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Between being wise and acting wise: A hidden conditional in some constructions with propensity adjectives[1]

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This paper develops a semantic analysis of three constructions: (i) the subject-oriented adverb construction (*Wisely, John left early*), (ii) the 'Adj + *to* Inf' construction (*John was wise to leave early*), and (iii) the 'Adj + *of* NP' construction (*It was wise of John to leave early*), which all involve three semantic components: (i) an individual *a* (*John*), (ii) a property P_1 that describes a mental/behavioral propensity (*wise*), and (iii) another property P_2 which typically describes an action (*leave early*). I argue that the three constructions share a meaning along the lines of '$P_2(a)$, and from this it is possible to infer that $P_1(a)$', where P_1 is forced to receive the transitory interpretation, but they differ as to which component they assert/presuppose. I further demonstrate that this analysis allows us to solve two well-known semantic puzzles concerning these constructions (the 'entailment puzzle' and the 'embeddability puzzle'). The three constructions are highly amenable to the Construction Grammar approach, because their meaning cannot be derived from the intuitive meanings of their constituents and regular semantic rules only. I provide formal analyses of the three constructions in the framework of Sign-Based Construction Grammar (SBCG).

1. Introduction

This paper develops syntactic and semantic analyses of the three constructions illustrated in (1), which, for convenience, I call the subject-oriented adverb construction (so-adv-cxn), the 'Adj + *to* Inf' construction (adj-to-inf-cxn), and the 'Adj + *of* NP' construction (adj-of-np-cxn).

(1) (a) Wisely, John left early. (so-adv-cxn)
(b) John was wise to leave early. (adj-to-inf-cxn)
(c) It was wise of John to leave early. (adj-of-np-cxn)

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The adverb in a so-adv-cxn is called subject-oriented (Jackendoff 1972) because it appears to characterize the referent of the subject, rather than the event denoted by the main predicate (as in *John walked gracefully* ≈ *John walked in a graceful manner*) or the proposition denoted by the sentence (as in *Probably, John failed the exam* ≈ *It is probable that John failed the exam*).

As has been pointed out in previous studies, the three constructions are roughly synonymous (Wilkinson 1970, 1976; Jackendoff 1972; Tenny 2000).[2] The exact meaning of the three constructions, however, is harder to pin down than it may appear. In particular, there are two well-known semantic puzzles related to these constructions, which must be accounted for by any sensible analysis of them (Wilkinson 1970, 1976; Barker 2002). First, from (1a–c) we cannot infer that John is a wise person (ENTAILMENT PUZZLE). Second, the adj-to-inf-cxn and adj-of-np-cxn cannot be embedded under a predicate of intention, desire, or command, while the so-adv-cxn seems not to be subject to this constraint (EMBEDDABILITY PUZZLE).

I propose that the meaning shared by (1a–c) is along the lines of 'John left early, and from this it can be inferred that John was being wise', and demonstrate that this analysis solves both puzzles at once. Then, I will implement the proposed semantic analysis in the framework of Sign-Based Construction Grammar (Sag 2007a, Fillmore et al. forthcoming), to provide a complete picture of the syntactic and semantic aspects of the three constructions.[3]

2. BASIC PROPERTIES OF THE THREE CONSTRUCTIONS

2.1 *Semantic similarities*

Semantically, the three constructions have been said to be (roughly) equivalent (Wilkinson 1970: 430, 1976: 164–166; Jackendoff 1972: 57, among others). They all involve (i) an individual a (*John* in (1)), (ii) a property P_1 that describes a characteristic of an individual (*wise*), and (iii) another property P_2 which typically describes an action (*leave early*) as semantic components. Also, they all force a peculiar 'relativized' interpretation of P_1 (see below).

Some adverbs (adverbial forms) are ambiguous between the 'subject-oriented' use and the 'verb-oriented' use. Jackendoff (1972: 49) notes, for example, that (2a) is ambiguous between (3a) and (3b); when the adverb is

[2] They differ as to which part of their meaning they assert/presuppose; see below.

[3] In most parts of the paper, I will refer by the terms so-adv-cxn/adj-to-inf-cxn/adj-of-np-cxn (or 'the three constructions') to the *sentence types* exemplified in (1). As will become clear in section 5, however, what I will develop Construction Grammar analyses for are not these three sentence types, but rather the sentence type exemplified by (1a) and the adjectival phrase types exemplified by (1b) and (1c).

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fronted to precede the subject (as in (2)), the subject-oriented interpretation is evoked.[4]

(2) (a) John cleverly dropped his cup of coffee.
    (b) Cleverly, John dropped his cup of coffee.
(3) (a) It was clever of John to drop his cup of coffee.
    (b) The manner in which John dropped his coffee was clever.

Adjectives (adjectival bases) that can fill in the P_1 slot of the three constructions include those listed below, which all describe a mental/behavioral propensity of a sentient individual.

(4) bold, brave, careful, careless, clever, clumsy, (in)considerate, cowardly, crazy, cruel, foolish, impudent, (un)kind, mean, nice, (im)polite, right, (un)wise, wicked, wrong, smart, stupid

There is another, smaller class of adjectives which can participate in the so-adv-cxn and adj-to-inf-cxn, but seemingly not the adj-of-np-cxn.

(5) (un)lucky, (un)fortunate
(6) (a) Luckily, John passed the exam.
    (b) John was lucky to pass the exam.
    (c) ?*It was lucky of John to pass the exam.
        (cf.) It was lucky for John to pass the exam.

Following Wilkinson (1970, 1976), I call the former type of adjectives the *W*(ISE) CLASS, and the latter type the *L*(UCKY) CLASS.

Roughly, we can make the following generalizations: (i) the adj-of-np-cxn selects for the W class (and nothing else) for its P_1 slot, and (ii) the so-adv-cxn and adj-to-inf-cxn select for both the W class and the L class (and nothing else) for their P_1 slot. There seem to be some exceptions/irregularities, however. For one thing, adjectival bases like *silly* and *cowardly* do not have corresponding adverbs derived with *-ly*, or at least such forms are awkward and marginal (e.g., * ~ ??*sillily*). This apparently has to do with a phonological (dissimilatory) constraint that disfavors the sequence /ləli/.

Also, as noted by Jackendoff (1972: 57), the base *careful* is rarely used in the adj-of-np-cxn, although it appears to belong to the W class (the judgements in (7) are Jackendoff's).

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[4] It is noteworthy that in a language like Japanese subject-oriented adverbs are marked with a distinct suffix.

(i) (a) **Shinsetsu-ni-mo**, Ken-ga michi-o oshiete-kure-ta.
kindly Ken-NOM road-ACC teach-BEN-PAST
'Kindly, Ken gave me directions.'
(b) Ken-ga **shinsetsu-ni** michi-o oshiete-kure-ta.
Ken-NOM kindly road-ACC teach-BEN-PAST
'Ken gave me directions in a kind manner.'

Sentence (ia) exemplifies the Japanese version of the so-adv-cxn.

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(7) (a) Carefully, John spilled the beans.
(b) John was careful to spill the beans.
(c) *It was careful of Jonn to spill the beans.

This is probably because the sequence *careful of* evokes the 'transitive' interpretation (of *careful*) as in 'The beaver stayed in the water, because it was careful of predators', thereby obscuring the other interpretation where the same sequence is part of the adj-of-np-cxn.

There may be other exceptions, and judgements may vary across speakers as to the acceptability of certain combinations of bases and constructions.

2.2 *Syntax*

Let us next consider some basic syntactic properties of the three constructions.

2.2.1 *The subject-oriented adverb construction*

In the so-adv-cxn, *a* and P_2 are realized as the subject and the predicate of the main clause, and P_1 is realized as a (subject-oriented) adverb. In the formal analysis developed in section 5, the so-adv-cxn is given a ternary structure where the adverb, the subject, and the VP occur as sisters.

(8) $[_S\ [_{Adv}$ Wisely$]\ [_{NP}$ John$]\ [_{VP}$ left early$]]$

2.2.2 *The 'Adj + to Inf' construction*

As to the adj-to-inf-cxn, two questions may be asked regarding the status of the *to*-infinitive (P_2): (i) Is it part of the AP, or outside? (ii) Is it an adjunct or an argument (complement)? The fact that the *to*-infinitive cannot be preposed along with the adjective suggests that these two units do not form a single constituent.

(9) (a) How stupid was John __ to leave town?
(b) *How stupid to leave town was John __?
(Stowell 1991: exx. (45), (46))

This makes a contrast with adjectival phrases that consist of a head adjective and a complement or modifier phrase.[5]

[5] The sentences in (11) were collected from the following sources:
(11a): www.eurekalert.org/pub_releases/2008-03/uhh-hdi032808.php (September 15, 2008)
(11b): www.share-international.org/magazine/old_issues/2007/sept_07.htm (September 15, 2008)

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(10) (a) How eager was John [__ to leave town]?
(b) How [eager to leave town] was John __?
(Kertz 2006: exx. (30), (31))

(11) (a) How dangerous is boxing [__ for the brain]?
(b) How [dangerous for our health] are UMTS mobile masts __?

Postulating structures like (12a) or (12b), however, is not enough to account for the fact that the *to*-infinitive in the adj-to-inf-cxn resists preposing.

(12) (a) [S [NP John][VP was wise][VP to leave early]]
(b) [S [NP John][VP [V was] [A wise] [VP to leave early]]]

(13) (a) *To bring the trial to Houston, the government was smart.
(b) In bringing the trial to Houston, the government was smart.
(Kertz 2006: exx. (42), (41))

It appears that, for some reason, the *to*-infinitive of the adj-to-inf-cxn cannot be dislocated from the post-verbal position. In light of this constraint, we may as well adopt the structure in (14), where the *to*-infinitive occurs AP-internally.

(14) [S [NP John][VP was [AP wise [VP to leave early]]]]

As to question (ii), I believe that it is not feasible or necessary to give a straightforward answer (cf. Kertz 2006). The traditional argument/adjunct distinction tends to be obscured in 'non-canonical' constructions like the adj-to-inf-cxn. The *to*-infinitive is an indispensable constituent in the construction, and can be regarded as a complement in that respect; on the other hand, it may be considered an adjunct for the reason that the main predicate (adjective) does not inherently select for it.

2.2.3 *The 'Adj + of NP' construction*

The adj-of-np-cxn is an expletive construction with dummy *it*, where P_1, P_2, and *a* are realized as the main predicate, the *to*-infinitive, and the *of*-phrase, respectively.

It seems sensible to assume that this construction involves extraposition of the *to*-infinitive (Wilkinson 1970: 426). The version without extraposition tends to sound awkward/unacceptable (e.g., (15)), but this phenomenon is not specific to the adj-of-np-cxn (e.g., (16), (17)), and may well be dealt with by a separate constraint concerning surface constituent order (see Kim & Sag 2005: 41–42).[6]

[6] An anonymous reviewer notes that in related languages like German, the sentence forms corresponding to (15a) and (15b) are both acceptable. This can be taken as support for the view that the adj-of-np-cxn involves extraposition.

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(15) (a) It was nice of Kim to give me a ride.
(b) ??To give me a ride was nice of Kim.
(16) (a) Would it be better to pay now?
(b) *Would to pay now be better?
(Kim & Sag 2005: ex. (44); the judgments are theirs)
(17) (a) I made it my objective to settle the matter.
(b) *I made to settle the matter my objective.
(Kim & Sag 2005: ex. (51); the judgments are theirs)

Data like (18) suggest that the adj-of-np-cxn (with an expletive subject) has an internal structure along the lines of (19), where the adjective and the *of*-PP form a single constituent.[7]

(18) (a) How stupid of him was it to put all our oil under Iran?
(b) I have been thinking about my last diary and how stupid of me it was to mail it from China.
(19) [S [NP It][VP was [AP wise [PP of John]] [VP to leave early]]]

As in the case of the adj-to-inf-cxn, the *to*-infinitive must occur post-verbally.

(20) (a) *How stupid of John to leave town was it?
(b) *John didn't realize how stupid of him to leave town it was.

Again, I will not address the question of the argument-hood (or adjunct-hood) of the *of*-PP and *to*-infinitive.

2.3 *The 'relativized' interpretation of P*1

One intriguing issue about the three constructions is the fact that none of them appears to entail $P_1(a)$ in a straightforward way. Regarding the adj-to-inf-cxn, Barker (2002) illustrates this point with the following examples.

(21) (a) Feynman is stupid.
(b) Feynman is stupid to dance like that.

In [(21a)], Feynman is habitually stupid, or disposed or likely to behave stupid. In [(21b)], Feynman's stupidity is limited to his participation in a specific dancing event. Certainly neither sentence entails the other: Feynman might very well be stupid to dance wildly, in which case [(21b)] is

[7] The sentences in (18) were collected from the following sources:
(18a): csua.com/Politics/Foreign/MiddleEast/Iraq/?page=9#45803 (March 10, 2007)
(18b): www.defendamerica.mil/profiles/jun2004/pr062104a.html (March 10, 2007)

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> true, at the same time he is a Nobel laureate, in which case [(21a)] may very well be false. (Barker 2002: 3)

The same remark applies to the so-adv-cxn and the adj-of-np-cxn.

One may be tempted to solve this puzzle by resorting to the distinction of essential (permanent) vs. transitory (temporary) properties. Stowell (1991), in this spirit, proposes that dispositional adjectives like *stupid* and *kind* are coerced to receive a stage-level interpretation when combined with an infinitival complement.[8]

A simple analysis along these lines, however, cannot cope with the observation made by Wilkinson (1970: 432) that the adj-to-inf-cxn and the adj-of-np-cxn (but not the so-adv-cxn; see below) cannot be embedded under a predicate of intention, desire, or command (see also Barker 2002: 3, 26ff.); in the examples to follow, the diacritic # indicates unacceptability that is not necessarily caused by a syntactic reason.[9]

(22) (a) #Feynman intended [to be rude to be utterly honest].
(b) #I wanted it to be stupid of Feynman to dance like a fool.
(c) #Bob asked the man to be bold to dash into the cave.

As can be easily confirmed, transitory predicates in general do not resist embedding under intention, command, or desire predicates.

(23) (a) Feynman intended to be available.
(b) I wanted it to be sunny.
(c) Bob asked the man to be in the garden.

To account for the unembeddability of the adj-to-inf-cxn and the adj-of-np-cxn, it therefore does not suffice simply to assign a transitory interpretation to P_1. The analysis to be developed below, nevertheless, will build in 'P_1 on its transitory interpretation' as an essential component.

In the following I will assume that each W and L adjective allows both essential and transitory interpretations, and for simplicity, that the latter is

[8] As discussed in Kertz (2006), P_1 predicates of the three constructions exhibit several properties that are typical of (so-called) individual-level predicates, rather than of (so-called) stage-level predicates; e.g., (i) they do not admit the existential reading of a bare plural subject, and (ii) they cannot occur as the infinitival complement of a verb of perception such as *see*. This observation is compatible with the analysis suggested here, as such properties can be shown to be orthogonal to the notion of transitoriness (see Jäger 2001: 93ff.).

[9] A sentence like (i) appears to be acceptable and therefore to be an exception to this generalization.

(i) Bob asked the repairman to be careful to check all the bolts.

I suggest that some W adjectives including *careful* allow the result-clause interpretation of the *to*-infinitive, to the effect that (i) has a reading on which it is equivalent to (ii).

(ii) Bob asked the repairman [to be careful, so that he would check all the bolts].

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derived from the former by applying the modifier 'transitorily', without being specific about the detailed semantic relation between the two interpretations. The modifier is often implicit, but may be explicitly coded by such means as the 'progressive' form of *be*.

(24) (a) John is nice ↦ **nice**(**john**)
(b) John is being nice ↦ (**transitorily**(**nice**))(**john**)

3. Proposal

In this section, I put forth a semantic analysis of the three constructions which can cope with both the 'entailment puzzle' and the 'embeddability puzzle' mentioned above. Then, in the following section, I compare the proposed analysis with its major competitors, including the analysis of Barker (2002).

3.1 *A hidden conditional*

I propose that the meaning shared by the three constructions involves an epistemic conditional statement, and is along the lines of '*a* does P_2, and from this (and other known facts) it can be inferred that *a* is transitorily P_1'. 'John was wise to leave early', for example, can be paraphrased as 'John left early, and given that John left early, he must have been being wise', or more succinctly, 'John must have been being wise, {because/considering that} he left early'.

This analysis solves the entailment puzzle and the embeddability puzzle at once. $P_1(a)$ on its typical essential interpretation is not entailed, because the transitory interpretation is singled out. Also, under this analysis, the issue of unembeddability illustrated in (22) can be treated as a special case of the phenomenon illustrated below.[10]

(25) John is in the office, if the light is on.
(≈ It can be inferred that John is in the office, if the light is on.)
(26) #John intended [to be in the office, if the light is on].
(27) (a) #I want John [to be in the office, if the light is on].
(b) #I want it to be the case [that John is in the office, if the light is on].
(28) (a) #I asked John [to be in the office, if the light is on].
(b) #I asked [that John be in the office, if the light is on].

[10] I assume that the consequent of a conditional statement like (25) involves a covert modal operator, and thus (25) is equivalent to (i) (Kratzer 1986, von Fintel 1998).

(i) Johm must be in the office, if the light is on.

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Quite generally, statements that involve epistemic modal quantification resist embedding under predicates of intention, desire, or command.[11]

(29) Look, John left a $20 tip. He must be rich.
(30) #John intends to be such that he must be rich.
(31) (a) #I wanted John to be such that he must be rich.
(b) #I wanted it to be the case that John must be rich.
(cf.) I wanted it to be the case that John is rich.
(32) (a) #I asked John to be such that he must be rich.
(b) #I asked that John must be rich.
(cf.) I asked that John be rich.

This, intuitively, appears to be because epistemic modal statements cannot be made true by manipulating entities in the actual world, and in this sense are beyond one's intention, desire, or command. We may call this property 'uncontrollability'.[12]

It is interesting to note, in this connection, that the so-adv-cxn, in contrast to the other two constructions, is embeddable.

(33) (a) (?)Ken intended to nicely help out John.
(b) (?)Ken wanted John to wisely make a formal apology.
(c) (?)Ken asked John to boldly dash into the cave.

Sentences like (33a–c) may sound somewhat awkward, but I believe that it is only because of a 'split infinitive'.

This contrast can be attributed to the fact that the adj-to-inf-cxn and the adj-of-np-cxn on the one hand and the so-adv-cxn on the other assert/presuppose different semantic components. The adj-to-inf-cxn and the adj-of-np-cxn assert that 'from $P_2(a)$ it can be inferred that $P_1(a)$', and presupposes that '$P_2(a)$'; in the so-adv-cxn, the assertion and presupposition are switched (see below). Generally, the presupposed meaning of a complement clause is not interpreted as (part of) the target of intention, desire, etc., as can be seen from the fact that (34a) may well be true when (34b) is false (see Heim 1992, Oshima 2006).

(34) (a) Feynman wanted to manage to talk to Seinfeld.
(b) Feynman wanted it to be difficult to talk to Seinfeld.

In the adj-to-inf-cxn and the adj-of-np-cxn, the asserted component, which is the target of intention, desire, etc., is uncontrollable, and this leads to

[11] It is interesting to note that when one manipulates the modal base, the embeddability of a modal statement changes. (31a, b), for example, would be acceptable on the deontic interpretation, i.e., 'I want it to be the case that John is obliged to be rich.'

[12] It is not clear to me, however, how this property can be accounted for in formally precise terms.

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unacceptability. In the so-adv-cxn, the asserted component is controllable, and thus such a problem does not arise.

3.2 *Logical formulation*

The epistemic conditional inference of the form 'If p, then (it must be the case that) q', which is a hidden semantic component of the three constructions, can be formulated as a four-place relation that holds of (i) an epistemic modal base (i.e., a set of worlds that are compatible with the known facts), (ii) an ordering source based on stereotypicality (i.e., a set of propositions that are in accordance with the normal course of events), and (iii) two propositions, one of which serves as a restrictor of the modal base (Kratzer 1986, 1991). Ignoring the ordering source for ease of presentation, the logical form of an epistemic conditional can be approximated as:

(35) $\Box_e[p \rightarrow q]$

where $\Box_e$ is a necessity operator that quantifies over worlds that are epistemically accessible from the world of evaluation. The basic semantic format of the three constructions can then be given as follows.

(36) $P_2(a) \wedge \Box_e[P_2(a) \rightarrow (\textbf{transitorily}(P_1))(a)]$

If we instantiate a, P_1, and P_2 with 'John', 'wise', and 'leave early', we obtain the following, which can be informally paraphrased as 'John left early, and from this and other known facts, it can be inferred that John was being wise'.

(37) $\textbf{leave-early(john)} \wedge \Box_e[\textbf{leave-early(john)} \rightarrow (\textbf{transitorily}(\textbf{wise}))(\textbf{john})]$

To refute this statement, one must either convince the utterer that as a matter of fact John did not leave early, or that John was not being wise despite the fact that he left early (i.e., the presented inference does not hold).[13]

(38) A: John was wise to leave the party early.
B: No, he was not. He had to leave early only because he had a fight and broke his nose.

As mentioned above, the adj-to-inf-cxn and adj-of-np-cxn presuppose, rather than assert, $P_2(a)$ (Wilkinson 1970, Barker 2002). This can be confirmed by standard diagnoses involving negation, modal quantification, etc.

[13] It seems, curiously, that this statement cannot be refuted by stating that John *may* not have been being wise; see discussion in section 3.3 below.

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(39) (a) John was wise to leave early.
(b) John wasn't wise to leave early.
(c) Perhaps John was wise to leave early.
(40) (a) It was wise of John to leave early.
(b) It wasn't wise of John to leave early.
(c) Perhaps it was wise of John to leave early.

All the sentences in (39) and (40) entail 'John left early'. The so-adv-cxn, in contrast, asserts $P_2(a)$ and presupposes 'From $P_2(a)$ it can be inferred that $P_1(a)$'.

(41) (a) John wisely left early.
(b) Perhaps, John wisely left early.

(41b) does not entail 'John left early', but it still conveys a positive evaluation on the act of 'leaving early', just as (41a) does. By the same token, if a so-adv-cxn is embedded in the antecedent of a conditional, the entailment 'From $P_2(a)$ it can be inferred that $P_1(a)$' survives.

(42) If John wisely had left early, he wouldn't have been stabbed.

The assertion and presupposition of a statement can be expressed by a single logical formula, using the connective called PREDITIONAL (also known as PREJUNCTION, TRANSPLICATION; Blau 1985, Blamey 1986, Oshima 2006).[14]

(43) **preditional**
For any world w and assignment g, $[\![\langle \phi ; \psi \rangle]\!]^{w,g}$ is defined iff $[\![\psi]\!]^{w,g} = 1$. If defined, $[\![\langle \phi ; \psi \rangle]\!]^{w,g} = [\![\phi]\!]^{w,g}$.

In intuitive terms, a formula of the form $\langle \phi ; \psi \rangle$ represents a statement with a presupposition, ϕ and ψ corresponding to the assertion and the presupposition respectively. When ψ (the presupposition) holds true, $\langle \phi ; \psi \rangle$ is semantically equivalent to ϕ; when ψ does not hold true, on the other hand, $\langle \phi ; \psi \rangle$ is not evaluated either true or false. By way of illustration, the meaning of *John managed to escape*, which (roughly) asserts that John escaped and presupposes that it was difficult for John to escape, can be expressed as:

(44) $\langle$**escape**(**john**); **difficult-for**(**escape**, **john**)$\rangle$

[14] The preditional connective is a powerful tool, which enables us to deal with various technical issues concerning presupposition, such as projection through sub-sentential and sentential operators and the 'linking problem' concerning the presupposition of an existential statement (see Oshima 2006).

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The logical forms of (39a), (40a), and (41a) can now be given as follows:

(45) (a) (39a), (40a) ↦
〈□$_e$[**leave-early(john)**→(**transitorily(wise)**)(**john**)];
leave-early(john)〉
(b) (41a) ↦
〈**leave-early(john)**;
□$_e$[**leave-early(john)**→(**transitorily(wise)**)(**john**)]〉

3.3 *A note on evaluability*

A denial of the adj-to-inf-cxn or the adj-of-np-cxn does not appear to mean what it is predicted to mean.

(46) A: {John was wise / it was wise of John} to leave the party early.
B: That's not true. / You're wrong.

Recall that under the proposed analysis, A's utterance can be roughly paraphrased as: 'John must have been being wise, considering that he left the party early'. B's reply, thus, amounts to 'It is not the case that John must have been being wise' (='It may be the case that John was not being wise'). This, however, is not the natural interpretation of (46B), as can be confirmed by the observation that it can be naturally followed by (47a), but not by (47b).

(47) (as a continuation to (46B))
(a) He was not wise at all. He had to leave early only because he had a fight and broke his nose
(b) ?He (may or) may not have been wise.

This, however, is not a problem specific to (the conditional-based analysis of) the adj-to-inf-cxn and the adj-of-np-cxn. A similar phenomenon is attested with regular, explicit modal statements as well; an evaluation (acceptance, denial, etc.) of a modal statement is often understood as made on the 'core' proposition without a modal operator, rather than on the modal statement as a whole.

(48) A: This professor must be smart
B: That's not true. / You're wrong.
(=This professor is not smart.)
(≠ It is not true that this professor must be smart.)
B′: I agree.
(=I agree that this professor is smart.)
(≠ I agree that this professor must be smart.)
(adapted from Papafragou 2006: 1691)

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(49) A: Joe might be in Boston.
B: He can't be in Boston. I just saw him down the hall.
A: Oh, OK.
(i) Then I guess I was wrong.
(ii) #Nonetheless, when I said 'Joe might be in Boston', what I said was true.

(adapted from MacFarlane forthcoming)

The 'non-deniability' of the adj-to-inf-cxn and the adj-of-np-cxn is, thus, fully consistent with the proposed conditional-based analysis. Since these two constructions involve a strong modal operator (necessity operator) in their asserted component, it is only natural that they pattern the same with explicit modal statements like (48A) and (49A) with respect to evaluability.

In the literature on epistemic modality, it has also been pointed out that with appropriate contextual settings, an epistemic modal statement (or at least weak ones with 'might', 'possibly', etc.) can itself be a target of evaluation.

(50) (A and B are meteorologists)
A: It may rain tomorrow.
B: That's not true. / You're wrong.
(=It is not true that it may rain tomorrow.)
B′: I agree.
(=I agree that it may rain tomorrow.)

(adapted from Papafragou 2006: 1692)

Based on such observations, it has been claimed that two types of epistemic modality need to be distinguished: SUBJECTIVE (not evaluable) and OBJECTIVE (evaluable). Some scholars advocate the view that subjective modality is non-truth-conditional (outside the propositional content) and objective modality is truth-conditional (Lyons 1977, among others). Papafragou (2006), to the contrary, argues that the subjective/objective distinction can be reduced to the choice of the relevant conversational background (a set of propositions that determine the epistemic modal base); the conversational background for a subjective epistemic modal statement is the set of propositions known to the speaker at the time of utterance, while for an objective epistemic modal statement it is a set of propositions known to a larger group (e.g., {the speaker, the hearer}, an academic community) and/or known at the contextually specified time that differs from the utterance time. She further demonstrates that the evaluability puzzle illustrated above can be solved without compromising the standard, truth-conditional treatment of epistemic modality à la Kratzer.

An interesting observation regarding the adj-to-inf-cxn and the adj-of-np-cxn is that they appear to single out the subjective interpretation, to the effect

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that it is impossible to find a context where they (their asserted components) become evaluable. This may simply be because strong modal statements (with 'must', etc.) in general favor the subjective interpretation.

(51) (A and B are detectives)
A: John must have stolen the statue by himself.
B: That's not true. / You're wrong.
(i) He had an accomplice.
(ii) ?He may have had an accomplice.

Another possibility is that these constructions are inherently specialized for subjective modality (cf. Papafragou 2006: 1692). Here I leave the issue open for future discussion.

4. Comparison with alternative analyses

In this section, I examine two major previous analyses of the three constructions and point out the problems with them. In passing, I also point out that the adj-to-inf-cxn has a variant where the W/L adjective takes the comparative form, and discuss its implications.

4.1 *Wilkinson's action/event-based analysis*

Wilkinson (1976: 164ff.) suggests that a W adjective and an L adjective, when they participate in the three constructions under discussion (as well as some others), are predicated of an action (event) and a proposition, respectively. If this line of analysis is accepted, the sentences in (52) can be paraphrased as 'John left early, and John's action (act) of leaving early was wise', and (53) 'John passed the exam, and this fact (the fact that John passed the exam) was lucky for John'.

(52) (a) Wisely, John left early.
(b) John was wise to leave early.
(c) It was wise of John to leave early. (=(1))
(53) (a) Luckily, John passed the exam.
(b) John was lucky to pass the exam. (=(6))

W/L adjectives, as a matter of fact, can be predicated of individuals as well as of actions (events)/facts (propositions).

(54) (a) He is wise. / the wise man
(b) John's leaving early was wise. / His act(ion) was wise. / the wise act(ion)
(55) (a) He is lucky. / the lucky man
(b) It was lucky (for me) that it rained. / This fact is lucky. / the lucky fact

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Thus we may say that W adjectives are polysemous between a property of individuals and a property of events, and L adjectives between a property of individuals and a property of propositions (sets of worlds).

Although Wilkinson's analysis gives a straightforward solution to the entailment puzzle, it has some weaknesses, too. First, it is not clear how the ambiguity of some W adverbs (mentioned in section 2.1) can be explained. (56), for example, is ambiguous; one reading is roughly equivalent to '{It was kind of John/John was kind} to help me out', and the other 'John helped me out in a kind manner'.

(56) John kindly helped me out.

Suppose John is an employee of an electronic appliance store, whose main job is to help out customers. He is not particulary sympathetic in nature, but he takes pride in doing his job in a professional manner. In this setting, (56) may well be false on the first interpretation, when it is true on the second.

Now, on the second, 'manner' interpretation, *kindly* is clearly predicated of an event. Thus, as long as we adopt the standard ontological assumption that an action is a sort of event (Kamp & Reyle 1993: 506, among others), there seems to be no way to represent the difference between the two readings.

Furthermore, the embeddability puzzle remains unexplained under Wilkinson's analysis. That is, given that actions (events), like individuals, are inhabitants of worlds, sentences like (57) and (58) are predicted to be acceptable.

(57) #Ken asked (them) that Linda be polite to write letters of appreciation to her supporters.
(cf.) Ken asked (them) that {Linda's act(ion)/the way Linda acts} be polite.

(58) #Ken wanted Bob to be bold to challenge the world record.
(cf.) Ken wanted {Bob's act(ion)/the way Bob acts} to be bold.

4.2 *Barker's metalinguistic analysis*

Barker (2002) proposes an innovative analysis of the adj-to-inf-cxn and the adj-of-np-cxn, where the W/L adjectives participating in them are assigned a 'metalinguistic' interpretation. First, Barker observes two 'modes of use' of vague gradable predicates (which subsume W/L adjectives): descriptive and metalinguistic. When the gradable adjective *tall*, for example, is used in the normal, descriptive mode, it conveys new information concerning the (actual) world (e.g., the height of a particular individual). When it is used in the metalinguistic mode, on the other hand, it informs the hearer of how to use the word *tall* appropriately, by providing the contextually relevant standard of tallness. The descriptive use is exemplified by (59), the metalinguistic use by (60).

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(59) A: I am going to pick up Dr. Feynman at the airport. What does he look like?
B: Well, Feynman is tall.

(60) (**Situation**: Speakers A and B are at a party; Feynman stands a short distance away.)
A: What do you mean by 'if you are tall'? What counts as 'tall'?
B: Well, around here, Feynman is tall.

Building on the dynamic framework in the tradition of Heim (1982, 1983) and others, Barker argues that the descriptive use and the metalinguistic use of a vague predicate affect (update) different aspects of the context.

A descriptive use affects the common ground; (59B), for example, adds to the common ground the proposition that Feynman's maximal degree of height exceeds the contextually prevailing standard (say, 180 centimeters). A metalinguistic use, on the other hand, affects the standard of the relevant gradable adjective meaning (e.g., tallness), and thereby resolves or mitigates the vagueness of the adjective in question; (60B), which is uttered in a situation where both the speaker and the hearer can directly observe Feynman's height, does not expand the common ground at all, but only helps the interlocutors determine 'what counts as tall' (or, 'how to use the word *tall* appropriately').

To implement the idea that the standards for vague concepts too are a component of the context, the context set (in the Stalnakerian sense) may be defined, among other possibilities,[15] as a set of tuples ('information states') $\langle w, g, d \rangle$ where w is a possible world, g is an assignment function, and d is a DELINEATION – a function that maps gradable predicate meanings to standards (degrees). Suppose, when conversation (59) took place, the prevailing standard of (an adult male's) tallness was 180 centimeters; then, the utterance of speaker B has the effect of excluding from the context set those tuples whose world component w′ is such that $[\![\textit{Feynman is at least 180 cm tall}]\!]^{w'} = 0$. In the situation where the conversation (60) took place, in contrast, Feynman's height is already in the common ground – if Feynman was exactly 182 cm tall, then all information states in the context set (before and after the conversation) have a world component w′ such that $[\![\textit{Feynman is 182 cm tall}]\!]^{w'} = 1$. What the utterance of speaker B does is to exclude from the context set those tuples whose delineation component is inappropriate. If d′ is such that d′ ($[\![\textit{tall}]\!]$) = 185 cm, then $\langle w', g', d' \rangle$, $\langle w'', g', d' \rangle$, $\langle w', g'', d' \rangle$, etc. will be excluded (if a man who is 182 cm tall counts as tall, the standard of tallness cannot be as high as 185 cm); if d″ is such that d″ ($[\![\textit{tall}]\!]$) = 175 cm, then $\langle w', g', d'' \rangle$, $\langle w'', g', d'' \rangle$, $\langle w', g'', d'' \rangle$, etc. will survive (by the same reasoning, the standard of tallness may be as low as 175 cm).

[15] In Barker's (2002) formalism, an assignment function and a delineation are treated as inhabitants of worlds, and thus a context is defined simply as a set of worlds. This technical choice should not have any bearing on the discussion in the present paper.

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Regarding the adj-to-inf-cxn and the adj-of-np-cxn, Barker claims that in these constructions W/L adjectives are predicated of a proposition, and interpreted only in the metalinguistic mode of use.[16] The sentence *Feynman is stupid to dance*, for example, has no regular, descriptive entailment (putting aside the presupposition that Feynman danced), and merely narrows down the range of possible delineations, so that only those delineations according to which Feynman's dancing (the proposition that Feynman danced) counts as stupid will survive.

Barker's analysis of the adj-to-inf-cxn/adj-of-np-cxn is similar to the conditional-based analysis proposed in the previous section, building on the idea that (some aspect of) their meaning is not about the way things are in the actual world. I find problematic, however, its basic assumption that all W/L adjectives can be semantically predicated of a proposition. While all L adjectives and some W adjectives can take a clausal complement, there are some W adjectives that cannot.

(61) (a) It was lucky (for me) that John left early.
(b) It was {wise/stupid} that John left early.
(c) ?*It was {careful/careless} that John left early.

Furthermore, many W adjectives that can take a clausal complement require that the subject of the clausal complement be sentient, or at least that the event described by the clausal complement be a volitional action. This suggests that at the semantic level, these W adjectives may be predicated of an individual or a (certain kind of) event, but not of a proposition.

(62) (a) ??It was {rude/brave/kind} that the portrait of the secretary-general was removed.
(b) *It was {rude/brave/kind} that it rained.

The observation that W adjectives cannot modify a propositional noun like *fact* lends further support to this point.

(63) *a wise fact, *a careful fact, *a rude fact, *a brave fact, *a kind fact

Another problem with Barker's analysis is the fact that the W or L adjective participating in an adj-to-inf-cxn or adj-of-np-cxn may take the form of a comparative, as in:

(64) (a) John was smarter than Fred to bring a raincoat.
(b) John was luckier than Fred to survive.

[16] In Barker's (2002: 25) formulation, a W/L adjective in an adj-to-inf-cxn or adj-of-np-cxn is treated as a three-place predicate, which takes a degree d, an individual a, and a property P as its arguments. He explains that **stupid**(d, a, P) holds iff a's participation in the event $P(a)$ has a degree of stupidity that exceeds d. From this explanation, it is not clear to me (i) why a and P, rather than just $P(a)$, must occur as separate arguments of **stupid**, and (ii) whether $P(a)$ should be understood as denoting a proposition or an event. If $P(a)$ is to be understood as an event, then Barker's analysis, too, is subject to the problems I pointed out in section 4.1, in connection with Wilkinson's analysis.

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As discussed by Barker himself, the truth of a comparative statement can be determined independently from the contextually established standard for the relevant adjective, and thus comparatives cannot be interpreted in the metalinguistic mode. Therefore, the fact that a comparative may fill in the P_1 slot of the adj-to-inf-cxn clashes with Barker's claim that W/L adjectives in these constructions are used in the metalinguistic mode only.

Under the conditional-based analysis proposed above, adj-of-np-cxns with comparatives would be assigned semantic representations along the lines of (65).

(65) (a) $\langle \Box_e$[**bring-a-raincoat(john)**→(**transitorily**(**smarter**))(**john, fred**)]; **bring-a-raincoat(john)**$\rangle$
(in prose: John brought a raincoat, and from the fact that John brought a raincoat, it can be inferred that John was being smarter than Fred.)

(b) $\langle \Box_e$[**survive(john)**→(**transitorily**(**luckier**))(**john**, **fred**)]; **survive (john)**$\rangle$
(in prose: John survived, and from the fact that John survived, it can be inferred that John was being luckier than Fred.)

Are such semantic representations adequate? One may be skeptical, as (64a) and (64b) appear to entail that Fred did not bring a raincoat and that Fred did not survive, respectively, while neither of these follows from the logical forms in (65). A case can be made, however, that such entailments are only illusory. If the interlocutors are aware that John brought a raincoat and the speaker claims that it is possible to infer from this that John was being smarter than Fred, the hearer would naturally infer that Fred did not bring a raincoat, as otherwise the presented inference has no reasonable ground. To determine whether the messages in question are genuine entailments or mere implicatures, let us suppose the following.

(66) John visited Raincity, where it almost always rains. He, smartly, brought a raincoat. On the same day, Fred visited Suncity, where it is almost always hot and sunny. He meant to bring a straw hat, but mistakenly brought a raincoat.

Would (64a) be judged true under this scenario, where both John and Fred brought a raincoat? The judgment is somewhat subtle, but I believe that the answer is yes, which implies that Fred's not bringing a raincoat is not semantically entailed by (64a).

5. Construction Grammar analyses

The three constructions are amenable to the Construction Grammar approach, because their meaning cannot be derived from the intuitive meanings of their components and regular semantic rules only.

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Sentence (67a), for example, is assigned a logical form along the lines of (67b).

(67) (a) John was wise to leave early.
(b) $\langle \Box_e$[**leave-early**(**john**)→(**transitorily**(**wise**))(**john**)]; **leave-early**(**john**)$\rangle$

To derive (67b) using the regular functional application rule and meanings of the constituents alone, we would have to postulate lexical and phrasal syntax/semantics along the following lines.

(68) (a) *to leave early*
(i) semantics: λx [**leave-early**(x)]
(ii) syntactic valence: $\langle\ \rangle$ (i.e., syntactically saturated)
(b) *wise*
(i) semantics: λP [λy [$\langle \Box_e$[$P(y)$→(**transitorily**(**wise**))(y)]; $P(y)\rangle$]]
(ii) syntactic valence: ⟨NP, VP[to]⟩ (i.e., requires an NP and a *to*-infinitive)
(c) *John*
(i) semantics: **john**
(ii) syntactic valence: $\langle\ \rangle$

It seems, however, quite counter-intuitive, though not technically impossible, to posit the meaning described in (68b) for *wise*. The same point applies to the adj-of-np-cxn and the so-adv-cxn as well. To derive their sentential meanings in the classical, lexicalist manner, we would need to postulate something like:

(69) *wise* (as in *It was wise of John to leave early*)
(i) semantics:
$\lambda P[\lambda y[\langle \Box_e[P(y)\rightarrow$(**transitorily**(**wise**))(y)]; $P(y)\rangle$]]
(ii) syntactic valence: ⟨NP[it], PP[of], VP[to]⟩

(70) *wisely* (as in *Wisely, John left early*)
(i) semantics:
$\lambda P[\lambda y[\langle P(y); \Box_e[P(y)\rightarrow$(**transitorily**(**wise**))(y)]$\rangle$]]
(ii) syntactic valence: ⟨NP, VP[fin]⟩

In the following, I develop compositional analyses of the three constructions couched in the Sign-Based Construction Grammar (SBCG) framework (Sag, Wasow & Bender 2003: 469ff.; Sag 2007a, b; Fillmore et al. forthcoming), where the basic meanings of the components (P_1, P_2, and a) and the meanings induced by the constructions themselves are combined and yield the semantic representations discussed in section 3.

In the SBCG framework, linguistic objects are represented as typed feature structures. In Sag (2007a) and Fillmore et al. (forthcoming), feature structures are defined as (i) feature structure functions (sets of attribute-value pairs), (ii) atomic labels, such as `acc(usative)`, `fin(ite)`, `+`, etc., or (iii)

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referential indices (*i*, *j*, …). Additionally, I postulate that well-formed expressions of predicate logic can also be feature structures. Except for LF and CLASS, to be introduced presently, the attributes used in the feature structure descriptions below have the same intuitive roles as those with the identical names in Pollard & Sag (1994), Sag et al. (2003), Sag (2007a), and Fillmore et al. (forthcoming).

SBCG postulates two types of linguistic objects: signs and constructs, both of which are represented as feature structure functions. Signs are formal representations of linguistic expressions (i.e., words, phrases, and sentences); a sign is characterized by a set of attributes that subsumes PHON(OLOGY), SYN(TAX), and SEM(ANTICS). In Sag (2007a) and Fillmore et al. (forthcoming), the value of a SEM attribute is a feature structure function with two attributes named INDEX and FRAMES, which together constitute a frame semantic description. In the present work, I instead postulate that the value of a SEM attribute is a feature structure with three attributes: INDEX, LOGICAL FORM (LF), and CLASS. The INDEX attribute, whose value is a referential index, is necessary to deal with such linguistic phenomena as anaphora and to distinguish referential and non-referential (e.g., expletive) expressions, but it plays a minimal role in the discussion in the current work. The value of LF is an expression of higher-order logic equipped with the λ-operator and the preditional (presupposition connective). The value of CLASS is a label indicating the semantic class of the sign, which encodes such information as the count/mass property of a nominal, the lexical aspect (aktionsart) of a verb, etc. A partial representation of a lexical sign is exemplified below, in the format of an attribute-value matrix (AVM).

(71) A partial representation of the verb 'arrest'

$$\left[\begin{array}{ll} \textit{word} & \\ \textsc{phon} & /\text{ərɛst}/ \\ \textsc{syn} & \left[\begin{array}{ll} \textsc{cat} & \left[\begin{array}{ll} \textit{verb} & \\ \textsc{vform} & \texttt{base} \end{array}\right] \\ \textsc{val} & \left[\begin{array}{ll} \textsc{subj} & \left\langle \textsc{np}:\left[\textsc{sem}|\textsc{index} \quad i\right] \right\rangle \\ \textsc{comps} & \left\langle \textsc{np}:\left[\textsc{sem}|\textsc{index} \quad j\right] \right\rangle \end{array}\right] \end{array}\right] \\ \textsc{sem} & \left[\begin{array}{ll} \textsc{lf} & \lambda y[\lambda x[\mathbf{arrest}(y)(x)]] \\ \textsc{class} & \texttt{process} \end{array}\right] \end{array}\right]$$

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The other type of linguistic object, constructs, corresponds to a local tree in phrase structure grammar. A construct is defined as a function whose domain is a set of attributes that comprises MOTHER (MTR) and DAUGHTERS (DTRS); a headed construct further has the HEAD-DAUGHTER (HD-DTR) attribute. The value of MTR is a sign; the value of DTRS is a (possibly empty) list of signs.

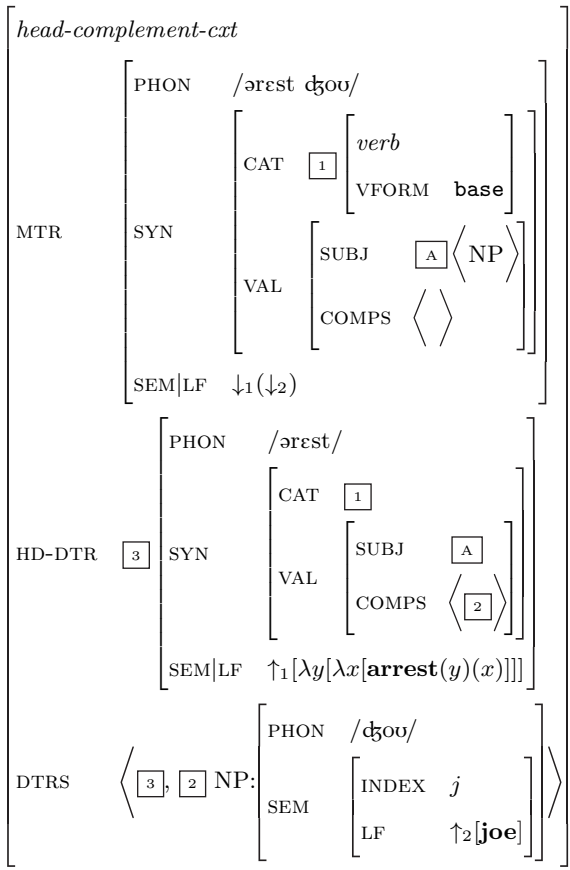
The term 'construction' refers to the description of a class of constructs; in other words, a construct (cxt) is a linguistic object licensed by a particular construction (cxn), which is a grammatical object. Whereas constructs correspond to local trees (with signs at the nodes) in phrase structure grammar, constructions correspond to phrase structure rules/schemas (e.g., 'VP→V NP'). Constructs are feature structures, and it is assumed that their specifications are always fully resolved; constructions are only descriptions of feature structures, and their specifications may be, and usually are, only partially resolved.

It must be noted that in sections 1–4 of this paper, as in many other linguistic discussions, the term 'construction' is used differently: (i) it is used ambiguously, sometimes referring to linguistic objects and sometimes to grammatical objects, and (ii) it refers exclusively to clauses (as linguistic or grammatical objects) but not to other categories such as NP's, AP's, etc. In the following, I will use the terms '([…]-)construct' and '([…]-)construction' in the SBCG sense, and use capitalized 'SO-ADV-CXN', 'ADJ-TO-INF-CXN', and 'ADJ-OF-NP-CXN' to refer to the three types of clauses under discussion.

An example of a construct is provided below (the construction that licenses it will be provided further below, in (80)).

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(72) A partial representation of a head-complement construct, whose mother sign is *arrest Joe*



For simplicity, I postulate here that NPs are invariably translated as type e expressions in the logical form.[17] Up and down arrows (with a numerical index) are (meta-)variables over logical expressions; in (72), '$\downarrow_1(\downarrow_2)$' in the mother sign is resolved as 'λx[**arrest**(**joe**)(x)]'.

A construct does not have a meaning *per se*, but it contributes to the meaning of the mother sign together with the meanings of the daughter signs. A canonical construct, such as the head-complement construct and the subject-predicate construct, merely serves as an equivalent of the functional application rule (or some other relatively simple semantic rule) in the classical Montagovian framework (see (72) above). In contrast, as will be seen

[17] This has no bearing on the validity of the analyses to follow, as the current framework can easily be combined with formal techniques like Cooper storage (Cooper 1983, Keller 1986).

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shortly, in a non-canonical construct the meaning of the mother sign can be more (or less) than what can be predicted from the meanings of the daughters.

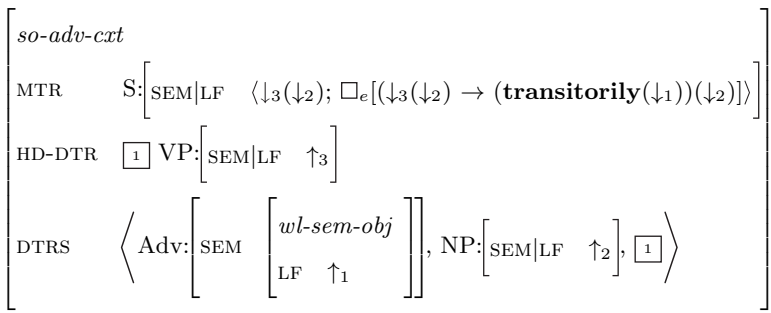
5.1 *The subject-oriented adverb construction*

In section 3, I proposed that the meaning of a SO-ADV-CXN can be represented by the following scheme, where a, P_1, and P_2 are logical translations of the subject, the (subject-oriented) adverb, and the VP, respectively.

(73) $\langle P_2(a);\ \Box_e[(P_2(a) \rightarrow (\mathbf{transitorily}(P_1))(a)]\rangle$

Below is a possible formulation of the so-adv-cxn, a construction that licenses a SO-ADV-CXN.[18]

(74) The subject-oriented adverb construction



The type *wl-sem-obj* is the immediate supertype of the two defined below (here WE_a = well-formed expression of type a).

(75) (a) *w-sem-obj*: $\begin{bmatrix} \mathrm{LF} & \mathrm{WE}_{\langle e,t\rangle} \\ \mathrm{CLASS} & \mathtt{W} \end{bmatrix}$

(b) *l-sem-obj*: $\begin{bmatrix} \mathrm{LF} & \mathrm{WE}_{\langle e,t\rangle} \\ \mathrm{CLASS} & \mathtt{L} \end{bmatrix}$

[18] The current framework does not assume a general and/or default semantics principle for the SEM|LF attribute; each construction serves as a semantic rule and specifies how to calculate the SEM|LF value of the mother sign.

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5.2 *The 'Adj+to Inf' construction*

The meaning of the ADJ-TO-INF-CXN can be represented in the following form, which is equivalent to (73) except that the assertion and the presupposition are switched.

(76) $\langle \Box_e[(P_2(a) \rightarrow (\textbf{transitorily}(P_1))(a)]; P_2(a) \rangle$

There is more than one conceivable constituent structure for the ADJ-TO-INF-CXN, and the choice largely depends on the general architecture and philosophy of the adopted syntactic framework. Here, I postulate the following (=(14)).

(77) [S [NP John][VP was [AP wise [VP to leave early]]]]

The most natural place to introduce the 'construction-specific' meaning is the AP, where, anomalously, the adjective and the *to*-infinitive form a constituent despite the fact that neither of them selects for the other.

(78) The 'Adj+*to* Inf' construction (AP; e.g., *wise to leave early*)

$$\left[\begin{array}{ll} \textit{adj-to-inf-cxt} & \\ \text{MTR} & \left[\begin{array}{ll} \text{SYN} & \left[\begin{array}{ll} \text{CAT} & \boxed{1}\left[\begin{array}{ll} \textit{adjective} & \\ \text{PRED} & + \end{array}\right] \\ \text{VAL} & \left[\begin{array}{ll} \text{SUBJ} & \langle \text{NP} \rangle \\ \text{COMPS} & \langle\ \rangle \end{array}\right] \end{array}\right] \\ \text{SEM|LF} & \lambda y[\langle \Box_e[\downarrow_2(y) \rightarrow (\textbf{transitorily}(\downarrow_1))(y)]]; \downarrow_2(y)\rangle] \end{array}\right] \\ \text{HD-DTR} & \boxed{2}\left[\begin{array}{ll} \text{SYN|CAT} & \boxed{1} \\ \text{SEM} & \left[\begin{array}{ll} \textit{wl-sem-obj} & \\ \text{LF} & \uparrow_1 \end{array}\right] \end{array}\right] \\ \text{DTRS} & \left\langle \boxed{2}, \text{VP:}\left[\begin{array}{ll} \text{SYN|CAT} & \left[\begin{array}{ll} \text{VFORM} & \texttt{base} \\ \text{INF} & + \end{array}\right] \\ \text{SEM|LF} & \uparrow_2 \end{array}\right] \right\rangle \end{array}\right]$$

Note that what is licensed by (78) is a construct whose mother sign is an adjectival phrase, rather than a clause. The+value of the SYN|CAT|PRED attribute indicates that the sign is predicative and thus can appear after *be*, as a complement of *consider*, etc. (e.g., *I consider John wise to have left early*); the+value of the SYN|CAT|INF attribute indicates that the sign is a *to*-infinitive, rather than a bare infinitive (Sag et al. 2003: 334ff., 361ff.).

The rest of the derivation is straightforward. First, the AP (the mother sign of the adj-to-inf construct) and (an appropriate form of) the auxiliary

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verb *be*, which is instantiated from the lexeme presented in (79), form a sign (VP; e.g., *was wise to leave early*) licensed by the head-complement construction presented in (80). The SEM|LF value of the mother sign is determined by sequentially applying the SEM|LF value of the head daughter to those of the complements, from left to right. Then, the VP and the subject form a sign (sentence; e.g., *John was wise to leave early*) licensed by the subject-predicate construction presented in (81).

(79)

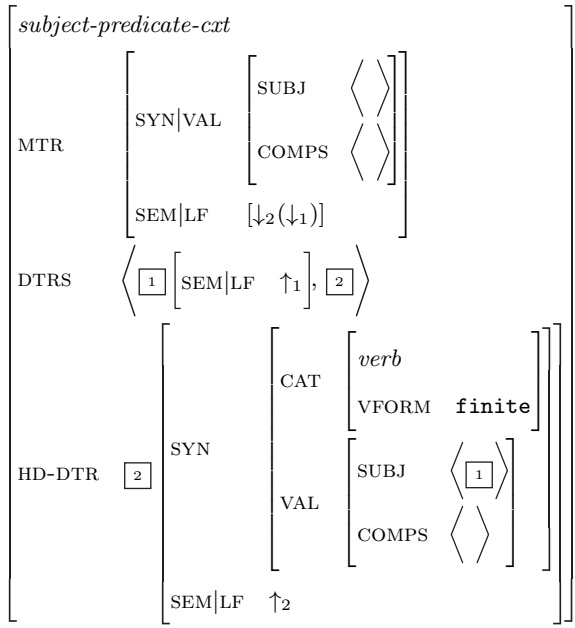
$$\left[\begin{array}{ll} \textit{be-lexeme} & \\ \textsc{phone} & /\text{bi}/ \\ \textsc{syn} & \left[\begin{array}{ll} \textsc{cat} & \left[\begin{array}{ll} \textit{verb} & \\ \textsc{aux} & + \end{array}\right] \\ \textsc{val} & \left[\begin{array}{ll} \textsc{subj} & \left\langle \boxed{1} \right\rangle \\ \textsc{comps} & \left\langle \left[\begin{array}{ll} \textsc{syn} & \left[\begin{array}{ll} \textsc{cat} & \left[\textsc{pred} \quad + \right] \\ \textsc{val} & \left[\begin{array}{ll} \textsc{subj} & \left\langle \boxed{1} \right\rangle \\ \textsc{comps} & \left\langle \right\rangle \end{array}\right] \end{array}\right] \end{array}\right] \right\rangle \end{array}\right] \end{array}\right] \\ \textsc{sem|lf} & \lambda P_{\langle \text{e,t} \rangle}[P] \end{array}\right]$$

(80)

$$\left[\begin{array}{ll} \textit{head-complement-cxt} & \\ \textsc{mtr} & \left[\begin{array}{ll} \textsc{syn|val} & \left[\begin{array}{ll} \textsc{subj} & \boxed{\text{A}} \\ \textsc{comps} & \left\langle \right\rangle \end{array}\right] \\ \textsc{sem|lf} & [\downarrow_1(\downarrow_2)(\downarrow_3)\ldots] \end{array}\right] \\ \textsc{dtrs} & \left\langle \boxed{1} \right\rangle \oplus \boxed{\text{B}} \left\langle \left[\textsc{sem|lf} \quad \uparrow_2\right], \left[\textsc{sem|lf} \quad \uparrow_3\right], \ldots \right\rangle \\ \textsc{hd-dtr} & \boxed{1} \left[\begin{array}{ll} \textit{word} & \\ \textsc{syn|val} & \left[\begin{array}{ll} \textsc{subj} & \boxed{\text{A}} \\ \textsc{comps} & \boxed{\text{B}} \end{array}\right] \\ \textsc{sem|lf} & \uparrow_1 \end{array}\right] \end{array}\right]$$

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(81)



5.3 *The 'Adj+*of *NP' construction*

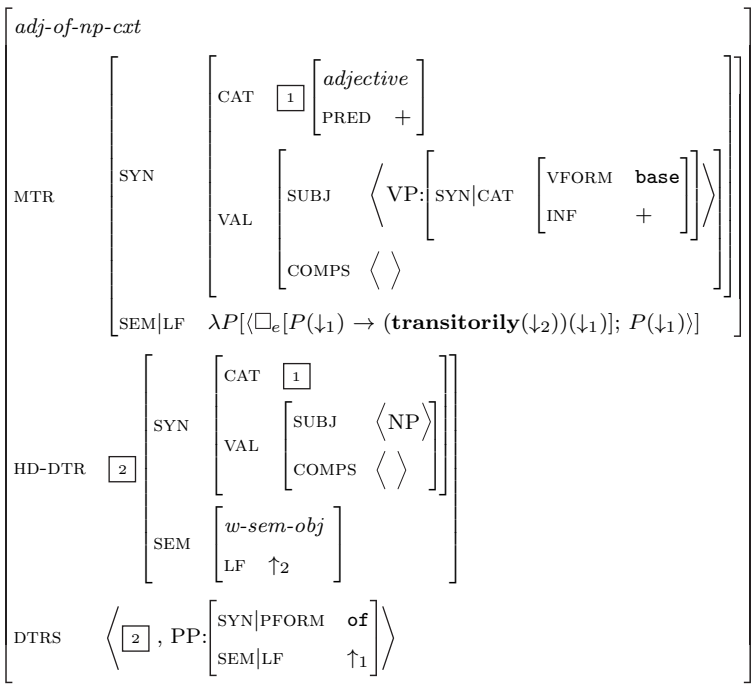
The meaning of the ADJ-OF-NP-CXN is truth-conditionally equivalent to that of the ADJ-TO-INF-CXN. As mentioned earlier, it seems sensible to assume that this construction involves extraposition and is related in some way to the structure given below.

(82) [S [VP To leave early][VP was [AP wise [PP of John]]]]

To assign (82) the appropriate meaning, the only natural place to introduce the construction-specific meaning is the AP node.

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(83) The 'Adj + *of* NP' construction (AP; e.g., *wise of John*)



The construction in (83) requires that the SEM value of the first daughter be *w-sem-obj*, rather than *wl-sem-obj*, to the effect that it does not license a phrase like *lucky of John*. To derive a sentence like (82) (with the appropriate meaning), it suffices (i) first to combine the AP (the mother sign of (83)) with the auxiliary *be* by the head-complement construction, and (ii) then to combine the resulting mother sign (VP) with the *to*-infinitive by the subject-predicate construction.[19]

The derivation of a sentence like (84), however, is less straightforward.

(84) It was wise of John to leave early.

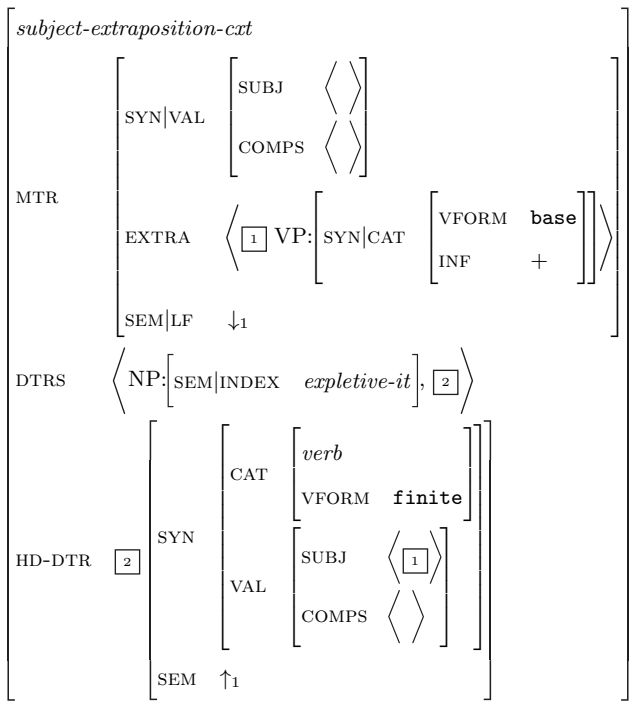
A lexical rule/construction, along the lines of those presented in Pollard & Sag (1994: 145ff.) and Sag (2007a: 41), cannot be used, as a phrase (e.g., (*was*) *wise of John*) cannot feed into it.

A possible solution is to treat extraposition as a phrasal, rather than a lexical, process, using an analog of the filler-gap construction (Sag et al. 2003: 484, Sag 2008). Specifically, I suggest postulating the following

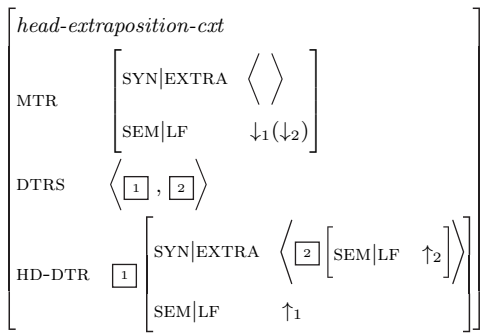
[19] As mentioned in section 2.2.3, a sentence like (82) is only marginally acceptable in English, if at all, and thus a separate rule to exclude such sentences would be needed.

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construction, which may be used as an alternative to the regular subject-predicate construction to form an expression like *it was wise of John*:

(85)


The EXTRA attribute plays a role similar to that of the GAP attribute, but its value is discharged to the right, rather than to the left, as specified by the following head-extraposition construction (Kim & Sag 2005: 202).[20]

(86)


[20] The EXTRA attribute and the head-extraposition construction are inventions of Kim & Sag (2005). The main difference between the current analysis and theirs lies in the way an item is introduced to the EXTRA list; the current analysis uses a phrasal construction and theirs uses a lexical construction.

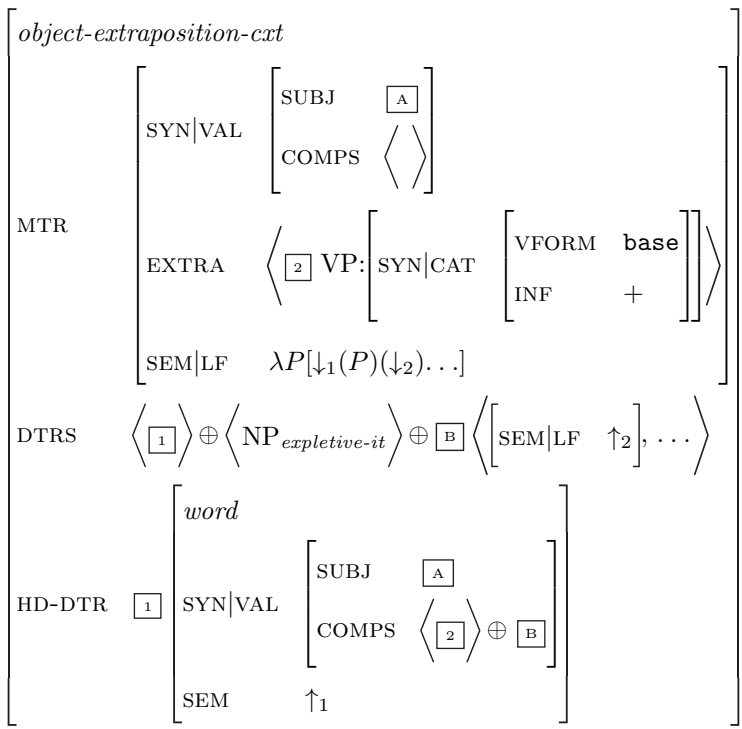
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Under this option, the internal structure of the ADJ-OF-NP-CXN will be like (87) (rather than (19)).

(87) [[S [NP It][VP was [AP wise [PP of John]]]] [VP to leave early]]

The suggested solution may not be ideal in terms of theoretical parsimony, in that it necessitates separate constructions for subject and object *it*-extraposition (cf. Kim & Sag 2005). To deal with expletive *it* in an object position (e.g., (*I*) *find it difficult to read that book*), the suggested analysis of extraposition will need to be supplemented with a separate construction, such as the following.

(88)



The mother sign of this construction would then feed into (86), thus generating a predicate phrase like *find it difficult to read that book*.

A case can be made, on the other hand, that a phrasal analysis (e.g., with constructions like (85) and (88)) may lead to a more uniform treatment of varieties of extraposition, considering that cases of adjunct extraposition like (89) appear to call for phrasal analyses anyway.

(89) A man came into the room {a. that no one knew / b. with blond hair}. (Kim & Sag 2005: ex. (42))

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In sum, the proposed phrasal constructional treatment of the ADJ-OF-NP-CXN demands a phrasal constructional treatment of extraposition, which contradicts some previous studies but nevertheless appears to be viable. The discussion in the current section contributes to the ongoing debate regarding the strength/weakness of the phrasal constructional approach in comparison to the lexical approach (Müller 2006, 2007, among others).

6. Summary

This paper has developed a semantic analysis of the three constructions called the subject-oriented adverb construction (*Wisely, John left early*), the 'Adj + *to* Inf' construction (*John was wise to leave early*), and the 'Adj + *of* NP' construction (*It was wise of John to leave early*). It was proposed that the meaning shared by the three constructions is along the lines of 'a does P_2, and from this we can infer that a is transitorily P_1' (where, for instance, P_1 = 'be wise', P_2 = 'leave early', and a = 'John'). It was further demonstrated that the proposed analysis solves two well-known semantic puzzles concerning the three constructions: (i) the entailment puzzle, and (ii) the embeddability puzzle (Wilkinson 1976, Barker 2002, among others).

The three constructions are amenable to the Construction Grammar approach, as their meaning cannot be derived from the intuitive meanings of their constituents and ordinary semantic rules alone. Formal analyses of the three constructions were provided in the Sign-Based Construction Grammar framework (Sag 2007a, Fillmore et al. forthcoming).

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