivation, while the expression *blonde beautiful dancer* can have not only structure (8b), but also (8c), which is the structure allowing event modification.

(8) a. beautiful [blond [-er [dance]]]
b. blond [beautiful [-er [dance]]]
c. blond [-er [beautiful [dance]]]

If this is the correct way to derive event readings, then the prediction is that only *deverbal* nouns allow event modification, since an explicit verb is necessary to provide the event. Another prediction is that this type of adjectival modification always corresponds to adverbial manner modification. If Olga is a beautiful dancer (under the event reading), then she dances beautifully, and vice versa.

In fact, the Larson-like examples that come to mind most easily are examples fitting these requirements. For instance: *heavy smoker*, *loud talker*, *fast typist*, *hard worker*, *long speaker* are all cases where the adjective can be analyzed as a manner modifier that applies to a verb before the derivational suffix applies. A phrase like *beautiful ballerina* does not seem to easily give rise to the same event reading as *beautiful dancer*, even though *ballerina* may also be intuitively associated to dancing events. Having said that, we should note that a more extensive survey of Adjective-Noun combinations is needed to determine to what extent this prediction goes through.

In working out the semantics of the derivation of *dancer* there is a choice between the two-place Davidsonian representation of the verb *dance* that we used above and a one-place Neo-Davidsonian representation (Carlson 1984, Dowty 1989, Parsons 1990). In the former option *dance* starts as a relation $\mathbf{dance}_2$ between events (the semantic argument) and individuals (the syntactic argument) and *-er* maps that relation to a one-place predicate by binding the semantic event argument and making the syntactic argument of the verb the semantic argument of the resulting noun (9a). In the latter option *dance* enters the derivation in a more basic semantic form, as a set $\mathbf{dance}_1$ of dancing events, without any thematic arguments (9b). The thematic argument is 'added' by the derivational suffix.

(9) a. *dance-er*: $\lambda x.\exists e\ [\mathbf{dance}_2(e,x)\ ]$
b. *dance-er*: $\lambda x.\exists e\ [\mathbf{dance}_1(e) \wedge \mathrm{Ag}(e) = x\ ]$

In both cases there is, before *-er* applies, an open event argument to which manner modifiers can apply.[2] For simplicity, we will assume option (9b), at this point.

Syntactically, this approach leads to what is known in the literature as a "bracketing paradox". For the semantics, we want *beautiful* to apply to the verb, but the syntax suggests that *beautiful* still applies to the noun, after *-er* has applied. The point is that the modifier has the form and position of an adjective and not of an adverb (hence, **beautifully dancer* or **dancer beautifully*). The need for different "bracketings" at different levels is well-known from the morphological literature of the eighties (e.g. Sproat 1988). An alternative that might avoid the bracketing paradox is based on the idea that the modified *dance* is not a full-fledged verb, but a categorially unspecified *root* denoting a set of dancing events. This unspecified root would be unable to license the adverbial *-ly* ending. Deciding between these alternatives involves issues of grammar architecture that we cannot explore here.

3 Skillful surgeons

3.1 *Beautiful* versus *Skillful*

As we saw in the previous section, Larson reduced a certain class of non-intersective modification constructions to intersective event modification. How does this approach extend to other classes of adjectives that also seem to behave non-intersectively? One well-known example is the adjective *skillful*. Other adjectives that seem to behave in a similar way are

[2] We ignore here the dimension that has to do with the habituality of the dancing. The existential quantifier is a very crude representation of the way in which events are quantified over in agent derivations and manner modification.

violent, *poor* and *quick*. Can modified constructions with such adjectives be treated in the same way as *beautiful dancer* or do we need to fall back on a Montagovian analysis in which *skillful* is a function from intensional properties to intensional properties (Partee 1995, Siegel 1976)?

Skillful can not simply be put in the same class as *beautiful*. First of all, *skillful* easily applies to all sorts of nouns that do not (synchronically) contain verbs (*skillful doctor*, *skillful lawyer*, *skillful poet*, etc.). Therefore, the non-intersective reading cannot come here from any verb. There are some other reasons for believing that *skillful* modification differs from *beautiful* modification. *Skillful* has a different relation with its adverbial counterpart than *beautiful*.

(10) a. John dances beautifully ⇒ John is a beautiful dancer
b. John dances skillfully ⇔ John is a skillful dancer

The reason that (10a) is not bidirectional is that adjectival modification with *beautiful* is ambiguous. The sentence *John is a beautiful dancer* only entails the adverbial sentence under the event reading of the adjectival modification construction. This object/event ambiguity seems to be missing in nominals with *skillful*. A person can be beautiful without doing anything, but it is not possible to be skillful without assuming an activity in which one can demonstrate that skill. Further, *skillful* prefers nouns that are associated with a particular activity. For instance, it is hard to interpret *skillful man* without attributing to the man some 'manly activity' that he performs skillfully, whatever that may be. In predicative constructions like *this man is skillful* the required activity in which the man is skillful is provided contextually or by an *as* phrase. Note in this connection the contrast between *she is skillful at operating* and ?*she is beautiful at dancing* (Larson 1998). Also, unlike *beautiful dancer,* where beauty may be independent of dancing, it is very difficult to interpret the skill in *skillful surgeon* independently of the person's surgery abilities: it is hard to use this expression for referring to a surgeon who is skillful as a magician, for instance. Finally, while it is natural to say *this dance is beautiful*, it sounds somewhat less natural to say *this dance is skillful*.

3.2 Events and properties

One traditional way to analyze the contrast between *beautiful*-type modification and *skillful*-type modification is by analyzing the adjective *beautiful* as a simple *et* predicate applying to entities (objects or events) that are beautiful, while analyzing the adjective *skillful* as a function from properties to properties, where properties are traditionally modeled as functions from indices to sets (or one-place predicates). Under this analysis, even if the set of surgeons is identical to the set of magicians, the sentence *He is a skillful surgeon* can be true without *He is a skillful magician* being true. This is because the property of being a surgeon is not the same as the property of being a magician, even though at a particular index the surgeons and the magicians can be identical.

The problem of this property-based analysis is that it seems to leave no room for events. This creates a gap between adjectival *skillful* (which would be property-based) and adverbial *skillfully* (which, in a Davidsonian approach of adverbs, is event-based). There is then no straightforward account of equivalences as in (10b).

Instead of taking the property-based route, we would therefore like to explore how the adjective *skillful* could be analyzed in terms of events, without becoming identical in type to *beautiful*. Our proposal is that *skillful* is interpreted by taking into account two entities at the same time: the event and an object involved in it. More specifically, we want to treat *skillful*

as a set of *pairs* consisting of an event and an individual. For the sake of concreteness, let us call such pairs *roles*, and treat them as being of a special type *r*. Nouns like *surgeon*, *author*, *poet*, *singer*, *lawyer*, can now be treated as predicates over roles (type *rt*), as opposed to ordinary predicates like *man*, which are still *et*. The combination *skillful surgeon* is interpreted intersectively, i.e. **skillful**$\cap$**surgeon**, denoting the set of roles that involve surgeons being skillful as surgeons. This set of roles cannot be modified by ordinary adjectives or by *beautiful* or be bound by determiners, so we need to map it to a set of individuals, which is accomplished by an operator **NOM** that maps roles to the individuals fulfilling those roles, by extracting the individual coordinates of the pairs. For instance, **NOM**(**surgeon**) = $\lambda x.\exists e$ [**surgeon**($\langle e,x\rangle$)]. We assume that this operator only works on nominals (simple or complex). The derivational suffix *-er*, finally, can be treated as a function from sets of events (type *et*) to sets of roles (type *rt*). For example **ER**(**dance**) will pair dance events with their agents, i.e. **ER**(**dance**) = $\lambda\langle e,x\rangle$ [**dance**(e) $\wedge$ Ag(e)=x]. With these assumptions, we can now spell out the following cases, all of type *et*.

(11)	a.	skillful surgeon:	**NOM**(**skillful**$_{rt}\cap$**surgeon**$_{rt}$)
	b.	skillful dancer:	**NOM**(**skillful**$_{rt}\cap$**ER**(**dance**$_{et}$))
	c.	skillful man:	type mismatch **skillful**$_{rt}$ and **man**$_{et}$
(12)	a.	beautiful surgeon:	**beautiful**$_{et}\cap$**NOM**(**surgeon**$_{rt}$)
	b.	beautiful dancer:	**beautiful**$_{et}\cap$**NOM**(**ER**(**dance**$_{\text{et}}$))
			NOM(**ER**(**beautiful**$_{et}\cap$**dance**$_{et}$)
	c.	beautiful man:	**beautiful**$_{et}\cap$**man**$_{et}$
(13)	a.	blond surgeon:	**blond**$_{et}\cap$**NOM**(**surgeon**$_{rt}$)
	b.	blond dancer:	**blond**$_{et}\cap$**NOM**(**ER**(**dance**$_{\text{et}}$))
	c.	blond man:	**blond**$_{et}\cap$**man**$_{et}$

Even if the surgeons and magicians are identical people, then **skillful**$\cap$**surgeon** will still be different from **skillful**$\cap$**magician**, because **surgeon** and **magician** denote different sets of *roles*. This is because the events in which surgeons and magicians are involved are different. *Surgeon* and *dancer* are both distinguished from *man* in allowing manner adjectives like *skillful*, but *dancer* has the additional option of applying modifiers to the verb.

For predicative and adverbial uses of *skillful* more work is needed. In the predicative use of *skillful*, the events come from the context (or an overt *at* phrase). Suppose that a set E of events is given in the context (e.g. dancings), then **PRED**(**skillful**) = $\lambda x.\exists e$ [$E(e)$ $\wedge$ **skilfull**($\langle e,x\rangle$)]. For the adverbial use, we assume an operator **ADV** that takes a set of roles and extracts the events from those roles. So **ADV**(**skillful**) will denote a set of events that can be intersected with the set of events denoted by **dance**, i.e. ADV(skillful) = $\lambda e.\exists$x.skillful($\langle e,x\rangle$). If a person is an element of **NOM**(**skillful**$\cap$**ER**(**dance**)), then she will also be an agent of an event in **ADV**(**skillful**)$\cap$**dance**. In this way *She is a skillful dancer* and *She dances skillfully* entail each other.

4 Conclusion

We took Larson's event-based analysis of non-intersective manner modifiers as a point of departure, but argued that the event argument should not just be added to the argument structure of the noun. In one set of cases, we suggest, the event argument comes from a verb. In another set of cases the event argument is part of a more complex role argument that couples an individual with an event in which it is involved.

These two lines are similar. They relate the adjective to something that is explicit in derivations like *dancer* (person who dances) and implicit in a non-derived noun like *surgeon* (person who operates). This kind of indirect modification is also reminiscent of Pustejovsky's qualia structure treatment of the adjective *fast* in combinations like *fast road*, *fast typist*, *fast car* (Pustejovsky 1995), a connection that is taken up in McNally (2006). We believe that our approach can help to build a more restrictive interface between lexical semantics and compositional semantics.

There is a great variety of adjectives that might involve reference to events. We have singled out only two adjectives and one class of nouns (human). How this extends to manner adjectives like *good*, *poor*, *fast* on the one hand and non-person nouns on the other hand is a question that can only answered by detailed studies of these adjectives, that does justice to both the lexical semantics of the nouns involved, but also to the compositional structure of nominals.

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